Reference = AAD 12I; EPJ C72 2046
Verifier code = ATLAS

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Kevin Einsweiler

EMAIL: einsweiler@lbl.gov

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.,* "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
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QUARKS

NODE=QXXX005

NODE=Q007

t

$I(J^P) = 0(\frac{1}{2}^+)$

NODE=Q007

Charge $= \frac{2}{3}\ e$ Top $= +1$

t-QUARK MASS

NODE=Q007210

NODE=Q007210

We first list the direct measurements of the top quark mass which employ the event kinematics and then list the measurements which extract a top quark mass from the measured $t\bar{t}$ cross-section using theory calculations. A discussion of the definition of the top quark mass in these measurements can be found in the review "The Top Quark."

OUR EVALUATION of $173.07 \pm 0.52 \pm 0.72$ GeV is an average of published top mass measurements from Tevatron Runs. The LHC experiments are working on a combined average that should appear in the 2014 PDG edition once the correlated uncertainties between experiments are understood. The Tevatron average was provided by the Tevatron Electroweak Working Group (TEVEWWG). It takes correlated uncertainties into account and has a χ^2 of 8.4 for 11 degrees of freedom.

For earlier search limits see PDG 96, Physical Review **D54** 1 (1996). We no longer include a compilation of indirect top mass determinations from Standard Model Electroweak fits in the Listings (our last compilation can be found in the Listings of the 2007 partial update). For a discussion of current results see the reviews "The Top Quark" and "Electroweak Model and Constraints on New Physics."

t-Quark Mass (Direct Measurements)

NODE=Q007TP

NODE=Q007TP

The following measurements extract a t-quark mass from the kinematics of $t\bar{t}$ events. They are sensitive to the top quark mass used in the MC generator that is usually interpreted as the pole mass, but the theoretical uncertainty in this interpretation is hard to quantify. See the review "The Top Quark" and references therein for more information.

NODE=Q007TP

	VALUE (GeV)	DOCUMENT ID		TECN	COMMENT
	173.07± 0.52± 0.72 OUR EVALUATION	See comments in the header above.			
	[173.5 ± 0.6 ± 0.8 GeV OUR 2012 EVALUATION]				
YOUR DATA	174.5 ± 0.6 ± 2.3	[1] AAD	12I	ATLS	$\ell+\not{E}_T+\geq 4$ jets (≥ 1 b), MT
	172.85± 0.71± 0.85	[2] AALTONEN	12AI	CDF	$\ell+\not{E}_T+\geq 4$j (0,1,2b) template
	172.7 ± 9.3 ± 3.7	[3] AALTONEN	12AL	CDF	$\tau_h + \not{E}_T$ +4j ($\geq 1b$)
	172.5 ± 1.4 ± 1.5	[4] AALTONEN	12G	CDF	6–8 jets with ≥ 1 b
	173.9 ± 1.9 ± 1.6	[5] ABAZOV	12AB	D0	$\ell\ell+\not{E}_T+\geq 2$j ($\nu$WT+MWT)
	172.5 ± 0.4 ± 1.5	[6] CHATRCHYAN	12BA	CMS	$\ell\ell+\not{E}_T+\geq 2$j ($\geq 1b$), AMWT
	173.49± 0.43± 0.98	[7] CHATRCHYAN	12BP	CMS	$\ell+\not{E}_T+\geq 4$j ($\geq 2b$)
	172.3 ± 2.4 ± 1.0	[8] AALTONEN	11AK	CDF	$\not{E}_T + \geq 4$ jets (≥ 1 b-tag)
	172.1 ± 1.1 ± 0.9	[9] AALTONEN	11E	CDF	ℓ + jets and dilepton
	174.94± 0.83± 1.24	[10] ABAZOV	11P	D0	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag)
	173.0 ± 1.2	[11] AALTONEN	10AE	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag), ME method
	170.7 ± 6.3 ± 2.6	[12] AALTONEN	10D	CDF	$\ell + \not{E}_T$ + 4 jets (b-tag)
	180.1 ± 3.6 ± 3.9	[13,14] ABAZOV	04G	D0	lepton + jets
	176.1 ± 5.1 ± 5.3	[15] AFFOLDER	01	CDF	lepton + jets
	167.4 ±10.3 ± 4.8	[16,17] ABE	99B	CDF	dilepton
	168.4 ±12.3 ± 3.6	[14] ABBOTT	98D	D0	dilepton
	186 ±10 ± 5.7	[16,18] ABE	97R	CDF	6 or more jets
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	173.18± 0.56± 0.75	[19] AALTONEN	12AP	TEVA	CDF, D0 combination
	173.7 ± 2.8 ± 1.5	[20] ABAZOV	12AB	D0	$\ell\ell + \not{E}_T + \geq 2$ j (νWT)
	172.4 ± 1.4 ± 1.3	[21] AALTONEN	11AC	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag)
	176.9 ± 8.0 ± 2.7	[22] AALTONEN	11T	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag), $p_T(\ell)$ shape
	174.0 ± 1.8 ± 2.4	[23] ABAZOV	11R	D0	dilepton + $\not{E}_T + \geq 2$ jets
	175.5 ± 4.6 ± 4.6	[24] CHATRCHYAN	11F	CMS	dilepton + $\not{E}_T$ + jets
	169.3 ± 2.7 ± 3.2	[25] AALTONEN	10C	CDF	dilepton + b-tag (MT2+NWA)
	174.8 ± 2.4 $^{+1.2}_{-1.0}$	[26] AALTONEN	10E	CDF	≥ 6 jets, vtx b-tag

NEW;→ UNCHECKED ←

OCCUR=2

OCCUR=2

$180.5 \pm 12.0 \pm 3.6$	[27] AALTONEN	09AK	CDF	$\ell + \not{E}_T$ + jets (soft μ b-tag)	
$172.7 \pm 1.8 \pm 1.2$	[28] AALTONEN	09J	CDF	$\ell + \not{E}_T$ + 4 jets (b-tag)	
$171.1 \pm 3.7 \pm 2.1$	[29] AALTONEN	09K	CDF	6 jets, vtx b-tag	
$171.9 \pm 1.7 \pm 1.1$	[30] AALTONEN	09L	CDF	ℓ + jets, $\ell\ell$ + jets	
$171.2 \pm 2.7 \pm 2.9$	[31] AALTONEN	09O	CDF	dilepton	
$165.5 {}^{+3.4}_{-3.3} \pm 3.1$	[32] AALTONEN	09X	CDF	$\ell\ell + \not{E}_T$ ($\nu\phi$ weighting)	
$174.7 \pm 4.4 \pm 2.0$	[33] ABAZOV	09AH	D0	dilepton + b-tag (νWT+MWT)	
$170.7 {}^{+4.2}_{-3.9} \pm 3.5$	[34,35] AALTONEN	08C	CDF	dilepton, $\sigma_{t\bar{t}}$ constrained	
$171.5 \pm 1.8 \pm 1.1$	[36] ABAZOV	08AH	D0	$\ell + \not{E}_T$ + 4 jets	
$177.1 \pm 4.9 \pm 4.7$	[37,38] AALTONEN	07	CDF	6 jets with ≥ 1 b vtx	
$172.3 {}^{+10.8}_{-9.6} \pm 10.8$	[39] AALTONEN	07B	CDF	≥ 4 jets (b-tag)	
$174.0 \pm 2.2 \pm 4.8$	[40] AALTONEN	07D	CDF	≥ 6 jets, vtx b-tag	
$170.8 \pm 2.2 \pm 1.4$	[41,42] AALTONEN	07I	CDF	lepton + jets (b-tag)	
$173.7 \pm 4.4 {}^{+2.1}_{-2.0}$	[38,43] ABAZOV	07F	D0	lepton + jets	
$176.2 \pm 9.2 \pm 3.9$	[44] ABAZOV	07W	D0	dilepton (MWT)	
$179.5 \pm 7.4 \pm 5.6$	[44] ABAZOV	07W	D0	dilepton (νWT)	OCCUR=2
$164.5 \pm 3.9 \pm 3.9$	[42,45] ABULENCIA	07D	CDF	dilepton	
$180.7 {}^{+15.5}_{-13.4} \pm 8.6$	[46] ABULENCIA	07J	CDF	lepton + jets	
$170.3 {}^{+4.1}_{-4.5} {}^{+1.2}_{-1.8}$	[42,47] ABAZOV	06U	D0	lepton + jets (b-tag)	
$173.2 {}^{+2.6}_{-2.4} \pm 3.2$	[48,49] ABULENCIA	06D	CDF	lepton + jets	
$173.5 {}^{+3.7}_{-3.6} \pm 1.3$	[35,48] ABULENCIA	06D	CDF	lepton + jets	OCCUR=2
$165.2 \pm 6.1 \pm 3.4$	[42,50] ABULENCIA	06G	CDF	dilepton	
$170.1 \pm 6.0 \pm 4.1$	[35,51] ABULENCIA	06V	CDF	dilepton	
$178.5 \pm 13.7 \pm 7.7$	[52,53] ABAZOV	05	D0	6 or more jets	
176.1 ± 6.6	[54] AFFOLDER	01	CDF	dilepton, lepton+jets, all-jets	OCCUR=2
$172.1 \pm 5.2 \pm 4.9$	[55] ABBOTT	99G	D0	di-lepton, lepton+jets	
176.0 ± 6.5	[17,56] ABE	99B	CDF	dilepton, lepton+jets, all-jets	
$173.3 \pm 5.6 \pm 5.5$	[14,57] ABBOTT	98F	D0	lepton + jets	
$175.9 \pm 4.8 \pm 5.3$	[16,58] ABE	98E	CDF	lepton + jets	
$161 \pm 17 \pm 10$	[16] ABE	98F	CDF	dilepton	
$172.1 \pm 5.2 \pm 4.9$	[59] BHAT	98B	RVUE	dilepton and lepton+jets	
173.8 ± 5.0	[60] BHAT	98B	RVUE	dilepton, lepton+jets, all-jets	OCCUR=2
$173.3 \pm 5.6 \pm 6.2$	[14] ABACHI	97E	D0	lepton + jets	
$199 {}^{+19}_{-21} \pm 22$	ABACHI	95	D0	lepton + jets	
$176 \pm 8 \pm 10$	ABE	95F	CDF	lepton + b-jet	
$174 \pm 10 {}^{+13}_{-12}$	ABE	94E	CDF	lepton + b-jet	

[1] Based on 1.04 fb^{-1} of data at LHC7. Uses 2d-template analysis (MT) with m_t and jet energy scale factor (JSF) from m_W mass fit. NODE=Q007TP;LINKAGE=GD

[2] Based on 8.7 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. The JES is calibrated by using the dijet mass from the W boson decay. NODE=Q007TP;LINKAGE=CL

[3] Use the ME method based on 2.2 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. NODE=Q007TP;LINKAGE=CD

[4] Based on 5.8 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. The quoted systematic error is the sum of JES($\pm$1.0) and systematic($\pm$1.0) uncertainties. The measurement is performed with a liklihood fit technique which simultaneously determines m_t and JES. NODE=Q007TP;LINKAGE=OA

[5] Combination with the result in 1 fb^{-1} of preceding data reported in ABAZOV 09AH as well as the MWT result of ABAZOV 11R with a statistical correlation of 60%. NODE=Q007TP;LINKAGE=VB

[6] Based on 5.0 fb^{-1} of data at LHC7. Uses an analytical matrix weighting technique (AMWT) and full kinematic analysis (KIN). NODE=Q007TP;LINKAGE=CA

[7] Based on 5.0 fb^{-1} of data at LHC7. The first error is statistical and JES combined, and the second is systematic. Ideogram method is used to obtain 2D liklihood for the kinematical fit with two parameters mtop and JES. NODE=Q007TP;LINKAGE=RC

[8] Based on 5.7 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. Events with an identified charged lepton or small $\not{E}_T$ are rejected from the event sample, so that the measurement is statistically independent from those in the ℓ + jets and all hadronic channels while being sensitive to those events with a τ lepton in the final state. Supersedes AALTONEN 07B. NODE=Q007TP;LINKAGE=TL

[9] Based on 5.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. Employs a multi-dimensional template likelihood technique where the lepton plus jets (one or two b-tags) channel gives $172.2 \pm 1.2 \pm 0.9$ GeV while the dilepton channel yields $170.3 \pm 2.0 \pm 3.1$ GeV. The results are combined. OUR EVALUATION includes the measurement in the dilepton channel only. NODE=Q007TP;LINKAGE=NT

[10] Based on 3.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. ABAZOV 11P reports $174.94 \pm 0.83 \pm 0.78 \pm 0.96$ GeV, where the first uncertainty is from statistics, the second from JES, and the last from other systematic uncertainties. We combine the JES and systematic uncertainties. A matrix-element method is used where the JES uncertainty is constrained NODE=Q007TP;LINKAGE=ZA

by the W mass. ABAZOV 11P describes a measurement based on 2.6 fb^{-1} that is combined with ABAZOV 08AH, which employs an independent 1 fb^{-1} of data.

[11] Based on 5.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The likelihood calculated using a matrix element method gives m_t = 173.0 ± 0.7(stat)±0.6(JES)±0.9(syst) GeV, for a total uncertainty of 1.2 GeV. NODE=Q007TP;LINKAGE=NA

[12] Based on 1.9 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The result is from the measurement using the transverse decay lenght of b-hadrons and that using the transverse momentum of the W decay muons, which are both insensitive to the JES (jet energy scale) uncertainty. OUR EVALUATION uses only the measurement exploiting the decay length significance which yields $166.9^{+9.5}_{-8.5}$(stat)±2.9 (syst) GeV. The measurement that uses the lepton transverse momentum is excluded from the average because of a statistical correlation with other samples. NODE=Q007TP;LINKAGE=AE

[13] Obtained by re-analysis of the lepton + jets candidate events that led to ABBOTT 98F. It is based upon the maximum likelihood method which makes use of the leading order matrix elements. NODE=Q007TP;LINKAGE=AO

[14] Based on 125 ± 7 pb^{-1} of data at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=WW

[15] Based on ∼ 106 pb^{-1} of data at $\sqrt{s}$= 1.8 TeV. NODE=Q007TP;LINKAGE=F1

[16] Based on 109 ± 7 pb^{-1} of data at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=XX

[17] See AFFOLDER 01 for details of systematic error re-evaluation. NODE=Q007TP;LINKAGE=XZ

[18] Based on the first observation of all hadronic decays of $t\overline{t}$ pairs. Single b-quark tagging with jet-shape variable constraints was used to select signal enriched multi-jet events. The updated systematic error is listed. See AFFOLDER 01, appendix C. NODE=Q007TP;LINKAGE=AR

[19] Combination based on up to 5.8 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. NODE=Q007TP;LINKAGE=EA

[20] Based on 4.3 fb^{-1} of data in p-pbar collisions at 1.96 TeV. The measurement reduces the JES uncertainty by using the single lepton channel study of ABAZOV 11P. NODE=Q007TP;LINKAGE=VA

[21] Based on 3.2 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and JES combined, and the latter is from the other systematic uncertainties. The result is obtained using an unbinned maximum likelihood method where the top quark mass and the JES are measured simultaneously, with Δ_{JES} = 0.3 ± 0.3(stat). NODE=Q007TP;LINKAGE=NL

[22] Uses a likelihood fit of the lepton p_T distribution based on 2.7 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=NN

[23] Based on a matrix-element method which employs 5.4 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. Superseded by ABAZOV 12AB. NODE=Q007TP;LINKAGE=OZ

[24] Based on 36 pb^{-1} of pp collisions at $\sqrt{s}$ = 7 TeV. A Kinematic Method using b-tagging and an analytical Matrix Weighting Technique give consistent results and are combined. Superseded by CHATRCHYAN 12BA. NODE=Q007TP;LINKAGE=CH

[25] Based on 3.4 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The result is obtained by combining the MT2 variable method and the NWA (Neutrino Weighting Algorithm). The MT2 method alone gives $m_t = 168.0^{+4.8}_{-4.0}$(stat)±2.9(syst) GeV with smaller systematic error due to small JES uncertainty. NODE=Q007TP;LINKAGE=TA

[26] Based on 2.9 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and JES uncertainty, and the latter is from the other systematics. Neural-network-based kinematical selection of 6 highest E_T jets with a vtx b-tag is used to distinguish signal from background. Superseded by AALTONEN 12G. NODE=Q007TP;LINKAGE=LN

[27] Based on 2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The top mass is obtained from the measurement of the invariant mass of the lepton (e or μ) from W decays and the soft μ in b-jet. The result is insensitive to jet energy scaling. NODE=Q007TP;LINKAGE=NO

[28] Based on 1.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and jet energy scale uncertainty, and the latter is from the other systematics. Matrix element method with effective propagators. NODE=Q007TP;LINKAGE=LO

[29] Based on 943 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistical and jet-energy-scale uncertainties, and the latter is from other systematics. AALTONEN 09K selected 6 jet events with one or more vertex b-tags and used the tree-level matrix element to construct template models of signal and background. NODE=Q007TP;LINKAGE=OT

[30] Based on 1.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistical and jet-energy-scale (JES) uncertainties, and the second is from other systematics. Events with lepton + jets and those with dilepton + jets were simultaneously fit to constrain m_t and JES. Lepton + jets data only give m_t = 171.8 ± 2.2 GeV, and dilepton data only give $m_t = 171.2^{+5.3}_{-5.1}$ GeV. NODE=Q007TP;LINKAGE=EN

[31] Based on 2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Matrix Element method. Optimal selection criteria for candidate events with two high p_T leptons, high $\not{E}_T$, and two or more jets with and without b-tag are obtained by neural network with neuroevolution technique to minimize the statistical error of m_t. NODE=Q007TP;LINKAGE=TE

[32] Based on 2.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Mass m_t is estimated from the likelihood for the eight-fold kinematical solutions in the plane of the azimuthal angles of the two neutrino momenta. NODE=Q007TP;LINKAGE=ON

[33] Based on 1 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Events with two identified leptons, and those with one lepton plus one isolated track and a b-tag were used to constrain m_t. The result is a combination of the νWT (ν Weighting Technique) result of 176.2 ± 4.8 ± 2.1 GeV and the MWT (Matrix-element Weighting Technique) result of 173.2 ± 4.9 ± 2.0 GeV. NODE=Q007TP;LINKAGE=ZV

[34] Reports measurement of $170.7^{+4.2}_{-3.9} \pm 2.6 \pm 2.4$ GeV based on 1.2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The last error is due to the theoretical uncertainty on $\sigma_{t\bar{t}}$. Without the cross-section constraint a top mass of $169.7^{+5.2}_{-4.9} \pm 3.1$ GeV is obtained. NODE=Q007TP;LINKAGE=AN

[35] Template method. NODE=Q007TP;LINKAGE=BC

[36] Result is based on 1 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and jet energy scale uncertainty, and the latter is from the other systematics. NODE=Q007TP;LINKAGE=BV

[37] Based on 310 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=TN

[38] Ideogram method. NODE=Q007TP;LINKAGE=TO

[39] Based on 311 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Events with 4 or more jets with $E_T >$ 15 GeV, significant missing E_T, and secondary vertex b-tag are used in the fit. About 44% of the signal acceptance is from $\tau\nu$ + 4 jets. Events with identified e or μ are vetoed to provide a statistically independent measurement. NODE=Q007TP;LINKAGE=LT

[40] Based on 1.02 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Superseded by AALTONEN 12G. NODE=Q007TP;LINKAGE=NE

[41] Based on 955 pb^{-1} of data $\sqrt{s}$ = 1.96 TeV. m_t and JES (Jet Energy Scale) are fitted simultaneously, and the first error contains the JES contribution of 1.5 GeV. NODE=Q007TP;LINKAGE=LA

[42] Matrix element method. NODE=Q007TP;LINKAGE=UB

[43] Based on 425 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is a combination of statistics and JES (Jet Energy Scale) uncertainty, which has been measured simultaneously to give JES = 0.989 ± 0.029(stat). NODE=Q007TP;LINKAGE=OV

[44] Based on 370 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Combined result of MWT (Matrix-element Weighting Technique) and νWT (ν Weighting Technique) analyses is 178.1 ± 6.7 ± 4.8 GeV. NODE=Q007TP;LINKAGE=ZO

[45] Based on 1.0 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. ABULENCIA 07D improves the matrix element description by including the effects of initial-state radiation. NODE=Q007TP;LINKAGE=LE

[46] Based on 695 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The transverse decay length of the b hadron is used to determine m_t, and the result is free from the JES (jet energy scale) uncertainty. NODE=Q007TP;LINKAGE=UL

[47] Based on ∼ 400 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error includes statistical and systematic jet energy scale uncertainties, the second error is from the other systematics. The result is obtained with the b-tagging information. The result without b-tagging is $169.2^{+5.0}_{-7.4}{}^{+1.5}_{-1.4}$ GeV. Superseded by ABAZOV 08AH. NODE=Q007TP;LINKAGE=BZ

[48] Based on 318 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=BA

[49] Dynamical likelihood method. NODE=Q007TP;LINKAGE=BB

[50] Based on 340 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=UA

[51] Based on 360 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=AL

[52] Based on 110.2 ± 5.8 pb^{-1} at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=AA

[53] Based on the all hadronic decays of $t\bar{t}$ pairs. Single b-quark tagging via the decay chain $b \rightarrow c \rightarrow \mu$ was used to select signal enriched multijet events. The result was obtained by the maximum likelihood method after bias correction. NODE=Q007TP;LINKAGE=AZ

[54] Obtained by combining the measurements in the lepton + jets [AFFOLDER 01], all-jets [ABE 97R, ABE 99B], and dilepton [ABE 99B] decay topologies. NODE=Q007TP;LINKAGE=F2

[55] Obtained by combining the D0 result m_t (GeV) = 168.4 ± 12.3 ± 3.6 from 6 di-lepton events (see also ABBOTT 98D) and m_t (GeV) = 173.3 ± 5.6 ± 5.5 from lepton+jet events (ABBOTT 98F). NODE=Q007TP;LINKAGE=DG

[56] Obtained by combining the CDF results of m_t (GeV)=167.4 ± 10.3 ± 4.8 from 8 dilepton events, m_t (GeV)=175.9 ± 4.8 ± 5.3 from lepton+jet events (ABE 98E), and m_t (GeV)=186.0 ± 10.0 ± 5.7 from all-jet events (ABE 97R). The systematic errors in the latter two measurements are changed in this paper. NODE=Q007TP;LINKAGE=BG

[57] See ABAZOV 04G. NODE=Q007TP;LINKAGE=AT

[58] The updated systematic error is listed. See AFFOLDER 01, appendix C. NODE=Q007TP;LINKAGE=XY

[59] Obtained by combining the DØ results of m_t(GeV)=168.4 ± 12.3 ± 3.6 from 6 dilepton events and m_t(GeV)=173.3 ± 5.6 ± 5.5 from 77 lepton+jet events. NODE=Q007TP;LINKAGE=BE

[60] Obtained by combining the DØ results from dilepton and lepton+jet events, and the CDF results (ABE 99B) from dilepton, lepton+jet events, and all-jet events. NODE=Q007TP;LINKAGE=BF

t-Quark REFERENCES

NODE=Q007

YOUR PAPER	AAD	12I	EPJ C72 2046	G. Aad *et al.*	(ATLAS Collab.)	REFID=54125
	AALTONEN	12AI	PRL 109 152003	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54597
	AALTONEN	12AL	PRL 109 192001	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54600
	AALTONEN	12AP	PR D86 092003	T. Aaltonen *et al.*	(CDF, D0 Collab.)	REFID=54700
	AALTONEN	12G	PL B714 24	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54192
	ABAZOV	12AB	PR D86 051103	V.M. Abazov *et al.*	(D0 Collab.)	REFID=54604
	CHATRCHYAN	12BA	EPJ C72 2202	S. Chatrchyan *et al.*	(CMS Collab.)	REFID=54677
	CHATRCHYAN	12BP	JHEP 1212 105	S. Chatrchyan *et al.*	(CMS Collab.)	REFID=54779
	AALTONEN	11AC	PR D84 071105	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53800
	AALTONEN	11AK	PRL 107 232002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53944
	AALTONEN	11E	PR D83 111101	T. Aaltonen *et al.*	(CDF Collab.)	REFID=16429
	AALTONEN	11T	PL B698 371	T. Aaltonen *et al.*	(CDF Collab.)	REFID=16459
	ABAZOV	11P	PR D84 032004	V.M. Abazov *et al.*	(D0 Collab.)	REFID=53708
	ABAZOV	11R	PRL 107 082004	V.M. Abazov *et al.*	(D0 Collab.)	REFID=53710
	CHATRCHYAN	11F	JHEP 1107 049	S. Chatrchyan *et al.*	(CMS Collab.)	REFID=16357
	AALTONEN	10AE	PRL 105 252001	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53561
	AALTONEN	10C	PR D81 031102	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53266
	AALTONEN	10D	PR D81 032002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53267
	AALTONEN	10E	PR D81 052011	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53268

AALTONEN	09AK	PR D80 051104	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53018
AALTONEN	09J	PR D79 072001	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52804
AALTONEN	09K	PR D79 072010	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52805
AALTONEN	09L	PR D79 092005	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52806
AALTONEN	09O	PRL 102 152001	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52854
AALTONEN	09X	PR D79 072005	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52881
ABAZOV	09AH	PR D80 092006	V.M. Abazov *et al.*	(D0 Collab.)	REFID=53080
AALTONEN	08C	PRL 100 062005	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52193
ABAZOV	08AH	PRL 101 182001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52548
AALTONEN	07	PRL 98 142001	T. Aaltonen *et al.*	(CDF Collab.)	REFID=51684
AALTONEN	07B	PR D75 111103	T. Aaltonen *et al.*	(CDF Collab.)	REFID=51802
AALTONEN	07D	PR D76 072009	T. Aaltonen *et al.*	(CDF Collab.)	REFID=51996
AALTONEN	07I	PRL 99 182002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52044
ABAZOV	07F	PR D75 092001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=51792
ABAZOV	07W	PL B655 7	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52026
ABULENCIA	07D	PR D75 031105	A. Abulencia *et al.*	(CDF Collab.)	REFID=51683
ABULENCIA	07J	PR D75 071102	A. Abulencia *et al.*	(CDF Collab.)	REFID=51783
ABAZOV	06U	PR D74 092005	V.M. Abazov *et al.*	(D0 Collab.)	REFID=51503
ABULENCIA	06D	PRL 96 022004	A. Abulencia *et al.*	(CDF Collab.)	REFID=51102
Also		PR D73 032003	A. Abulencia *et al.*	(CDF Collab.)	REFID=51103
Also		PR D73 092002	A. Abulencia *et al.*	(CDF Collab.)	REFID=51306
ABULENCIA	06G	PRL 96 152002	A. Abulencia *et al.*	(CDF Collab.)	REFID=51104
Also		PR D74 032009	A. Abulencia *et al.*	(CDF Collab.)	REFID=51329
ABULENCIA	06V	PR D73 112006	A. Abulencia *et al.*	(CDF Collab.)	REFID=51285
ABAZOV	05	PL B606 25	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50386
ABAZOV	04G	NAT 429 638	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50556
AFFOLDER	01	PR D63 032003	T. Affolder *et al.*	(CDF Collab.)	REFID=48049
ABBOTT	99G	PR D60 052001	B. Abbott *et al.*	(D0 Collab.)	REFID=47135
ABE	99B	PRL 82 271	F. Abe *et al.*	(CDF Collab.)	REFID=46548
Also		PRL 82 2808 (erratum)	F. Abe *et al.*	(CDF Collab.)	REFID=46822
ABBOTT	98D	PRL 80 2063	B. Abbott *et al.*	(D0 Collab.)	REFID=45940
ABBOTT	98F	PR D58 052001	B. Abbott *et al.*	(D0 Collab.)	REFID=45967
ABE	98E	PRL 80 2767	F. Abe *et al.*	(CDF Collab.)	REFID=45941
ABE	98F	PRL 80 2779	F. Abe *et al.*	(CDF Collab.)	REFID=45942
BHAT	98B	IJMP A13 5113	P.C. Bhat, H.B. Prosper, S.S. Snyder		REFID=46531
ABACHI	97E	PRL 79 1197	S. Abachi *et al.*	(D0 Collab.)	REFID=45590
ABE	97R	PRL 79 1992	F. Abe *et al.*	(CDF Collab.)	REFID=45594
PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495
ABACHI	95	PRL 74 2632	S. Abachi *et al.*	(D0 Collab.)	REFID=44167
ABE	95F	PRL 74 2626	F. Abe *et al.*	(CDF Collab.)	REFID=44170
ABE	94E	PR D50 2966	F. Abe *et al.*	(CDF Collab.)	REFID=43810
Also		PRL 73 225	F. Abe *et al.*	(CDF Collab.)	REFID=43823

Reference = AAD 12AE; PL B713 387
Verifier code = ATLAS

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Kevin Einsweiler

EMAIL: einsweiler@lbl.gov

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM, STRANGE MESONS ($B = \pm 1$, $S = \mp 1$)

NODE=MXXX046

$B_s^0 = s\overline{b}$, $\overline{B}_s^0 = \overline{s}\,b$, similarly for B_s^*'s

NODE=MXXX046

B_s^0

NODE=S086

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

B_s^0 BRANCHING RATIOS

NODE=S086230

$\Gamma(\mu^+\mu^-)/\Gamma_{total}$ — Γ_{51}/Γ

NODE=S086R14

Test for $\Delta B = 1$ weak neutral current.

NODE=S086R14

NODE=S086R14

VALUE (units 10^{-9})	CL%	DOCUMENT ID		TECN	COMMENT
$\mathbf{3.2^{+1.4+0.5}_{-1.2-0.3}}$		[1] AAIJ	13B	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA $<$ 19	90	[2] AAD	12AE	ATLS	pp at 7 TeV
$<$ 12	90	[3] AAIJ	12A	LHCB	Repl. by AAIJ 12W
$<$ 3.8	90	[4] AAIJ	12W	LHCB	Repl. by AAIJ 13B
$<$ 6.4	90	[5] CHATRCHYAN	12A	CMS	pp at 7 TeV
$<$ 43	90	[6] AAIJ	11B	LHCB	Repl. by AAIJ 12A
$<$ 35	90	[7] AALTONEN	11AG	CDF	$p\overline{p}$ at 1.96 TeV
$<$ 16	90	[8] CHATRCHYAN	11T	CMS	Repl. by CHATRCHYAN 12A
$<$ 42	90	[9] ABAZOV	10S	D0	$p\overline{p}$ at 1.96 TeV
$<$ 47	90	[9] AALTONEN	08I	CDF	Repl. by AALTONEN 11AG
$<$ 94	90	[10] ABAZOV	07Q	D0	Repl. by ABAZOV 10S
$<$ 410	90	[11] ABAZOV	05E	D0	$p\overline{p}$ at 1.96 TeV
$<$ 150	90	[12] ABULENCIA	05	CDF	$p\overline{p}$ at 1.96 TeV
$<$ 580	90	[13] ACOSTA	04D	CDF	$p\overline{p}$ at 1.96 TeV
$<$ 2000	90	[14] ABE	98	CDF	$p\overline{p}$ at 1.8 TeV
$<$38000	90	[15] ACCIARRI	97B	L3	$e^+e^- \to Z$
$<$ 8400	90	[16] ABE	96L	CDF	Repl. by ABE 98

[1] Uses B production ratio $f(\overline{b} \to B_s^0)/f\overline{b} \to B_d^0 = 0.256 \pm 0.020$ and two normalization modes: $B(B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+) = (6.01 \pm 0.21) \times 10^{-5}$ and $B(B^0 \to K^+\pi^-) = (1.94 \pm 0.06) \times 10^{-5}$. NODE=S086R14;LINKAGE=A

[2] Uses B production ratio $f(\overline{b} \to B^+)/f(\overline{b} \to B_s^0) = 3.75 \pm 0.29$ and $B(B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+) = (6.0 \pm 0.2) \times 10^{-5}$. NODE=S086R14;LINKAGE=AD

[3] Uses B production ratio $f(\overline{b} \to B_s^0)/f(\overline{b} \to B_d^0) = 0.267^{+0.021}_{-0.020}$ and three normalization modes $B(B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+) = (6.01 \pm 0.21) \times 10^{-5}$, $B(B^0 \to K^+\pi^-) = (1.94 \pm 0.06) \times 10^{-5}$, and $B(B_s^0 \to J/\psi\phi \to \mu^+\mu^- K^+K^-) = (3.4 \pm 0.9) \times 10^{-5}$. NODE=S086R14;LINKAGE=AJ

[4] Uses B production ratio $f(\overline{b} \to B_s^0)/f(\overline{b} \to B_d^0) = 0.267^{+0.021}_{-0.020}$ and three normalization modes of $B^+ \to J/\psi K^+$, $B^0 \to K^+\pi^-$, and $B_s^0 \to J/\psi\phi$. NODE=S086R14;LINKAGE=IJ

[5] Uses $f_s/f_u = 0.267 \pm 0.021$ and $B(B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+) = (6.0 \pm 0.2) \times 10^{-5}$. NODE=S086R14;LINKAGE=CA

[6] Uses B production ratio $f(\overline{b} \to B^+)/f(\overline{b} \to B_s^0) = 3.71 \pm 0.47$ and three normalization modes. NODE=S086R14;LINKAGE=AI

[7] Uses B production ratio $f(\overline{b} \to B^+)/f(\overline{b} \to B_s^0) = 3.55 \pm 0.47$ and $B(B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+) = (6.01 \pm 0.21) \times 10^{-5}$. NODE=S086R14;LINKAGE=AT

[8] Uses B production ratio $f(\overline{b} \to B^+)/f(\overline{b} \to B_s^0) = 3.55 \pm 0.42$ and $B(B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+) = (6.0 \pm 0.2) \times 10^{-5}$. NODE=S086R14;LINKAGE=CH

[9] Uses B production ratio $f(\overline{b} \to B^+)/f(\overline{b} \to B_s^0) = 3.86 \pm 0.59$, and the number of $B^+ \to J/\psi K^+$ decays. NODE=S086R14;LINKAGE=AA

[10] Uses B production ratio $f(\overline{b} \to B^+)/f(\overline{b} \to B_s^0) = 3.86 \pm 0.54$ and the number of $B^+ \to J/\psi K^+$ decays. NODE=S086R14;LINKAGE=ZO

[11] Assumes production cross-section $\sigma(B_s)/\sigma(B^+) = 0.270 \pm 0.034$. NODE=S086R14;LINKAGE=AB

[12] Assumes production cross section $\sigma(B^+)/\sigma(B_s) = 3.71 \pm 0.41$ and $B(B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+) = (5.88 \pm 0.26) \times 10^{-5}$. NODE=S086R14;LINKAGE=AL

[13] Assumes production cross-section $\sigma(B_s)/\sigma(B^+) = 0.100/0.391$ and the CDF measured value of $\sigma(B^+) = 3.6 \pm 0.6$ μb. NODE=S086R14;LINKAGE=AC

[14] ABE 98 assumes production of $\sigma(B^0) = \sigma(B^+)$ and $\sigma(B_s)/\sigma(B^0) = 1/3$. They normalize to their measured $\sigma(B^0, p_T(B) > 6, |y| < 1.0) = 2.39 \pm 0.32 \pm 0.44$ μb. NODE=S086R14;LINKAGE=C

[15] ACCIARRI 97B assume PDG 96 production fractions for B^+, B^0, B_s, and Λ_b. NODE=S086R14;LINKAGE=BQ

[16] ABE 96L assumes B^+/B_s production ratio 3/1. They normalize to their measured $\sigma(B^+, p_T(B) > 6$ GeV/c, $|y| < 1) = 2.39 \pm 0.54$ μb. NODE=S086R14;LINKAGE=PA

B_s^0 REFERENCES

NODE=S086

	AAIJ	13B	PRL 110 021801	R. Aaij *et al.*	(LHCb Collab.)	REFID=54767
YOUR PAPER	AAD	12AE	PL B713 387	G. Aad *et al.*	(ATLAS Collab.)	REFID=54194
	AAIJ	12A	PL B708 55	R. Aaij *et al.*	(LHCb Collab.)	REFID=54033
	AAIJ	12W	PRL 108 231801	R. Aaij *et al.*	(LHCb Collab.)	REFID=54217
	CHATRCHYAN	12A	JHEP 1204 033	S. Chatrchyan *et al.*	(CMS Collab.)	REFID=54060
	AAIJ	11B	PL B699 330	R. Aaij *et al.*	(LHCb Collab.)	REFID=16667
	AALTONEN	11AG	PRL 107 191801	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53834
	Also		PRL 107 239903 (errat)	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54005
	CHATRCHYAN	11T	PRL 107 191802	S. Chatrchyan *et al.*	(CMS Collab.)	REFID=53839
	ABAZOV	10S	PL B693 539	V.M. Abazov *et al.*	(D0 Collab.)	REFID=53481
	AALTONEN	08I	PRL 100 101802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52233
	ABAZOV	07Q	PR D76 092001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52002
	ABAZOV	05E	PRL 94 071802	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50575
	ABULENCIA	05	PRL 95 221805	A. Abulencia *et al.*	(CDF Collab.)	REFID=50950
	Also		PRL 95 249905 (errat)	A. Abulencia *et al.*	(CDF Collab.)	REFID=51015
	ACOSTA	04D	PRL 93 032001	D. Acosta *et al.*	(CDF Collab.)	REFID=49995
	ABE	98	PR D57 R3811	F. Abe *et al.*	(CDF Collab.)	REFID=45879
	ACCIARRI	97B	PL B391 474	M. Acciarri *et al.*	(L3 Collab.)	REFID=45248
	ABE	96L	PRL 76 4675	F. Abe *et al.*	(CDF Collab.)	REFID=44807
	PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495

Reference = AAD 12CV; JHEP 1212 072
Verifier code = ATLAS

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Kevin Einsweiler

EMAIL: einsweiler@lbl.gov

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM, STRANGE MESONS ($B = \pm 1$, $S = \mp 1$)

NODE=MXXX046

$B_s^0 = s\overline{b}$, $\overline{B}_s^0 = \overline{s}\,b$, similarly for B_s^*'s

NODE=MXXX046

B_s^0

NODE=S086

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

$\Delta\Gamma_{B_s^0}$

NODE=S086DGS

"OUR EVALUATION" has been obtained by the Heavy Flavor Averaging Group (HFAG) using the constraint of the flavor-specific lifetime average in a way similar to $\Delta\Gamma_{B_s^0}/\Gamma_{B_s^0}$.

NODE=S086DGS

	VALUE (10^{12} s^{-1})	DOCUMENT ID		TECN	COMMENT
	0.081±0.011 OUR EVALUATION				
	[(0.100 ± 0.013) × 10^{12} s^{-1} OUR 2012 EVALUATION]				
	0.080±0.020 OUR AVERAGE Error includes scale factor of 1.3. See the ideogram below.				
	[(0.109 ± 0.022) × 10^{12} s^{-1} OUR 2012 AVERAGE]				
YOUR DATA	$0.053 \pm 0.021 \pm 0.010$	[1] AAD	12CV	ATLS	pp at 7 TeV
	$0.123 \pm 0.029 \pm 0.011$	[1] AAIJ	12D	LHCB	pp at 7 TeV
	$0.068 \pm 0.026 \pm 0.007$	[1] AALTONEN	12AJ	CDF	$p\overline{p}$ at 1.96 TeV
	$0.163^{+0.065}_{-0.064}$	[2,3] ABAZOV	12D	D0	$p\overline{p}$ at 1.96 TeV
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	$0.075 \pm 0.035 \pm 0.006$	[4] AALTONEN	12D	CDF	Repl. by AALTONEN 12AJ
	$0.085^{+0.072}_{-0.078} \pm 0.001$	[5] ABAZOV	09E	D0	Repl. by ABAZOV 08AM
	$0.076^{+0.059}_{-0.063} \pm 0.006$	[6] AALTONEN	08J	CDF	Repl. by AALTONEN 12D
	$0.19 \pm 0.07 \; ^{+0.02}_{-0.01}$	[3,7] ABAZOV	08AM	D0	Repl. by ABAZOV 12D
	$0.12 \; ^{+0.08}_{-0.10} \pm 0.02$	[6,8] ABAZOV	07	D0	Repl. by ABAZOV 07N
	0.13 ± 0.09	[9] ABAZOV	07N	D0	Repl. by ABAZOV 09E
	$0.47 \; ^{+0.19}_{-0.24} \pm 0.01$	[6] ACOSTA	05	CDF	Repl. by AALTONEN 08J

NODE=S086DGS;LINKAGE=AJ
NEW;→ UNCHECKED ←
NEW

[1] Measured using the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.
[2] The error includes both statistical and systematic uncertainties.
[3] Measured using fully reconstructed $B_s \to J/\psi\phi$ decays.
[4] Uses the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays and assuming CP-violating angle $\beta_s(B^0 \to J/\psi\phi) = 0.02$.
[5] Measured the angular and lifetime parameters for the time-dependent angular untagged decays $B_d^0 \to J/\psi K^{*0}$ and $B_s^0 \to J/\psi\phi$.
[6] Measured using the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays and assuming CP-violating phase $\phi_s = 0$.
[7] Obtaines 90% CL interval $-0.06 < \Delta\Gamma_s < 0.30$.
[8] ABAZOV 07 reports $0.17 \pm 0.09 \pm 0.02$ with CP-violating phase ϕ_s as a free parameter.
[9] Combines D^0 measurements of time-dependent angular distributions in $B_s^0 \to J/\psi\phi$ and charge asymmetry in semileptonic decays. There is a 4-fold ambiguity in the solution.

NODE=S086DGS;LINKAGE=CE
NODE=S086DGS;LINKAGE=OV
NODE=S086DGS;LINKAGE=AT
NODE=S086DGS;LINKAGE=AB
NODE=S086DGS;LINKAGE=AC
NODE=S086DGS;LINKAGE=ZV
NODE=S086DGS;LINKAGE=BZ
NODE=S086DGS;LINKAGE=ZO

$1 / \Gamma_{B_s^0}$

NODE=S086MLF

"OUR EVALUATION" has been obtained by the Heavy Flavor Averaging Group (HFAG) using the constraint of the flavor-specific lifetime average in a way similar to $\Delta\Gamma_{B_s^0}/\Gamma_{B_s^0}$.

NODE=S086MLF

VALUE (10^{-12} s)	DOCUMENT ID	TECN	COMMENT
1.516±0.011 OUR EVALUATION			
[(1.497 ± 0.015) × 10^{-12} s OUR 2012 EVALUATION]			
1.497±0.017 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below.			
[(1.508 ± 0.024) × 10^{-12} s OUR 2012 AVERAGE Scale factor = 1.4]			
YOUR DATA 1.477±0.015±0.009	[1] AAD	12CV ATLS	pp at 7 TeV
1.522±0.021±0.019	[2] AAIJ	12D LHCB	pp at 7 TeV
1.528±0.019±0.009	[3] AALTONEN	12AJ CDF	$p\overline{p}$ at 1.96 TeV
$1.443^{+0.038}_{-0.035}$	[3,4] ABAZOV	12D D0	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
1.529±0.025±0.012	[3] AALTONEN	12D CDF	Repl. by AALTONEN 12AJ
1.487±0.060±0.028	[3] ABAZOV	09E D0	Repl. by ABAZOV 08AM
1.52 ±0.04 ±0.02	[3] AALTONEN	08J CDF	Repl. by AALTONEN 12D
1.52 ±0.05 ±0.01	[3] ABAZOV	08AM D0	Repl. by ABAZOV 12D

[1] AAD 12CV reports $\Gamma_{B^0_s} = 0.677 \pm 0.007 \pm 0.004$ ps^{-1} measured using a time-dependent angular analysis of $B^0_s \rightarrow J/\psi\phi$ decays. NODE=S086MLF;LINKAGE=AD

[2] AAIJ 12D reports average deacy width of B^0_s, $\Gamma_{B^0_s} = 0.657 \pm 0.009 \pm 0.008$ ps^{-1} that we converted to $1/\Gamma_{B^0_s}$. NODE=S086MLF;LINKAGE=AJ

[3] Measured using the time-dependent angular analysis of $B^0_s \rightarrow J/\psi\phi$ decays. NODE=S086MLF;LINKAGE=AC

[4] The error includes both statistical and systematic uncertainties. NODE=S086MLF;LINKAGE=CE

POLARIZATION IN B^0_s DECAY

NODE=S086233

Γ_L/Γ in $B^0_s \rightarrow J/\psi(1S)\phi$

NODE=S086P1

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.542±0.011 OUR AVERAGE				
[0.543 ± 0.016 OUR 2012 AVERAGE Scale factor = 1.2]				
YOUR DATA 0.539±0.014±0.016		[1] AAD	12CV ATLS	pp at 7 TeV
0.524±0.013±0.015		[1] AALTONEN	12D CDF	$p\overline{p}$ at 1.96 TeV
$0.558^{+0.017}_{-0.019}$		[1,2] ABAZOV	12D D0	$p\overline{p}$ at 1.96 TeV
0.61 ±0.14 ±0.02		[3] AFFOLDER	00N CDF	$p\overline{p}$ at 1.8 TeV
0.56 ±0.21 $^{+0.02}_{-0.04}$	19	ABE	95Z CDF	$p\overline{p}$ at 1.8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.555±0.027±0.006		[4] ABAZOV	09E D0	Repl. by ABAZOV 12D
0.531±0.020±0.007		[1] AALTONEN	08J CDF	Repl. by AALTONEN 12D
0.62 ±0.06 ±0.01		ACOSTA	05 CDF	Repl. by AALTONEN 08J

[1] Measured using the time-dependent angular analysis of $B^0_s \rightarrow J/\psi\phi$ decays. NODE=S086P1;LINKAGE=AC

[2] The error includes both statistical and systematic uncertainties. NODE=S086P1;LINKAGE=CE

[3] AFFOLDER 00N measurements are based on 40 B^0_s candidates obtained from a data sample of 89 pb^{-1}. The P-wave fraction is found to be 0.23 ± 0.19 ± 0.04. NODE=S086P1;LINKAGE=P1

[4] Measured the angular and lifetime parameters for the time-dependent angular untagged decays $B^0_d \rightarrow J/\psi K^{*0}$ and $B^0_s \rightarrow J/\psi\phi$. NODE=S086P1;LINKAGE=AB

$\Gamma_\parallel/\Gamma$ in $B^0_s \rightarrow J/\psi(1S)\phi$

NODE=S086P2

VALUE	DOCUMENT ID	TECN	COMMENT
0.227±0.010 OUR AVERAGE			
[0.231 ± 0.016 OUR 2012 AVERAGE]			
YOUR DATA 0.224±0.010±0.009	[1] AAD	12CV ATLS	pp at 7 TeV
0.231±0.014±0.015	[1] AALTONEN	12D CDF	$p\overline{p}$ at 1.96 TeV
$0.231^{+0.024}_{-0.030}$	[1,2] ABAZOV	12D D0	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.244±0.032±0.014	[3] ABAZOV	09E D0	Repl. by ABAZOV 12D
0.230±0.029±0.011	[1] AALTONEN	08J CDF	Repl. by AALTONEN 12D
0.260±0.084±0.013	ACOSTA	05 CDF	Repl. by AALTONEN 08J

[1] Measured using the time-dependent angular analysis of $B^0_s \rightarrow J/\psi\phi$ decays. NODE=S086P2;LINKAGE=AC

[2] The error includes both statistical and systematic uncertainties. NODE=S086P2;LINKAGE=CE

[3] Measured the angular and lifetime parameters for the time-dependent angular untagged decays $B^0_d \rightarrow J/\psi K^{*0}$ and $B^0_s \rightarrow J/\psi\phi$. NODE=S086P2;LINKAGE=AB

CP VIOLATION PARAMETERS in B_s^0

NODE=S086240

CP Violation phase β_s

NODE=S086PHS

$-2\beta_s$ is the weak phase difference between B_s^0 mixing amplitude and the $B_s^0 \to J/\psi\phi$ decay amplitude. The Standard Model value of β_s is arg$(-\frac{V_{ts}V_{tb}^*}{V_{cs}V_{cb}^*})$.

NODE=S086PHS

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/scaling procedure takes into account correlation between the measurements.

NODE=S086PHS

	VALUE (units 10^{-2})	*DOCUMENT ID*	*TECN*	*COMMENT*
	4^{+10}_{-13} OUR EVALUATION			
	$[0.08^{+0.05}_{-0.07}$ OUR 2012 EVALUATION]			
	-1 ± 6 OUR AVERAGE			
	$[0.02 \pm 0.11$ OUR 2012 AVERAGE Scale factor $= 1.3]$			
YOUR DATA	$-11.0 \pm 20.5 \pm 5.0$	[1] AAD	12CV ATLS	pp at 7 TeV
	$-8 \pm 9 \pm 3$	[2] AAIJ	12D LHCB	pp at 7 TeV
	$0.95^{+8.70+0.15}_{-8.65-0.20}$	[3] AAIJ	12Q LHCB	pp at 7 TeV
		[4] AALTONEN	12AJ CDF	$p\overline{p}$ at 1.96 TeV
	28^{+18}_{-19}	[5,6,7] ABAZOV	12D D0	$p\overline{p}$ at 1.96 TeV
	• • • We do not use the following data for averages, fits, limits, etc. • • •			
	$22 \pm 22 \pm 1$	[8] AAIJ	12B LHCB	Repl. by AAIJ 12Q
		[9] AALTONEN	12D CDF	Repl. by AALTONEN 12AJ
		[10] AALTONEN	08G CDF	Repl. by AALTONEN 12D
	$28^{+12}_{-15}{}^{+4}_{-1}$	[6,11] ABAZOV	08AM D0	Repl. by ABAZOV 12D
	$39.5 \pm 28.0^{+0.5}_{-7.0}$	[7,12] ABAZOV	07 D0	Repl. by ABAZOV 07N
	35^{+20}_{-24}	[7,13] ABAZOV	07N D0	Repl. by ABAZOV 08AM

NEW;→ UNCHECKED ←

NEW

[1] AAD 12CV reports $\phi_s = -2\,\beta_s = 0.22 \pm 0.41 \pm 0.10$ rad. that was measured using a time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.

NODE=S086PHS;LINKAGE=AD

[2] Reports $\phi_s = -2\,\beta_s = 0.15 \pm 0.18 \pm 0.06$ that was measured using a time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.

NODE=S086PHS;LINKAGE=AJ

[3] Reports $\phi_s = -2\,\beta_s = -0.019^{+0.173+0.004}_{-0.174-0.003}$ radians which was measured using a time-dependent fit to $B_s^0 \to J/\psi\pi^+\pi^-$ decays, with the $\pi^+\pi^-$ mass within 775–1550 MeV. Searches for, but finds no evidence, for direct *CP* violation in $B_s^0 \to J/\psi\pi\pi$ decays.

NODE=S086PHS;LINKAGE=IA

[4] AALTONEN 12AJ reports $-\pi/2 < \beta_s < -1.51$ or $-0.06 < \beta_s < 0.30$, or $1.26 < \beta_s < \pi/2$ at 68% CL. Measured using the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.

NODE=S086PHS;LINKAGE=AL

[5] The error includes both statistical and systematic uncertainties.

NODE=S086PHS;LINKAGE=CE

[6] Measured using fully reconstructed $B_s \to J/\psi\phi$ decays.

NODE=S086PHS;LINKAGE=OV

[7] Reports ϕ_s which equals to $-2\beta_s$.

NODE=S086PHS;LINKAGE=RP

[8] Reports $\phi_s = -2\,\beta_s = -0.44 \pm 0.44 \pm 0.02$ that was measured using a time-dependent fit to $B_s^0 \to J/\psi f_0(980)$ decays.

NODE=S086PHS;LINKAGE=AI

[9] Reports $0.02 < \phi_s < 0.52$ or $1.08 < \phi_s < 1.55$ at 68% C.L. confidence regions in the two-dimensional space of ϕ_s and $\Delta\Gamma_{B_s^0}$ from $B_s^0 \to J/\psi\phi$ decays.

NODE=S086PHS;LINKAGE=AT

[10] Reports $0.32 < 2\beta_s < 2.82$ at 68% C.L. and confidence regions in the two-dimensional space of $2\beta_s$ and $\Delta\Gamma$ from the first measurement of $B_s^0 \to J/\psi\phi$ decays using flavor tagging. The probability of a deviation from SM prediction as large as the level of observed data is 15%.

NODE=S086PHS;LINKAGE=AA

[11] Reports $\phi_s = -2\,\beta_s$ and obtains 90% CL interval $-0.03 < \beta_s < 0.60$.

NODE=S086PHS;LINKAGE=ZV

[12] The first direct measurement of the *CP*-violating mixing phase is reported from the time-dependent analysis of flavor untagged $B_s^0 \to J/\psi\phi$ decays.

NODE=S086PHS;LINKAGE=AZ

[13] Combines D0 collaboration measurements of time-dependent angular distributions in $B_s^0 \to J/\psi\phi$ and charge asymmetry in semileptonic decays. There is a 4-fold ambiguity in the solution.

NODE=S086PHS;LINKAGE=ZO

B_s^0 REFERENCES

NODE=S086

YOUR PAPER	AAD	12CV	JHEP 1212 072	G. Aad *et al.*	(ATLAS Colalb.)	REFID=54785
	AAIJ	12B	PL B707 497	R. Aaij *et al.*	(LHCb Collab.)	REFID=54034
	AAIJ	12D	PRL 108 101803	R. Aaij *et al.*	(LHCb Collab.)	REFID=54036
	AAIJ	12Q	PL B713 378	R. Aaij *et al.*	(LHCb Collab.)	REFID=54190
	AALTONEN	12AJ	PRL 109 171802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54598
	AALTONEN	12D	PR D85 072002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54070
	ABAZOV	12D	PR D85 032006	V.M. Abazov *et al.*	(D0 Collab.)	REFID=54062
	ABAZOV	09E	PRL 102 032001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52650
	AALTONEN	08G	PRL 100 161802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52228
	AALTONEN	08J	PRL 100 121803	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52234
	ABAZOV	08AM	PRL 101 241801	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52604
	ABAZOV	07	PRL 98 121801	V.M. Abazov *et al.*	(D0 Collab.)	REFID=51664
	ABAZOV	07N	PR D76 057101	V.M. Abazov *et al.*	(D0 Collab.)	REFID=51936
	ACOSTA	05	PRL 94 101803	D. Acosta *et al.*	(CDF Collab.)	REFID=50519
	AFFOLDER	00N	PRL 85 4668	T. Affolder *et al.*	(CDF Collab.)	REFID=47875
	ABE	95Z	PRL 75 3068	F. Abe *et al.*	(CDF Collab.)	REFID=44490

Reference = AAD 13U; PR D87 032002
Verifier code = ATLAS

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Kevin Einsweiler

EMAIL: einsweiler@lbl.gov

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
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BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 MASS

NODE=S042M

The fit uses m_{B^+}, $(m_{B^0} - m_{B^+})$, and m_{B^0} to determine m_{B^+}, m_{B^0}, and the mass difference.

NODE=S042M

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
	5279.55±0.26 OUR AVERAGE					
YOUR DATA	5279.6 ±0.2 ±1.0		[1] AAD	13U	ATLS	pp at 7 TeV
	5279.58±0.15±0.28		[2] AAIJ	12E	LHCB	pp at 7 TeV
	5279.63±0.53±0.33		[3] ACOSTA	06	CDF	$p\overline{p}$ at 1.96 TeV
	5279.1 ±0.7 ±0.3	135	[4] CSORNA	00	CLE2	$e^+e^- \to \Upsilon(4S)$
	5281.3 ±2.2 ±1.4	51	ABE	96B	CDF	$p\overline{p}$ at 1.8 TeV
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	5279.2 ±0.54±2.0	340	ALAM	94	CLE2	$e^+e^- \to \Upsilon(4S)$
	5278.0 ±0.4 ±2.0		BORTOLETTO	92	CLEO	$e^+e^- \to \Upsilon(4S)$
	5279.6 ±0.7 ±2.0	40	[5] ALBRECHT	90J	ARG	$e^+e^- \to \Upsilon(4S)$
	5278.2 ±1.0 ±3.0	40	ALBRECHT	87C	ARG	$e^+e^- \to \Upsilon(4S)$
	5279.5 ±1.6 ±3.0	7	[6] ALBRECHT	87D	ARG	$e^+e^- \to \Upsilon(4S)$
	5280.6 ±0.8 ±2.0		BEBEK	87	CLEO	$e^+e^- \to \Upsilon(4S)$

NODE=S042M

SYCLP=A

SYCLP=A

SYCLP=A

SYCLP=A

[1] Measured with $B^0_d \to J/\psi(\mu^+\mu^-)\,K^0_S(\pi^+\pi^-)$ decays.

[2] Uses $B^0 \to J/\psi K^0$ fully reconstructed decays.

[3] Uses exclusively reconstructed final states containing a $J/\psi \to \mu^+\mu^-$ decays.

[4] CSORNA 00 uses fully reconstructed 135 $B^0 \to J/\psi^{(\prime)} K^0_S$ events and invariant masses without beam constraint.

[5] ALBRECHT 90J assumes 10580 for $\Upsilon(4S)$ mass. Supersedes ALBRECHT 87C and ALBRECHT 87D.

[6] Found using fully reconstructed decays with J/ψ. ALBRECHT 87D assume $m_{\Upsilon(4S)} =$ 10577 MeV.

NODE=S042M;LINKAGE=AD

NODE=S042M;LINKAGE=AA

NODE=S042M;LINKAGE=AT

NODE=S042M;LINKAGE=N1

NODE=S042M;LINKAGE=E

NODE=S042M;LINKAGE=D

B^0 MEAN LIFE

NODE=S042T

See $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE section for data on B-hadron mean life averaged over species of bottom particles.

NODE=S042T

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements and asymmetric lifetime errors.

	VALUE (10^{-12} s)	EVTS	DOCUMENT ID		TECN	COMMENT
	1.519±0.007 OUR EVALUATION					
	Average is meaningless.		[(1.518 ± 0.007) × 10^{-12} s OUR 2012 AVERAGE]			
YOUR DATA	1.509±0.012±0.018		[1] AAD	13U	ATLS	pp at 7 TeV

NODE=S042T

→ UNCHECKED ←

$1.508 \pm 0.025 \pm 0.043$		[2] ABAZOV	12U	D0	$p\overline{p}$ at 1.96 TeV	
$1.507 \pm 0.010 \pm 0.008$		[3] AALTONEN	11	CDF	$p\overline{p}$ at 1.96 TeV	
$1.414 \pm 0.018 \pm 0.034$		[4] ABAZOV	09E	D0	$p\overline{p}$ at 1.96 TeV	
$1.504 \pm 0.013 {}^{+0.018}_{-0.013}$		[5] AUBERT	06G	BABR	$e^+e^- \rightarrow \Upsilon(4S)$	
$1.534 \pm 0.008 \pm 0.010$		[6] ABE	05B	BELL	$e^+e^- \rightarrow \Upsilon(4S)$	
$1.531 \pm 0.021 \pm 0.031$		[7] ABDALLAH	04E	DLPH	$e^+e^- \rightarrow Z$	
$1.523 {}^{+0.024}_{-0.023} \pm 0.022$		[8] AUBERT	03C	BABR	$e^+e^- \rightarrow \Upsilon(4S)$	
$1.533 \pm 0.034 \pm 0.038$		[9] AUBERT	03H	BABR	$e^+e^- \rightarrow \Upsilon(4S)$	
$1.497 \pm 0.073 \pm 0.032$		[10] ACOSTA	02C	CDF	$p\overline{p}$ at 1.8 TeV	
$1.529 \pm 0.012 \pm 0.029$		[11] AUBERT	02H	BABR	$e^+e^- \rightarrow \Upsilon(4S)$	
$1.546 \pm 0.032 \pm 0.022$		[12] AUBERT	01F	BABR	$e^+e^- \rightarrow \Upsilon(4S)$	
$1.541 \pm 0.028 \pm 0.023$		[11] ABBIENDI,G	00B	OPAL	$e^+e^- \rightarrow Z$	
$1.518 \pm 0.053 \pm 0.034$		[13] BARATE	00R	ALEP	$e^+e^- \rightarrow Z$	
$1.523 \pm 0.057 \pm 0.053$		[14] ABBIENDI	99J	OPAL	$e^+e^- \rightarrow Z$	
$1.474 \pm 0.039 {}^{+0.052}_{-0.051}$		[13] ABE	98Q	CDF	$p\overline{p}$ at 1.8 TeV	
$1.52 \pm 0.06 \pm 0.04$		[14] ACCIARRI	98S	L3	$e^+e^- \rightarrow Z$	
$1.64 \pm 0.08 \pm 0.08$		[14] ABE	97J	SLD	$e^+e^- \rightarrow Z$	
$1.532 \pm 0.041 \pm 0.040$		[15] ABREU	97F	DLPH	$e^+e^- \rightarrow Z$	
$1.25 {}^{+0.15}_{-0.13} \pm 0.05$	121	[10] BUSKULIC	96J	ALEP	$e^+e^- \rightarrow Z$	OCCUR=3
$1.49 {}^{+0.17}_{-0.15} {}^{+0.08}_{-0.06}$		[16] BUSKULIC	96J	ALEP	$e^+e^- \rightarrow Z$	OCCUR=4
$1.61 {}^{+0.14}_{-0.13} \pm 0.08$		[13,17] ABREU	95Q	DLPH	$e^+e^- \rightarrow Z$	
$1.63 \pm 0.14 \pm 0.13$		[18] ADAM	95	DLPH	$e^+e^- \rightarrow Z$	
$1.53 \pm 0.12 \pm 0.08$		[13,19] AKERS	95T	OPAL	$e^+e^- \rightarrow Z$	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$1.501 {}^{+0.078}_{-0.074} \pm 0.050$		[2] ABAZOV	07S	D0	Repl. by ABAZOV 12U	
$1.524 \pm 0.030 \pm 0.016$		[2] ABULENCIA	07A	CDF	Repl. by AALTONEN 11	
$1.473 {}^{+0.052}_{-0.050} \pm 0.023$		[4] ABAZOV	05B	D0	Repl. by ABAZOV 05W	
$1.40 {}^{+0.11}_{-0.10} \pm 0.03$		[2] ABAZOV	05C	D0	Repl. by ABAZOV 07S	
$1.530 \pm 0.043 \pm 0.023$		[4] ABAZOV	05W	D0	Repl. by ABAZOV 09E	
$1.54 \pm 0.05 \pm 0.02$		[20] ACOSTA	05	CDF	Repl. by AALTONEN 11	
$1.554 \pm 0.030 \pm 0.019$		[12] ABE	02H	BELL	Repl. by ABE 05B	
$1.58 \pm 0.09 \pm 0.02$		[10] ABE	98B	CDF	Repl. by ACOSTA 02C	
$1.54 \pm 0.08 \pm 0.06$		[13] ABE	96C	CDF	Repl. by ABE 98Q	
$1.55 \pm 0.06 \pm 0.03$		[21] BUSKULIC	96J	ALEP	$e^+e^- \rightarrow Z$	
$1.61 \pm 0.07 \pm 0.04$		[13] BUSKULIC	96J	ALEP	Repl. by BARATE 00R	OCCUR=2
1.62 ± 0.12		[22] ADAM	95	DLPH	$e^+e^- \rightarrow Z$	OCCUR=2
$1.57 \pm 0.18 \pm 0.08$	121	[10] ABE	94D	CDF	Repl. by ABE 98B	
$1.17 {}^{+0.29}_{-0.23} \pm 0.16$	96	[13] ABREU	93D	DLPH	Sup. by ABREU 95Q	
$1.55 \pm 0.25 \pm 0.18$	76	[18] ABREU	93G	DLPH	Sup. by ADAM 95	
$1.51 {}^{+0.24}_{-0.23} {}^{+0.12}_{-0.14}$	78	[13] ACTON	93C	OPAL	Sup. by AKERS 95T	
$1.52 {}^{+0.20}_{-0.18} {}^{+0.07}_{-0.13}$	77	[13] BUSKULIC	93D	ALEP	Sup. by BUSKULIC 96J	
$1.20 {}^{+0.52}_{-0.36} {}^{+0.16}_{-0.14}$	15	[23] WAGNER	90	MRK2	E^{ee}_{cm}= 29 GeV	
$0.82 {}^{+0.57}_{-0.37} \pm 0.27$		[24] AVERILL	89	HRS	E^{ee}_{cm}= 29 GeV	

[1] Measured with $B^0_d \rightarrow J/\psi(\mu^+\mu^-) K^0_S(\pi^+\pi^-)$ decays. NODE=S042T;LINKAGE=AD

[2] Measured mean life using $B^0 \rightarrow J/\psi K^0_S$ decays. NODE=S042T;LINKAGE=AO

[3] Measured mean life using fully reconstructed decays ($J/\psi K^{(*)}$). NODE=S042T;LINKAGE=AA

[4] Measured mean life using $B^0 \rightarrow J/\psi K^{*0}$ decays. NODE=S042T;LINKAGE=AZ

[5] Measured using a simultaneous fit of the B^0 lifetime and $\overline{B}^0 B^0$ oscillation frequency Δm_d in the partially reconstructed $B^0 \rightarrow D^{*-}\ell\nu$ decays. NODE=S042T;LINKAGE=AU

[6] Measurement performed using a combined fit of CP-violation, mixing and lifetimes. NODE=S042T;LINKAGE=AE

[7] Measurement performed using an inclusive reconstruction and B flavor identification technique. NODE=S042T;LINKAGE=AB

[8] AUBERT 03C uses a sample of approximately 14,000 exclusively reconstructed $B^0 \rightarrow D^*(2010)^-\ell\nu$ and simultaneously measures the lifetime and oscillation frequency. NODE=S042T;LINKAGE=C3

[9] Measurement performed with decays $B^0 \rightarrow D^{*-}\pi^+$ and $B^0 \rightarrow D^{*-}\rho^+$ using a partial reconstruction technique. NODE=S042T;LINKAGE=BH

[10] Measured mean life using fully reconstructed decays. NODE=S042T;LINKAGE=CD
[11] Data analyzed using partially reconstructed $\overline{B}^0 \rightarrow D^{*+} \ell^- \overline{\nu}$ decays. NODE=S042T;LINKAGE=C2
[12] Events are selected in which one B meson is fully reconstructed while the second B meson is reconstructed inclusively. NODE=S042T;LINKAGE=FT
[13] Data analyzed using $D/D^* \ell X$ event vertices. NODE=S042T;LINKAGE=C
[14] Data analyzed using charge of secondary vertex. NODE=S042T;LINKAGE=M
[15] Data analyzed using inclusive $D/D^* \ell X$. NODE=S042T;LINKAGE=L
[16] Measured mean life using partially reconstructed $D^{*-} \pi^+ X$ vertices. NODE=S042T;LINKAGE=I
[17] ABREU 95Q assumes $B(B^0 \rightarrow D^{**-} \ell^+ \nu_\ell) = 3.2 \pm 1.7\%$. NODE=S042T;LINKAGE=CQ
[18] Data analyzed using vertex-charge technique to tag B charge. NODE=S042T;LINKAGE=F
[19] AKERS 95T assumes $B(B^0 \rightarrow D_s^{(*)} D^{0(*)}) = 5.0 \pm 0.9\%$ to find B^+/B^0 yield. NODE=S042T;LINKAGE=H
[20] Measured using the time-dependent angular analysis of $B_d^0 \rightarrow J/\psi K^{*0}$ decays. NODE=S042T;LINKAGE=AC
[21] Combined result of $D/D^* \ell x$ analysis, fully reconstructed B analysis, and partially reconstructed $D^{*-} \pi^+ X$ analysis. NODE=S042T;LINKAGE=J
[22] Combined ABREU 95Q and ADAM 95 result. NODE=S042T;LINKAGE=K
[23] WAGNER 90 tagged B^0 mesons by their decays into $D^{*-} e^+ \nu$ and $D^{*-} \mu^+ \nu$ where the D^{*-} is tagged by its decay into $\pi^- \overline{D}^0$. NODE=S042T;LINKAGE=BB
[24] AVERILL 89 is an estimate of the B^0 mean lifetime assuming that $B^0 \rightarrow D^{*+} + X$ always. NODE=S042T;LINKAGE=A

B^0 REFERENCES

NODE=S042

YOUR PAPER	AAD	13U	PR D87 032002	G. Aad *et al.*	(ATLAS Collab.)	REFID=54939
	AAIJ	12E	PL B708 241	R. Aaij *et al.*	(LHCb Collab.)	REFID=54043
	ABAZOV	12U	PR D85 112003	V.M. Abazov *et al.*	(D0 Collab.)	REFID=54350
	AALTONEN	11	PRL 106 121804	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53674
	ABAZOV	09E	PRL 102 032001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52650
	ABAZOV	07S	PRL 99 142001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52008
	ABULENCIA	07A	PRL 98 122001	A. Abulencia *et al.*	(FNAL CDF Collab.)	REFID=51662
	ACOSTA	06	PRL 96 202001	D. Acosta *et al.*	(CDF Collab.)	REFID=51231
	AUBERT	06G	PR D73 012004	B. Aubert *et al.*	(BABAR Collab.)	REFID=51087
	ABAZOV	05B	PRL 94 042001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50492
	ABAZOV	05C	PRL 94 102001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50511
	ABAZOV	05W	PRL 95 171801	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50929
	ABE	05B	PR D71 072003	K. Abe *et al.*	(BELLE Collab.)	REFID=50517
	Also		PR D71 079903 (errat.)	K. Abe *et al.*	(BELLE Collab.)	REFID=50555
	ACOSTA	05	PRL 94 101803	D. Acosta *et al.*	(CDF Collab.)	REFID=50519
	ABDALLAH	04E	EPJ C33 307	J. Abdallah *et al.*	(DELPHI Collab.)	REFID=49917
	AUBERT	03C	PR D67 072002	B. Aubert *et al.*	(BaBar Collab.)	REFID=49210
	AUBERT	03H	PR D67 091101	B. Aubert *et al.*	(BaBar Collab.)	REFID=49430
	ABE	02H	PRL 88 171801	K. Abe *et al.*	(BELLE Collab.)	REFID=48633
	ACOSTA	02C	PR D65 092009	D. Acosta *et al.*	(CDF Collab.)	REFID=48794
	AUBERT	02H	PRL 89 011802	B. Aubert *et al.*	(BaBar Collab.)	REFID=48639
	Also		PRL 89 169903 (errat)	B. Aubert *et al.*	(BaBar Collab.)	REFID=48983
	AUBERT	01F	PRL 87 201803	B. Aubert *et al.*	(BaBar Collab.)	REFID=48432
	ABBIENDI,G	00B	PL B493 266	G. Abbiendi *et al.*	(OPAL Collab.)	REFID=47835
	BARATE	00R	PL B492 275	R. Barate *et al.*	(ALEPH Collab.)	REFID=47827
	CSORNA	00	PR D61 111101	S.E. Csorna *et al.*	(CLEO Collab.)	REFID=47435
	ABBIENDI	99J	EPJ C12 609	G. Abbiendi *et al.*	(OPAL Collab.)	REFID=46738
	ABE	98B	PR D57 5382	F. Abe *et al.*	(CDF Collab.)	REFID=45880
	ABE	98Q	PR D58 092002	F. Abe *et al.*	(CDF Collab.)	REFID=46475
	ACCIARRI	98S	PL B438 417	M. Acciarri *et al.*	(L3 Collab.)	REFID=46503
	ABE	97J	PRL 79 590	K. Abe *et al.*	(SLD Collab.)	REFID=45413
	ABREU	97F	ZPHY C74 19	P. Abreu *et al.*	(DELPHI Collab.)	REFID=45412
	Also		ZPHY C75 579 (erratum)	P. Abreu *et al.*	(DELPHI Collab.)	REFID=45614
	ABE	96B	PR D53 3496	F. Abe *et al.*	(CDF Collab.)	REFID=44688
	ABE	96C	PRL 76 4462	F. Abe *et al.*	(CDF Collab.)	REFID=44700
	BUSKULIC	96J	ZPHY C71 31	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=44824
	ABREU	95Q	ZPHY C68 13	P. Abreu *et al.*	(DELPHI Collab.)	REFID=44460
	ADAM	95	ZPHY C68 363	W. Adam *et al.*	(DELPHI Collab.)	REFID=44465
	AKERS	95T	ZPHY C67 379	R. Akers *et al.*	(OPAL Collab.)	REFID=44379
	ABE	94D	PRL 72 3456	F. Abe *et al.*	(CDF Collab.)	REFID=43761
	ALAM	94	PR D50 43	M.S. Alam *et al.*	(CLEO Collab.)	REFID=43738
	ABREU	93D	ZPHY C57 181	P. Abreu *et al.*	(DELPHI Collab.)	REFID=43267
	ABREU	93G	PL B312 253	P. Abreu *et al.*	(DELPHI Collab.)	REFID=43443
	ACTON	93C	PL B307 247	P.D. Acton *et al.*	(OPAL Collab.)	REFID=43352
	BUSKULIC	93D	PL B307 194	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=43349
	Also		PL B325 537 (erratum)	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=43945
	BORTOLETTO	92	PR D45 21	D. Bortoletto *et al.*	(CLEO Collab.)	REFID=41920
	ALBRECHT	90J	ZPHY C48 543	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=41437
	WAGNER	90	PRL 64 1095	S.R. Wagner *et al.*	(Mark II Collab.)	REFID=41096
	AVERILL	89	PR D39 123	D.A. Averill *et al.*	(HRS Collab.)	REFID=40691
	ALBRECHT	87C	PL B185 218	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=40323
	ALBRECHT	87D	PL B199 451	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=40325
	BEBEK	87	PR D36 1289	C. Bebek *et al.*	(CLEO Collab.)	REFID=40270

BOTTOM BARYONS
($B = -1$)

$\Lambda_b^0 = u\,d\,b$, $\Xi_b^0 = u\,s\,b$, $\Xi_b^- = d\,s\,b$, $\Omega_b^- = s\,s\,b$

NODE=BXXX045

NODE=BXXX045

NODE=S040

Λ_b^0

$I(J^P) = 0(\frac{1}{2}^+)$ Status: ***

In the quark model, a Λ_b^0 is an isospin-0 $u\,d\,b$ state. The lowest Λ_b^0 ought to have $J^P = 1/2^+$. None of I, J, or P have actually been measured.

NODE=S040

Λ_b^0 MASS

NODE=S040205

$m_{\Lambda_b^0}$

NODE=S040M

NODE=S040M

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
	5619.4 ± 0.6 OUR AVERAGE					
	[5619.4 ± 0.7 MeV OUR 2012 AVERAGE]					
YOUR DATA	5619.7 ± 0.7 ± 1.1		[1] AAD	13U	ATLS	pp at 7 TeV
	5619.19 ± 0.70 ± 0.30		[1] AAIJ	12E	LHCB	pp at 7 TeV
	5619.7 ± 1.2 ± 1.2		[2] ACOSTA	06	CDF	$p\overline{p}$ at 1.96 TeV
	5621 ± 4 ± 3		[3] ABE	97B	CDF	$p\overline{p}$ at 1.8 TeV
	5668 ± 16 ± 8	4	[4] ABREU	96N	DLPH	$e^+e^- \to Z$
	5614 ± 21 ± 4	4	[4] BUSKULIC	96L	ALEP	$e^+e^- \to Z$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	not seen		[5] ABE	93B	CDF	Sup. by ABE 97B
	5640 ± 50 ± 30	16	[6] ALBAJAR	91E	UA1	$p\overline{p}$ 630 GeV
	$5640\ ^{+100}_{-210}$	52	BARI	91	SFM	$\Lambda_b^0 \to p D^0 \pi^-$
	$5650\ ^{+150}_{-200}$	90	BARI	91	SFM	$\Lambda_b^0 \to \Lambda_c^+ \pi^+ \pi^- \pi^-$

NEW

OCCUR=2

[1] Uses $\Lambda_b^0 \to J/\psi \Lambda$ fully reconstructed decays.

[2] Uses exclusively reconstructed final states containing a $J/\psi \to \mu^+\mu^-$ decays.

[3] ABE 97B observed 38 events with a background of 18 ± 1.6 events in the mass range 5.60–5.65 GeV/c^2, a significance of > 3.4 standard deviations.

[4] Uses 4 fully reconstructed Λ_b events.

[5] ABE 93B states that, based on the signal claimed by ALBAJAR 91E, CDF should have found 30 ± 23 $\Lambda_b^0 \to J/\psi(1S)\Lambda$ events. Instead, CDF found not more than 2 events.

[6] ALBAJAR 91E claims 16 ± 5 events above a background of 9 ± 1 events, a significance of about 5 standard deviations.

NODE=S040M;LINKAGE=AA

NODE=S040M;LINKAGE=AT

NODE=S040M;LINKAGE=F

NODE=S040M;LINKAGE=E

NODE=S040M;LINKAGE=D

NODE=S040M;LINKAGE=C

Λ_b^0 MEAN LIFE

NODE=S040T

See b-baryon Admixture section for data on b-baryon mean life average over species of b-baryon particles.

NODE=S040T

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements and asymmetric lifetime errors.

NODE=S040T

NEW;→ UNCHECKED ←

	VALUE (10^{-12} s)	EVTS	DOCUMENT ID		TECN	COMMENT
	1.429±0.024 OUR EVALUATION					
	[(1.425 ± 0.032) × 10^{-12} s OUR 2012 EVALUATION]					
YOUR DATA	1.449±0.036±0.017		[9] AAD	13U	ATLS	pp at 7 TeV
	1.303±0.075±0.035		[9] ABAZOV	12U	D0	$p\overline{p}$ at 1.96 TeV
	1.537±0.045±0.014		[9] AALTONEN	11	CDF	$p\overline{p}$ at 1.96 TeV
	1.401±0.046±0.035		[10] AALTONEN	10B	CDF	$p\overline{p}$ at 1.96 TeV
	$1.290^{+0.119}_{-0.110}{}^{+0.087}_{-0.091}$		[11] ABAZOV	07U	D0	$p\overline{p}$ at 1.96 TeV

$1.11\ ^{+0.19}_{-0.18}\ \pm0.05$	[12] ABREU	99W	DLPH	$e^+e^- \to Z$	
$1.29\ ^{+0.24}_{-0.22}\ \pm0.06$	[12] ACKERSTAFF	98G	OPAL	$e^+e^- \to Z$	
$1.21\ \pm0.11$	[12] BARATE	98D	ALEP	$e^+e^- \to Z$	
$1.32\ \pm0.15\ \pm0.07$	[13] ABE	96M	CDF	$p\overline{p}$ at 1.8 TeV	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.218^{+0.130}_{-0.115}\pm0.042$	[9] ABAZOV	07S	D0	Repl. by ABAZOV 12U	
$1.593^{+0.083}_{-0.078}\pm0.033$	[9] ABULENCIA	07A	CDF	Repl. by AALTONEN 11	
$1.22\ ^{+0.22}_{-0.18}\ \pm0.04$	[9] ABAZOV	05C	D0	Repl. by ABAZOV 07S	
$1.19\ ^{+0.21}_{-0.18}\ ^{+0.07}_{-0.08}$	ABREU	96D	DLPH	Repl. by ABREU 99W	OCCUR=3
$1.14\ ^{+0.22}_{-0.19}\ \pm0.07$	69 AKERS	95K	OPAL	Repl. by ACKERSTAFF 98G	
$1.02\ ^{+0.23}_{-0.18}\ \pm0.06$	44 BUSKULIC	95L	ALEP	Repl. by BARATE 98D	OCCUR=2

[9] Measured mean life using fully reconstructed $\Lambda_b^0 \to J/\psi\Lambda$ decays. NODE=S040T;LINKAGE=AB

[10] Measured mean life using fully reconstructed $\Lambda_b^0 \to \Lambda_c^+\pi^-$ decays. NODE=S040T;LINKAGE=AA

[11] Measured using semileptonic decays $\Lambda_b^0 \to \Lambda_c^+\mu\nu X$ and $\Lambda_c^+ \to K_S^0 p$. NODE=S040T;LINKAGE=AZ

[12] Measured using $\Lambda_c\ell^-$ and $\Lambda\ell^+\ell^-$. NODE=S040T;LINKAGE=KK

[13] Excess $\Lambda_c\ell^-$, decay lengths. NODE=S040T;LINKAGE=AE

$\tau_{\Lambda_b^0}/\tau_{B^0}$ MEAN LIFE RATIO

NODE=S040211

$\tau_{\Lambda_b^0}/\tau_{B^0}$ (direct measurements)

NODE=S040TR

VALUE	DOCUMENT ID		TECN	COMMENT
0.975±0.034 OUR AVERAGE Error includes scale factor of 1.7. See the ideogram below. [1.00 ± 0.06 OUR 2012 AVERAGE Scale factor = 2.0]				NODE=S040TR NEW
YOUR DATA $0.960\pm0.025\pm0.016$	[14] AAD	13U	ATLS	pp at 7 TeV
$0.864\pm0.052\pm0.033$	[15,16] ABAZOV	12U	D0	$p\overline{p}$ at 1.96 TeV
$1.020\pm0.030\pm0.008$	[15] AALTONEN	11	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.811^{+0.096}_{-0.087}\pm0.034$	[15,16] ABAZOV	07S	D0	Repl. by ABAZOV 12U
1.041 ± 0.057	[17] ABULENCIA	07A	CDF	Repl. by AALTONEN 11
$0.87\ ^{+0.17}_{-0.14}\ \pm0.03$	[17] ABAZOV	05C	D0	Repl. by ABAZOV 07S

[14] Measured with $\Lambda_b^0 \to J/\psi(\mu^+\mu^-)\ \Lambda^0(p\pi^-)$ decays. NODE=S040TR;LINKAGE=AD

[15] Uses fully reconstructed $\Lambda_b \to J/\psi\Lambda$ decays. NODE=S040TR;LINKAGE=ZO

[16] Uses $B^0 \to J/\psi K_S^0$ decays for denominator. NODE=S040TR;LINKAGE=ZV

[17] Measured mean life ratio using fully reconstructed decays. NODE=S040TR;LINKAGE=AB

Λ_b^0 REFERENCES

NODE=S040

YOUR PAPER AAD	13U	PR D87 032002	G. Aad *et al.*	(ATLAS Collab.)	REFID=54939
AAIJ	12E	PL B708 241	R. Aaij *et al.*	(LHCb Collab.)	REFID=54043
ABAZOV	12U	PR D85 112003	V.M. Abazov *et al.*	(D0 Collab.)	REFID=54350
AALTONEN	11	PRL 106 121804	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53674
AALTONEN	10B	PRL 104 102002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53241
ABAZOV	07S	PRL 99 142001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52008
ABAZOV	07U	PRL 99 182001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52043
ABULENCIA	07A	PRL 98 122001	A. Abulencia *et al.*	(FNAL CDF Collab.)	REFID=51662
ACOSTA	06	PRL 96 202001	D. Acosta *et al.*	(CDF Collab.)	REFID=51231
ABAZOV	05C	PRL 94 102001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50511
ABREU	99W	EPJ C10 185	P. Abreu *et al.*	(DELPHI Collab.)	REFID=47301
ACKERSTAFF	98G	PL B426 161	K. Ackerstaff *et al.*	(OPAL Collab.)	REFID=45875
BARATE	98D	EPJ C2 197	R. Barate *et al.*	(ALEPH Collab.)	REFID=45878
ABE	97B	PR D55 1142	F. Abe *et al.*	(CDF Collab.)	REFID=45267
ABE	96M	PRL 77 1439	F. Abe *et al.*	(CDF Collab.)	REFID=44810
ABREU	96D	ZPHY C71 199	P. Abreu *et al.*	(DELPHI Collab.)	REFID=44691
ABREU	96N	PL B374 351	P. Abreu *et al.*	(DELPHI Collab.)	REFID=44895
BUSKULIC	96L	PL B380 442	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=44845
AKERS	95K	PL B353 402	R. Akers *et al.*	(OPAL Collab.)	REFID=44324
BUSKULIC	95L	PL B357 685	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=44468
ABE	93B	PR D47 R2639	F. Abe *et al.*	(CDF Collab.)	REFID=43282
ALBAJAR	91E	PL B273 540	C. Albajar *et al.*	(UA1 Collab.)	REFID=41642
BARI	91	NC 104A 1787	G. Bari *et al.*	(CERN R422 Collab.)	REFID=41918

b-baryon ADMIXTURE (Λ_b, Ξ_b, Σ_b, Ω_b)

NODE=S061

b-baryon ADMIXTURE MEAN LIFE

NODE=S061T

NODE=S061T

Each measurement of the *b*-baryon mean life is an average over an admixture of various *b* baryons which decay weakly. Different techniques emphasize different admixtures of produced particles, which could result in a different *b*-baryon mean life. More *b*-baryon flavor specific channels are not included in the measurement.

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements and asymmetric lifetime errors.

NODE=S061T

NEW;→ UNCHECKED ←

	VALUE (10^{-12} s)	EVTS	DOCUMENT ID		TECN	COMMENT	
	1.402±0.023 OUR EVALUATION						
	[(1.382 ± 0.029) × 10^{-12} s OUR 2012 EVALUATION]						
	Average is meaningless. [(1.32 ± 0.04) × 10^{-12} s OUR 2012 AVERAGE Scale factor = 1.3]						
YOUR DATA	$1.449 \pm 0.036 \pm 0.017$		[1] AAD	13U	ATLS	pp at 7 TeV	
	$1.401 \pm 0.046 \pm 0.035$		[2] AALTONEN	10B	CDF	$p\overline{p}$ at 1.96 TeV	
	$1.218^{+0.130}_{-0.115} \pm 0.042$		[3] ABAZOV	07S	D0	$p\overline{p}$ at 1.96 TeV	
	$1.290^{+0.119}_{-0.110}{}^{+0.087}_{-0.091}$		[4] ABAZOV	07U	D0	$p\overline{p}$ at 1.96 TeV	
	$1.593^{+0.083}_{-0.078} \pm 0.033$		[3] ABULENCIA	07A	CDF	$p\overline{p}$ at 1.96 TeV	
	$1.16 \pm 0.20 \pm 0.08$		[5] ABREU	99W	DLPH	$e^+e^- \rightarrow Z$	
	$1.19 \pm 0.14 \pm 0.07$		[6] ABREU	99W	DLPH	$e^+e^- \rightarrow Z$	OCCUR=2
	$1.11 {}^{+0.19}_{-0.18} \pm 0.05$		[7] ABREU	99W	DLPH	$e^+e^- \rightarrow Z$	OCCUR=4
	$1.29 {}^{+0.24}_{-0.22} \pm 0.06$		[7] ACKERSTAFF	98G	OPAL	$e^+e^- \rightarrow Z$	
	$1.20 \pm 0.08 \pm 0.06$		[8] BARATE	98D	ALEP	$e^+e^- \rightarrow Z$	
	1.21 ± 0.11		[7] BARATE	98D	ALEP	$e^+e^- \rightarrow Z$	OCCUR=2
	$1.32 \pm 0.15 \pm 0.07$		[9] ABE	96M	CDF	$p\overline{p}$ at 1.8 TeV	
	$1.10 {}^{+0.19}_{-0.17} \pm 0.09$		[7] ABREU	96D	DLPH	$e^+e^- \rightarrow Z$	OCCUR=2
	$1.16 \pm 0.11 \pm 0.06$		[7] AKERS	96	OPAL	$e^+e^- \rightarrow Z$	
	• • • We do not use the following data for averages, fits, limits, etc. • • •						
	$1.22 {}^{+0.22}_{-0.18} \pm 0.04$		[3] ABAZOV	05C	D0	Repl. by ABAZOV 07S	
	$1.14 \pm 0.08 \pm 0.04$		[10] ABREU	99W	DLPH	$e^+e^- \rightarrow Z$	OCCUR=3
	$1.46 {}^{+0.22}_{-0.21}{}^{+0.07}_{-0.09}$		ABREU	96D	DLPH	Repl. by ABREU 99W	
	$1.27 {}^{+0.35}_{-0.29} \pm 0.09$		ABREU	95S	DLPH	Repl. by ABREU 99W	
	$1.05 {}^{+0.12}_{-0.11} \pm 0.09$	290	BUSKULIC	95L	ALEP	Repl. by BARATE 98D	
	$1.04 {}^{+0.48}_{-0.38} \pm 0.10$	11	[11] ABREU	93F	DLPH	Excess $\Lambda\mu^-$, decay lengths	
	$1.05 {}^{+0.23}_{-0.20} \pm 0.08$	157	[12] AKERS	93	OPAL	Excess $\Lambda\ell^-$, decay lengths	
	$1.12 {}^{+0.32}_{-0.29} \pm 0.16$	101	[13] BUSKULIC	92I	ALEP	Excess $\Lambda\ell^-$, impact parameters	

[1] Measured with $\Lambda_b^0 \rightarrow J/\psi(\mu^+\mu^-)\,\Lambda^0(p\pi^-)$ decays. NODE=S061T;LINKAGE=AD

[2] Measured mean life using fully reconstructed $\Lambda_b^0 \rightarrow \Lambda_c^+\pi^-$ decays. NODE=S061T;LINKAGE=AA

[3] Measured mean life using fully reconstructed $\Lambda_b^0 \rightarrow J/\psi\Lambda$ decays. NODE=S061T;LINKAGE=AB

[4] Measured using semileptonic decays $\Lambda_b(0) \rightarrow \Lambda_c^+\mu\nu X$, $\Lambda_c^+ \rightarrow K_S^0 p$. NODE=S061T;LINKAGE=BA

[5] Measured using $\Lambda\ell^-$ decay length. NODE=S061T;LINKAGE=N2

[6] Measured using $p\ell^-$ decay length. NODE=S061T;LINKAGE=N3

[7] Measured using $\Lambda_c\ell^-$ and $\Lambda\ell^+\ell^-$. NODE=S061T;LINKAGE=LP

[8] Measured using the excess of $\Lambda\ell^-$, lepton impact parameter. NODE=S061T;LINKAGE=KK

[9] Measured using $\Lambda_c\ell^-$. NODE=S061T;LINKAGE=AE

[10] This ABREU 99W result is the combined result of the $\Lambda\ell^-$, $p\ell^-$, and excess $\Lambda\mu^-$ impact parameter measurements. NODE=S061T;LINKAGE=N4

[11] ABREU 93F superseded by ABREU 96D. NODE=S061T;LINKAGE=C

[12] AKERS 93 superseded by AKERS 96. NODE=S061T;LINKAGE=B

[13] BUSKULIC 92I superseded by BUSKULIC 95L. NODE=S061T;LINKAGE=D

b-baryon ADMIXTURE (Λ_b, Ξ_b, Σ_b, Ω_b) REFERENCES

NODE=S061

YOUR PAPER	AAD	13U	PR D87 032002	G. Aad *et al.*	(ATLAS Collab.)	REFID=54939
	AALTONEN	10B	PRL 104 102002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53241
	ABAZOV	07S	PRL 99 142001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52008
	ABAZOV	07U	PRL 99 182001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52043
	ABULENCIA	07A	PRL 98 122001	A. Abulencia *et al.*	(FNAL CDF Collab.)	REFID=51662
	ABAZOV	05C	PRL 94 102001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50511
	ABREU	99W	EPJ C10 185	P. Abreu *et al.*	(DELPHI Collab.)	REFID=47301
	ACKERSTAFF	98G	PL B426 161	K. Ackerstaff *et al.*	(OPAL Collab.)	REFID=45875
	BARATE	98D	EPJ C2 197	R. Barate *et al.*	(ALEPH Collab.)	REFID=45878
	ABE	96M	PRL 77 1439	F. Abe *et al.*	(CDF Collab.)	REFID=44810
	ABREU	96D	ZPHY C71 199	P. Abreu *et al.*	(DELPHI Collab.)	REFID=44691
	AKERS	96	ZPHY C69 195	R. Akers *et al.*	(OPAL Collab.)	REFID=44676
	ABREU	95S	ZPHY C68 375	P. Abreu *et al.*	(DELPHI Collab.)	REFID=44466
	BUSKULIC	95L	PL B357 685	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=44468
	ABREU	93F	PL B311 379	P. Abreu *et al.*	(DELPHI Collab.)	REFID=43437
	AKERS	93	PL B316 435	R. Akers *et al.*	(OPAL Collab.)	REFID=43541
	BUSKULIC	92I	PL B297 449	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=43221

Reference = DEL-AMO-SANCHEZ 11L; PRL 107 041804
Verifier code = BABAR

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June 4, 2013

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Thank you for helping us make the Review accurate and useful.

Sincerely,

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Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(D_s^{(*)-} K^+ \ell^+ \nu_\ell)/\Gamma_{total}$ — **Γ_{16}/Γ**

NODE=S041C78

NODE=S041C78

	VALUE (units 10^{-4})	*DOCUMENT ID*		*TECN*	*COMMENT*
	6.1 ±0.9 OUR AVERAGE				
	$6.13^{+1.04}_{-1.03} \pm 0.67$	[1] STYPULA	12	BELL	$e^+e^- \to \Upsilon(4S)$
YOUR DATA	$6.13^{+1.04}_{-1.03} \pm 0.67$	[1] DEL-AMO-SA...	11L	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041C78;LINKAGE=EP

$B^\pm$ REFERENCES

NODE=S041

	STYPULA 12	PR D86 072007	J. Stypula *et al.*	(BELLE Colalb.)	REFID=54633
YOUR PAPER	DEL-AMO-SA... 11L	PRL 107 041804	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=16499

Reference = AUBERT 09AA; PR D79 112001
Verifier code = BABAR

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NODE=MXXX045

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$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(J/\psi(1S)K^0\pi^+)/\Gamma_{total}$ — **Γ_{209}/Γ**

NODE=S041C74
NODE=S041C74

	VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
	• • • We do not use the following data for averages, fits, limits, etc. • • •			
YOUR DATA	1.101±0.021	[1] AUBERT	09AA BABR	$e^+e^- \to \Upsilon(4S)$

[1] Does not report systematic uncertainties.

NODE=S041C74;LINKAGE=AU

$\Gamma(\psi(2S)K^0\pi^+)/\Gamma_{total}$ — **Γ_{233}/Γ**

NODE=S041C75
NODE=S041C75

	VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
	• • • We do not use the following data for averages, fits, limits, etc. • • •			
YOUR DATA	0.588±0.034	[1] AUBERT	09AA BABR	$e^+e^- \to \Upsilon(4S)$

[1] Does not report systematic uncertainties.

NODE=S041C75;LINKAGE=AU

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER AUBERT 09AA PR D79 112001 B. Aubert *et al.* (BABAR Collab.)

REFID=52940
NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(J/\psi(1S)K^+\pi^-)/\Gamma_{total}$ — **Γ_{168}/Γ**

NODE=S042R4
NODE=S042R4

	VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
	1.16 ±0.56 ±0.01			[1] BORTOLETTO92	CLEO	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA	1.079±0.011			[2] AUBERT	09AA BABR	$e^+e^- \to \Upsilon(4S)$
	<1.3	90		[3] ALBRECHT	87D ARG	$e^+e^- \to \Upsilon(4S)$
	<6.3	90	2	GILES	84 CLEO	$e^+e^- \to \Upsilon(4S)$

[1] BORTOLETTO 92 reports $(1.0 \pm 0.4 \pm 0.3) \times 10^{-3}$ from a measurement of $[\Gamma(B^0 \to J/\psi(1S) K^+ \pi^-)/\Gamma_{total}] \times [B(J/\psi(1S) \to e^+ e^-)]$ assuming $B(J/\psi(1S) \to e^+ e^-) = 0.069 \pm 0.009$, which we rescale to our best value $B(J/\psi(1S) \to e^+ e^-) = (5.94 \pm 0.06) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042R4;LINKAGE=B9

[2] Does not report systematic uncertainties. NODE=S042R4;LINKAGE=AU

[3] ALBRECHT 87D assume $B^+ B^- / B^0 \overline{B}^0$ ratio is 55/45. $K\pi$ system is specifically selected as nonresonant. NODE=S042R4;LINKAGE=C

$\Gamma(\psi(2S) K^+ \pi^-)/\Gamma_{total}$ — Γ_{210}/Γ

NODE=S042R68
NODE=S042R68

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
5.68±0.13±0.42		[1] MIZUK	09	BELL	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA 5.57±0.16		[2] AUBERT	09AA	BABR	$e^+ e^- \to \Upsilon(4S)$
<10	90	[1] ALBRECHT	90J	ARG	$e^+ e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042R68;LINKAGE=EP

[2] Does not report systematic uncertainties. NODE=S042R68;LINKAGE=AU

B^0 REFERENCES

NODE=S042

YOUR PAPER	AUBERT	09AA	PR D79 112001	B. Aubert *et al.*	(BABAR Collab.)	REFID=52940
	MIZUK	09	PR D80 031104	R. Mizuk *et al.*	(BELLE Collab.)	REFID=52960
	BORTOLETTO	92	PR D45 21	D. Bortoletto *et al.*	(CLEO Collab.)	REFID=41920
	ALBRECHT	90J	ZPHY C48 543	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=41437
	ALBRECHT	87D	PL B199 451	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=40325
	GILES	84	PR D30 2279	R. Giles *et al.*	(CLEO Collab.)	REFID=11570

Reference = LEES 12; PR D85 011102
Verifier code = BABAR

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NODE=MXXX045

NODE=MXXX045

$B^\pm/B^0$ ADMIXTURE

NODE=S049

$B^\pm/B^0$ ADMIXTURE BRANCHING RATIOS

NODE=S049215

$\Gamma(\overline{\Lambda}_c^- \mu^+ \text{anything})/\Gamma(\overline{\Lambda}_c^- \text{anything})$ **Γ_{100}/Γ_{97}**

NODE=S049R03
NODE=S049R03

	VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$-2.0 \pm 2.0 \pm 1.9$**	LEES	12	BABR	$e^+e^- \to \Upsilon(4S)$

$\Gamma(\overline{\Lambda}_c^- \ell^+ \text{anything})/\Gamma(\Lambda_c^+ / \overline{\Lambda}_c^- \text{anything})$ **Γ_{98}/Γ_{95}**

NODE=S049R04
NODE=S049R04

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$<2.5 \times 10^{-2}$**	90	[1] LEES	12	BABR	$e^+e^- \to \Upsilon(4S)$

[1] LEES 12 quotes also the measurement $\Gamma(B \to \overline{\Lambda}_c^- \ell^+ \text{anything})/\Gamma(B \to \Lambda_c^+ / \overline{\Lambda}_c^- \text{anything}) = (1.2 \pm 0.7 \pm 0.4) \times 10^{-2}$.

NODE=S049R04;LINKAGE=LE

$\Gamma(\overline{\Lambda}_c^- \ell^+ \text{anything})/\Gamma(\overline{\Lambda}_c^- \text{anything})$ **Γ_{98}/Γ_{97}**

NODE=S049R02
NODE=S049R02

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$<3.5 \times 10^{-2}$**	90	[1] LEES	12	BABR	$e^+e^- \to \Upsilon(4S)$

[1] LEES 12 quotes also the measurement $\Gamma(B \to \overline{\Lambda}_c^- \ell^+ \text{anything})/\Gamma(B \to \overline{\Lambda}_c^- \text{anything}) = (1.7 \pm 1.0 \pm 0.6) \times 10^{-2}$.

NODE=S049R02;LINKAGE=LE

$B^\pm/B^0$ ADMIXTURE REFERENCES

NODE=S049

YOUR PAPER LEES 12 PR D85 011102 J.P. Lees *et al.* (BABAR Collab.)

REFID=53992

Reference = LEES 12B; PR D85 052003
Verifier code = BABAR

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NODE=MXXX045

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(\chi_{c1}(1P)K^0\pi^+)/\Gamma(J/\psi(1S)K^0\pi^+)$ **$\Gamma_{246}/\Gamma_{209}$**

NODE=S041C73
NODE=S041C73

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.496±0.029±0.021**	[1] LEES	12B	BABR	$e^+e^- \to \Upsilon(4S)$

[1] LEES 12B reports 0.501 ± 0.024 ± 0.028 from a measurement of $[\Gamma(B^+ \to \chi_{c1}(1P)K^0\pi^+)/\Gamma(B^+ \to J/\psi(1S)K^0\pi^+)] \times [B(\chi_{c1}(1P) \to \gamma J/\psi(1S))]$ assuming $B(\chi_{c1}(1P) \to \gamma J/\psi(1S)) = (34.4 \pm 1.5) \times 10^{-2}$, which we rescale to our best value $B(\chi_{c1}(1P) \to \gamma J/\psi(1S)) = (34.8 \pm 1.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=S041C73;LINKAGE=LE

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER LEES 12B PR D85 052003 J.P. Lees *et al.* (BABAR Collab.)

REFID=54042
NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

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B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(\chi_{c1}(1P)K^-\pi^+)/\Gamma(J/\psi(1S)K^+\pi^-)$ **$\Gamma_{218}/\Gamma_{168}$**

NODE=S042C16
NODE=S042C16

	VALUE	DOCUMENT ID		TECN
YOUR DATA	**0.469±0.020±0.020**	[1] LEES	12B	BABR

[1] LEES 12B reports 0.474 ± 0.013 ± 0.026 from a measurement of $[\Gamma(B^0 \to \chi_{c1}(1P)K^-\pi^+)/\Gamma(B^0 \to J/\psi(1S)K^+\pi^-)] \times [B(\chi_{c1}(1P) \to \gamma J/\psi(1S))]$ assuming $B(\chi_{c1}(1P) \to \gamma J/\psi(1S)) = (34.4 \pm 1.5) \times 10^{-2}$, which we rescale to our best value $B(\chi_{c1}(1P) \to \gamma J/\psi(1S)) = (34.8 \pm 1.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=S042C16;LINKAGE=LE

$\Gamma(X(4051)^+K^- \times B(X^+ \to \chi_{c1}\pi^+))/\Gamma_{total}$ **Γ_{220}/Γ**

NODE=S042B92
NODE=S042B92

	VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
	$\mathbf{3.0^{+1.5+3.7}_{-0.8-1.6}}$		[1] MIZUK	08	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
YOUR DATA	<1.8	90	[1,2] LEES	12B	BABR	

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042B92;LINKAGE=EP

[2] Uses $\chi_{c1} \rightarrow J/\psi\gamma$ mode. Uses $\chi_{c1} \rightarrow J/\psi\gamma$ mode. Finds a good description of the data without this $B^0 \rightarrow X(4051)^+ K^-$ decay mode in a fit. NODE=S042B92;LINKAGE=LE

$\Gamma(X(4248)^+ K^- \times B(X^+ \rightarrow \chi_{c1}\pi^+))/\Gamma_{total}$ — Γ_{221}/Γ

NODE=S042B93
NODE=S042B93

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
$4.0^{+2.3}_{-0.9}{}^{+19.7}_{-\ 0.5}$		[1] MIZUK	08	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA <4.0	90	[1,2] LEES	12B	BABR	

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042B93;LINKAGE=EP

[2] Uses $\chi_{c1} \rightarrow J/\psi\gamma$ mode. Finds a good description of the data without this $B^0 \rightarrow X(4248)^+ K^-$ decay mode in a fit. NODE=S042B93;LINKAGE=LE

B^0 REFERENCES

NODE=S042

YOUR PAPER	LEES	12B	PR D85 052003	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54042
	MIZUK	08	PR D78 072004	R. Mizuk *et al.*	(BELLE Collab.)	REFID=52535

Reference = LEES 12D; PRL 109 101802
Verifier code = BABAR

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$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(\overline{D}^0\tau^+\nu_\tau)/\Gamma(\overline{D}^0\ell^+\nu_\ell)$ **Γ_5/Γ_4**

NODE=S041C52

VALUE	DOCUMENT ID		TECN	COMMENT
0.43 ±0.10 OUR AVERAGE	[0.31 ± 0.18 OUR 2012 AVERAGE]			
YOUR DATA **0.429±0.082±0.052**	[1,2] LEES	12D	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.314±0.170±0.049	[1] AUBERT	09S	BABR	Repl. by LEES 12D

NODE=S041C52
NEW

[1] Uses a fully reconstructed B meson as a tag on the recoil side.
[2] Uses $\tau^+ \to e^+\nu_e\overline{\nu}_\tau$ and $\tau^+ \to \mu^+\nu_\mu\overline{\nu}_\tau$ and e^+ or μ^+ as ℓ^+.

NODE=S041C52;LINKAGE=AU
NODE=S041C52;LINKAGE=LE

$\Gamma(\overline{D}^*(2007)^0\tau^+\nu_\tau)/\Gamma(\overline{D}^*(2007)^0\ell^+\nu_\ell)$ **Γ_7/Γ_6**

NODE=S041C53

VALUE	DOCUMENT ID		TECN	COMMENT
0.32 ±0.04 OUR AVERAGE	[0.35 ± 0.08 OUR 2012 AVERAGE]			
YOUR DATA **0.322±0.032±0.022**	[1,2] LEES	12D	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.346±0.073±0.034	[1] AUBERT	09S	BABR	Repl. by LEES 12D

NODE=S041C53
NEW

[1] Uses a fully reconstructed B meson as a tag on the recoil side.
[2] Uses $\tau^+ \to e^+\nu_e\overline{\nu}_\tau$ and $\tau^+ \to \mu^+\nu_\mu\overline{\nu}_\tau$ and e^+ or μ^+ as ℓ^+.

NODE=S041C53;LINKAGE=AU
NODE=S041C53;LINKAGE=LE

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER LEES 12D PRL 109 101802 J.P. Lees *et al.* (BABAR Collab.) REFID=54261
AUBERT 09S PR D79 092002 B. Aubert *et al.* (BABAR Collab.) REFID=52799

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(D^-\tau^+\nu_\tau)/\Gamma(D^-\ell^+\nu_\ell)$ **Γ_5/Γ_4**

NODE=S042B94

VALUE	DOCUMENT ID		TECN	COMMENT
0.47 ±0.10 OUR AVERAGE	[0.49 ± 0.18 OUR 2012 AVERAGE]			
YOUR DATA **0.469±0.084±0.053**	[1,2] LEES	12D	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.489±0.165±0.069	[1] AUBERT	09S	BABR	Repl. by LEES 12D

NODE=S042B94
NEW

[1] Uses a fully reconstructed B meson as a tag on the recoil side. NODE=S042B94;LINKAGE=AU
[2] Uses $\tau^+ \to e^+ \nu_e \overline{\nu}_\tau$ and $\tau^+ \to \mu^+ \nu_\mu \overline{\nu}_\tau$ and e^+ or μ^+ as ℓ^+. NODE=S042B94;LINKAGE=LE

$\Gamma(D^*(2010)^- \tau^+ \nu_\tau)/\Gamma(D^*(2010)^- \ell^+ \nu_\ell)$ Γ_7/Γ_6

NODE=S042B95
NODE=S042B95

VALUE	DOCUMENT ID	TECN	COMMENT
0.35 ±0.04 OUR AVERAGE [0.21 ± 0.10 OUR 2012 AVERAGE]			NEW
YOUR DATA **0.355±0.039±0.021**	[1,2] LEES	12D BABR	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.207±0.095±0.008	[1] AUBERT	09S BABR	Repl. by LEES 12D

[1] Uses a fully reconstructed B meson as a tag on the recoil side. NODE=S042B95;LINKAGE=AU
[2] Uses $\tau^+ \to e^+ \nu_e \overline{\nu}_\tau$ and $\tau^+ \to \mu^+ \nu_\mu \overline{\nu}_\tau$ and e^+ or μ^+ as ℓ^+. NODE=S042B95;LINKAGE=LE

B^0 REFERENCES

NODE=S042

YOUR PAPER LEES	12D	PRL 109 101802	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54261
AUBERT	09S	PR D79 092002	B. Aubert *et al.*	(BABAR Collab.)	REFID=52799

$B^\pm/B^0$ ADMIXTURE

NODE=S049

$B^\pm/B^0$ ADMIXTURE BRANCHING RATIOS

NODE=S049215

$\Gamma(\overline{D}\tau^+ \nu_\tau)/\Gamma(\overline{D}\ell^+ \nu_\ell)$ Γ_8/Γ_7

NODE=S049R36
NODE=S049R36

VALUE (units 10^{-2})	DOCUMENT ID	TECN	COMMENT
44 ± 7 OUR AVERAGE [(0.86 ± 0.27) × 10^{-2} OUR 2012 AVERAGE]			NEW
YOUR DATA **44.0 ± 5.8±4.2**	[1,2] LEES	12D BABR	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
4.16±11.7±5.2	[1] AUBERT	08N BABR	Repl. by LEES 12D

[1] Uses a fully reconstructed B meson as a tag on the recoil side. NODE=S049R36;LINKAGE=AU
[2] Uses $\tau^+ \to e^+ \nu_e \overline{\nu}_\tau$ and $\tau^+ \to \mu^+ \nu_\mu \overline{\nu}_\tau$ and e^+ or μ^+ as ℓ^+. Obtained from simultaneous fit to B+ and B0 assuming isospin symmetry. NODE=S049R36;LINKAGE=LE

$\Gamma(D^* \tau^+ \nu_\tau)/\Gamma(D^* \ell^+ \nu_\ell)$ Γ_{12}/Γ_{11}

NODE=S049R37
NODE=S049R37

VALUE (units 10^{-2})	DOCUMENT ID	TECN	COMMENT
33.2±3.0 OUR AVERAGE [(1.62 ± 0.33) × 10^{-2} OUR 2012 AVERAGE]			NEW
YOUR DATA **33.2±2.4±1.8**	[1] LEES	12D BABR	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
29.7±5.6±1.8	[2] AUBERT	08N BABR	Repl. by LEES 12D

[1] Uses $\tau^+ \to e^+ \nu_e \overline{\nu}_\tau$ and $\tau^+ \to \mu^+ \nu_\mu \overline{\nu}_\tau$ and e^+ or μ^+ as ℓ^+. Obtained from simultaneous fit to B+ and B0 assuming isospin symmetry. Uses a fully reconstructed B meson as a tag on the recoil side. NODE=S049R37;LINKAGE=LE
[2] Uses a fully reconstructed B meson as a tag on the recoil side. The results are normalized to the B^+ decay rate. NODE=S049R37;LINKAGE=AU

$B^\pm/B^0$ ADMIXTURE REFERENCES

NODE=S049

YOUR PAPER LEES	12D	PRL 109 101802	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54261
AUBERT	08N	PRL 100 021801	B. Aubert *et al.*	(BABAR Collab.)	REFID=52222
Also		PR D79 092002	B. Aubert *et al.*	(BABAR Collab.)	REFID=52799

Reference = DEL-AMO-SANCHEZ 12; PR D85 092017
Verifier code = BABAR

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Fabio Anulli

EMAIL: anulli@slac.stanford.edu

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(\overline{D}^0 p\overline{p}\pi^+)/\Gamma_{total}$ — **Γ_{430}/Γ**

NODE=S041C22
NODE=S041C22

	VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
YOUR DATA	**3.72±0.11±0.25**	[1,2] DEL-AMO-SA..12	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Uses the values of D and D^* branching fractions from PDG 08.
[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041C22;LINKAGE=DA
NODE=S041C22;LINKAGE=EP

$\Gamma(\overline{D}^{*0} p\overline{p}\pi^+)/\Gamma_{total}$ — **Γ_{431}/Γ**

NODE=S041C23
NODE=S041C23

	VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
YOUR DATA	**3.73±0.17±0.27**	[1,2] DEL-AMO-SA..12	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Uses the values of D and D^* branching fractions from PDG 08.
[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041C23;LINKAGE=DA
NODE=S041C23;LINKAGE=EP

$\Gamma(D^- p\overline{p}\pi^+\pi^-)/\Gamma_{total}$ — **Γ_{432}/Γ**

NODE=S041C24
NODE=S041C24

	VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
YOUR DATA	**1.66±0.13±0.27**	[1,2] DEL-AMO-SA..12	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Uses the values of D and D^* branching fractions from PDG 08.
[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041C24;LINKAGE=DA
NODE=S041C24;LINKAGE=EP

$\Gamma(D^{*-} p\overline{p}\pi^+\pi^-)/\Gamma_{total}$ — **Γ_{433}/Γ**

NODE=S041C25
NODE=S041C25

	VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
YOUR DATA	**1.86±0.16±0.19**	[1,2] DEL-AMO-SA..12	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Uses the values of D and D^* branching fractions from PDG 08.
[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041C25;LINKAGE=DA
NODE=S041C25;LINKAGE=EP

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER	DEL-AMO-SA... 12	PR D85 092017	P. del Amo Sanchez *et al.*	(BABAR Collab.)
	PDG 08	PL B667 1	C. Amsler *et al.*	(PDG Collab.)

REFID=54286
REFID=52166

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(\overline{D}^0 p\overline{p})/\Gamma_{total}$ — Γ_{420}/Γ

NODE=S042B29
NODE=S042B29

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
1.04±0.07 OUR AVERAGE				
[(1.14 ± 0.09) × 10^{-4} OUR 2012 AVERAGE]				
YOUR DATA 1.02±0.04±0.06	[1,2] DEL-AMO-SA..12		BABR	$e^+e^- \to \Upsilon(4S)$
1.18±0.15±0.16	[2] ABE	02W	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.13±0.06±0.08	[2] AUBERT,B	06S	BABR	Repl. by DEL-AMO-SANCHEZ 12

NEW

[1] Uses the values of D and D^* branching fractions from PDG 08.
[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042B29;LINKAGE=DA
NODE=S042B29;LINKAGE=EP

$\Gamma(\overline{D}^*(2007)^0 p\overline{p})/\Gamma_{total}$ — Γ_{422}/Γ

NODE=S042B30
NODE=S042B30

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
0.99±0.11 OUR AVERAGE				
[(1.03 ± 0.13) × 10^{-4} OUR 2012 AVERAGE]				
YOUR DATA 0.97±0.07±0.09	[1,2] DEL-AMO-SA..12		BABR	$e^+e^- \to \Upsilon(4S)$
$1.20^{+0.33}_{-0.29}\pm0.21$	[2] ABE	02W	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.01±0.10±0.09	[2] AUBERT,B	06S	BABR	Repl. by DEL-AMO-SANCHEZ 12

NEW

[1] Uses the values of D and D^* branching fractions from PDG 08.
[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042B30;LINKAGE=DA
NODE=S042B30;LINKAGE=EP

$\Gamma(D^- p\overline{p}\pi^+)/\Gamma_{total}$ — Γ_{424}/Γ

NODE=S042B76
NODE=S042B76

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
3.32±0.31 OUR AVERAGE [(3.38 ± 0.32) × 10^{-4} OUR 2012 AVERAGE]				
YOUR DATA **3.32±0.10±0.29**	[1,2] DEL-AMO-SA..12		BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3.38±0.14±0.29	[2] AUBERT,B	06S	BABR	Repl. by DEL-AMO-SANCHEZ 12

NEW

[1] Uses the values of D and D^* branching fractions from PDG 08.
[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042B76;LINKAGE=DA
NODE=S042B76;LINKAGE=EP

$\Gamma(D^*(2010)^- p\overline{p}\pi^+)/\Gamma_{total}$ — Γ_{425}/Γ

NODE=S042S98
NODE=S042S98

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
4.7 ±0.5 OUR AVERAGE Error includes scale factor of 1.2. [(5.0 ± 0.5) × 10^{-4} OUR 2012 AVERAGE]				
YOUR DATA 4.55±0.16±0.39	[1,2] DEL-AMO-SA..12		BABR	$e^+e^- \to \Upsilon(4S)$
$6.5\ ^{+1.3}_{-1.2}\ \pm1.0$	[2] ANDERSON	01	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
4.81±0.22±0.44	[2] AUBERT,B	06S	BABR	Repl. by DEL-AMO-SANCHEZ 12

NEW

[1] Uses the values of D and D^* branching fractions from PDG 08.
[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042S98;LINKAGE=DA
NODE=S042S98;LINKAGE=EP

$\Gamma(\overline{D}^0 p\overline{p}\pi^+\pi^-)/\Gamma_{total}$ — Γ_{426}/Γ

NODE=S042C07
NODE=S042C07

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
YOUR DATA **2.99±0.21±0.45**	[1,2] DEL-AMO-SA..12		BABR	$e^+e^- \to \Upsilon(4S)$

[1] Uses the values of D and D^* branching fractions from PDG 08.
[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042C07;LINKAGE=DA
NODE=S042C07;LINKAGE=EP

$\Gamma(\overline{D}^{*0} p\overline{p}\pi^+\pi^-)/\Gamma_{total}$ — Γ_{427}/Γ

NODE=S042C08
NODE=S042C08

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
YOUR DATA **1.91±0.36±0.29**	[1,2] DEL-AMO-SA..12		BABR	$e^+e^- \to \Upsilon(4S)$

[1] Uses the values of D and D^* branching fractions from PDG 08.
[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042C08;LINKAGE=DA
NODE=S042C08;LINKAGE=EP

B^0 REFERENCES

NODE=S042

YOUR PAPER	DEL-AMO-SA... 12	PR D85 092017	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=54286
	PDG 08	PL B667 1	C. Amsler *et al.*	(PDG Collab.)	REFID=52166
	AUBERT,B 06S	PR D74 051101	B. Aubert *et al.*	(BABAR Collab.)	REFID=51323
	ABE 02W	PRL 89 151802	K. Abe *et al.*	(BELLE Collab.)	REFID=48980
	ANDERSON 01	PRL 86 2732	S. Anderson *et al.*	(CLEO Collab.)	REFID=48093

Reference = LEES 12I; PR D85 054023
Verifier code = BABAR

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Fabio Anulli

EMAIL: anulli@slac.stanford.edu

June 4, 2013

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(\chi_{c0}(1P)K^0)/\Gamma_{total}$ — Γ_{212}/Γ

NODE=S042S89
NODE=S042S89

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	147 ± 27 OUR AVERAGE					
	$[(140^{+60}_{-50}) \times 10^{-6}$ OUR 2012 AVERAGE]					
YOUR DATA	$148^{+105}_{-87} \pm 8$		[1,2] LEES	12I	BABR	$e^+e^- \to \Upsilon(4S)$
	$148 \pm 30 \pm 13$		[1,3] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
	$142^{+55}_{-44} \pm 22$		[1,4] AUBERT	09AU	BABR	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	< 113	90	[4] GARMASH	07	BELL	$e^+e^- \to \Upsilon(4S)$
	<1240	90	[1] AUBERT	05K	BABR	$e^+e^- \to \Upsilon(4S)$
	< 500	90	[5] EDWARDS	01	CLE2	$e^+e^- \to \Upsilon(4S)$

NEW

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042S89;LINKAGE=EP

[2] LEES 12I reports $[\Gamma(B^0 \to \chi_{c0}(1P)K^0)/\Gamma_{total}] \times [B(\chi_{c0}(1P) \to K^0_S K^0_S)] = (0.46^{+0.25}_{-0.17} \pm 0.21) \times 10^{-6}$ which we divide by our best value $B(\chi_{c0}(1P) \to K^0_S K^0_S) = (3.10 \pm 0.18) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=S042S89;LINKAGE=LE

[3] Measured in the $B^0 \to K^0_S K^+ K^-$ decay.

NODE=S042S89;LINKAGE=LA

[4] Uses Dalitz plot analysis of the $B^0 \to K^0 \pi^+ \pi^-$ final state decays.

NODE=S042S89;LINKAGE=GM

[5] EDWARDS 01 assumes equal production of B^0 and B^+ at the $\Upsilon(4S)$. The correlated uncertainties (28.3)% from $B(J/\psi(1S) \to \gamma\eta_c)$ in those modes have been accounted for.

NODE=S042S89;LINKAGE=A

$\Gamma(K^0_S K^0_S K^0_S)/\Gamma_{total}$ — Γ_{300}/Γ

NODE=S042B59
NODE=S042B59

	VALUE (units 10^{-6})		DOCUMENT ID		TECN	COMMENT
	6.0 ± 0.5 OUR AVERAGE Error includes scale factor of 1.1. $[(6.2^{+1.2}_{-1.1}) \times 10^{-6}$ OUR 2012 AVERAGE Scale factor = 1.3]					
YOUR DATA	$6.19 \pm 0.48 \pm 0.19$		[1] LEES	12I	BABR	$e^+e^- \to \Upsilon(4S)$
	$4.2^{+1.6}_{-1.3} \pm 0.8$		[1] GARMASH	04	BELL	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	$6.9^{+0.9}_{-0.8} \pm 0.6$		[1] AUBERT,B	05	BABR	Repl. by LEES 12I

NEW

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042B59;LINKAGE=EP

$\Gamma(f_0(980)K^0,\ f_0 \to K^0_S K^0_S)/\Gamma_{total}$ — Γ_{301}/Γ

NODE=S042T91
NODE=S042T91

	VALUE (units 10^{-6})		DOCUMENT ID		TECN	COMMENT
YOUR DATA	$\mathbf{2.7^{+1.3}_{-1.2} \pm 1.3}$		[1,2] LEES	12I	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042T91;LINKAGE=EP
[2] Uses Dalitz plot analysis of the $B^0 \to K^0_S K^0_S K^0_S$ decay. NODE=S042T91;LINKAGE=LE

$\Gamma(f_0(1710) K^0,\ f_0 \to K^0_S K^0_S)/\Gamma_{total}$ — Γ_{302}/Γ

NODE=S042T92
NODE=S042T92

	VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$0.50^{+0.46}_{-0.24} \pm 0.11$	[1,2] LEES	12I	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042T92;LINKAGE=EP
[2] Uses Dalitz plot analysis of the $B^0 \to K^0_S K^0_S K^0_S$ decay. NODE=S042T92;LINKAGE=LE

$\Gamma(f_0(2010) K^0,\ f_0 \to K^0_S K^0_S)/\Gamma_{total}$ — Γ_{303}/Γ

NODE=S042T93
NODE=S042T93

	VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$0.54^{+0.21}_{-0.20} \pm 0.52$	[1,2] LEES	12I	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042T93;LINKAGE=EP
[2] Uses Dalitz plot analysis of the $B^0 \to K^0_S K^0_S K^0_S$ decay. NODE=S042T93;LINKAGE=LE

$\Gamma(K^0_S K^0_S K^0_S \text{nonresonant})/\Gamma_{total}$ — Γ_{304}/Γ

NODE=S042T94
NODE=S042T94

	VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$13.3^{+2.2}_{-2.3} \pm 2.2$	[1,2] LEES	12I	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042T94;LINKAGE=EP
[2] Uses Dalitz plot analysis of the $B^0 \to K^0_S K^0_S K^0_S$ decay. NODE=S042T94;LINKAGE=LE

CP VIOLATION PARAMETERS

NODE=S042229

$C_{K_S K_S K_S}(B^0 \to K_S K_S K_S)$

NODE=S042CX5
NODE=S042CX5

	VALUE	DOCUMENT ID		TECN	COMMENT
	-0.23 ± 0.14 OUR AVERAGE [-0.15 ± 0.16 OUR 2012 AVERAGE Scale factor = 1.1]				NEW
YOUR DATA	$-0.17 \pm 0.18 \pm 0.04$	LEES	12I	BABR	$e^+e^- \to \Upsilon(4S)$
	$-0.31 \pm 0.20 \pm 0.07$	[1] CHEN	07	BELL	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	$0.02 \pm 0.21 \pm 0.05$	AUBERT	07AT	BABR	Repl. by LEES 12I
	$-0.34^{+0.28}_{-0.25} \pm 0.05$	AUBERT,B	05	BABR	Repl. by AUBERT 07AT
	$-0.54 \pm 0.34 \pm 0.09$	[1] SUMISAWA	05	BELL	Repl. by CHEN 07

[1] Belle Collab. quotes $A_{K_S K_S K_S}$ which is equal to $-C_{K_S K_S K_S}$. NODE=S042CX5;LINKAGE=BA

$S_{K_S K_S K_S}(B^0 \to K_S K_S K_S)$

NODE=S042SX5
NODE=S042SX5

	VALUE	DOCUMENT ID		TECN	COMMENT
	-0.5 ± 0.6 OUR AVERAGE Error includes scale factor of 3.0. [-0.4 ± 0.5 OUR 2012 AVERAGE Scale factor = 2.5]				NEW
YOUR DATA	$-0.94^{+0.24}_{-0.21} \pm 0.06$	LEES	12I	BABR	$e^+e^- \to \Upsilon(4S)$
	$0.30 \pm 0.32 \pm 0.08$	CHEN	07	BELL	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	$-0.71 \pm 0.24 \pm 0.04$	AUBERT	07AT	BABR	Repl. by LEES 12I
	$-0.71^{+0.38}_{-0.32} \pm 0.04$	AUBERT,B	05	BABR	Repl. by AUBERT 07AT
	$1.26 \pm 0.68 \pm 0.20$	SUMISAWA	05	BELL	Repl. by CHEN 07.

B^0 REFERENCES

NODE=S042

YOUR PAPER	LEES	12I	PR D85 054023	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54376
	LEES	12O	PR D85 112010	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54382
	AUBERT	09AU	PR D80 112001	B. Aubert *et al.*	(BABAR Collab.)	REFID=53180
	AUBERT	07AT	PR D76 091101	B. Aubert *et al.*	(BABAR Collab.)	REFID=51983
	CHEN	07	PRL 98 031802	K.-F. Chen *et al.*	(BELLE Collab.)	REFID=51609
	GARMASH	07	PR D75 012006	A. Garmash *et al.*	(BELLE Collab.)	REFID=51594
	AUBERT	05K	PRL 94 171801	B. Aubert *et al.*	(BABAR Collab.)	REFID=50591
	AUBERT,B	05	PRL 95 011801	B. Aubert *et al.*	(BABAR Collab.)	REFID=50683
	SUMISAWA	05	PRL 95 061801	K. Sumisawa *et al.*	(BELLE Collab.)	REFID=50695
	GARMASH	04	PR D69 012001	A. Garmash *et al.*	(BELLE Collab.)	REFID=49642
	EDWARDS	01	PRL 86 30	K.W. Edwards *et al.*	(CLEO Collab.)	REFID=47903

Reference = LEES 12J; PR D85 071103
Verifier code = BABAR

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Fabio Anulli

EMAIL: anulli@slac.stanford.edu

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

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(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(\pi^- e^+ e^+)/\Gamma_{total}$ — Γ_{488}/Γ

NODE=S041R58

Test of total lepton number conservation.

NODE=S041R58

NODE=S041R58

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
	$<2.3 \times 10^{-8}$ (CL = 90%)		[$<1.6 \times 10^{-6}$ (CL = 90%) OUR 2012 BEST LIMIT]			
YOUR DATA	**$<2.3 \times 10^{-8}$**	90	[1] LEES	12J	BABR	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	$<1.6 \times 10^{-6}$	90	[1] EDWARDS	02B	CLE2	$e^+e^- \to \Upsilon(4S)$
	<0.0039	90	[2] WEIR	90B	MRK2	e^+e^- 29 GeV

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

[2] WEIR 90B assumes B^+ production cross section from LUND.

NODE=S041R58;LINKAGE=EP

NODE=S041R58;LINKAGE=A

$\Gamma(\pi^- \mu^+ \mu^+)/\Gamma_{total}$ — Γ_{489}/Γ

NODE=S041R60

Test of total lepton number conservation.

NODE=S041R60

NODE=S041R60

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
	$< 1.3 \times 10^{-8}$ (CL = 95%)		[$<4.4 \times 10^{-8}$ (CL = 90%) OUR 2012 BEST LIMIT]			
	$< 1.3 \times 10^{-8}$	95	[1] AAIJ	12AD	LHCB	pp at 7 TeV
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	$< 4.4 \times 10^{-8}$	90	AAIJ	12C	LHCB	pp at 7 TeV
YOUR DATA	$<10.7 \times 10^{-8}$	90	[2] LEES	12J	BABR	$e^+e^- \to \Upsilon(4S)$
	$< 1.4 \times 10^{-6}$	90	[2] EDWARDS	02B	CLE2	$e^+e^- \to \Upsilon(4S)$
	$< 9.1 \times 10^{-3}$	90	[3] WEIR	90B	MRK2	e^+e^- 29 GeV

[1] Uses $B^+ \to J/\psi K^+$, $J/\psi \to \mu^+\mu^-$ mode for normalization. Obtains neutrino-mass-dependent upper limits in the range 0.4–1.0 $\times 10^{-8}$.

NODE=S041R60;LINKAGE=AA

[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041R60;LINKAGE=EP

[3] WEIR 90B assumes B^+ production cross section from LUND.

NODE=S041R60;LINKAGE=A

$\Gamma(K^- e^+ e^+)/\Gamma_{total}$ — Γ_{494}/Γ

NODE=S041R61

Test of total lepton number conservation.

NODE=S041R61

NODE=S041R61

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
	$<3.0 \times 10^{-8}$ (CL = 90%)		[$<1.0 \times 10^{-6}$ (CL = 90%) OUR 2012 BEST LIMIT]			
YOUR DATA	**$<3.0 \times 10^{-8}$**	90	[1] LEES	12J	BABR	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	$<1.0 \times 10^{-6}$	90	[1] EDWARDS	02B	CLE2	$e^+e^- \to \Upsilon(4S)$
	<0.0039	90	[2] WEIR	90B	MRK2	e^+e^- 29 GeV

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041R61;LINKAGE=EP

[2] WEIR 90B assumes B^+ production cross section from LUND.

NODE=S041R61;LINKAGE=A

$\Gamma(K^- \mu^+ \mu^+)/\Gamma_{total}$ — Γ_{495}/Γ

NODE=S041R63

Test of total lepton number conservation.

NODE=S041R63

NODE=S041R63

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
	$<4.1 \times 10^{-8}$	90	AAIJ	12C	LHCB	pp at 7 TeV
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA	$<6.7 \times 10^{-8}$	90	[1] LEES	12J	BABR	$e^+e^- \to \Upsilon(4S)$
	$<1.8 \times 10^{-6}$	90	[1] EDWARDS	02B	CLE2	$e^+e^- \to \Upsilon(4S)$
	$<9.1 \times 10^{-3}$	90	[2] WEIR	90B	MRK2	e^+e^- 29 GeV

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S041R63;LINKAGE=EP

[2] WEIR 90B assumes B^+ production cross section from LUND. NODE=S041R63;LINKAGE=A

$B^{\pm}$ REFERENCES

NODE=S041

	AAIJ	12AD	PR D85 112004	R. Aaij *et al.*	(LHCb Collab.)	REFID=54373
	AAIJ	12C	PRL 108 101601	R. Aaij *et al.*	(LHCb Collab.)	REFID=54035
YOUR PAPER	LEES	12J	PR D85 071103	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54377
	EDWARDS	02B	PR D65 111102	K.W. Edwards *et al.*	(CLEO Collab.)	REFID=48799
	WEIR	90B	PR D41 1384	A.J. Weir *et al.*	(Mark II Collab.)	REFID=41242

Reference = LEES 12K; PR D85 072005
Verifier code = BABAR

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Fabio Anulli

EMAIL: anulli@slac.stanford.edu

June 4, 2013

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
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1 Cyclotron Road
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BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(K^*(892)^0\rho^0)/\Gamma_{total}$ — Γ_{274}/Γ

NODE=S042R15
NODE=S042R15

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
3.9±1.3 OUR AVERAGE Error includes scale factor of 1.9. $[(3.4^{+1.7}_{-1.3}) \times 10^{-6}$ OUR 2012 AVERAGE Scale factor = 1.8]					NEW
YOUR DATA $5.1 \pm 0.6^{+0.6}_{-0.8}$		[1] LEES	12K	BABR	$e^+e^- \to \Upsilon(4S)$
$2.1^{+0.8}_{-0.7}{}^{+0.9}_{-0.5}$		[1] KYEONG	09	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$5.6 \pm 0.9 \pm 1.3$		[1] AUBERT,B	06G	BABR	Repl. by LEES 12K
< 34	90	[2] GODANG	02	CLE2	$e^+e^- \to \Upsilon(4S)$
<286	90	[3] ABE	00C	SLD	$e^+e^- \to Z$
<460	90	ALBRECHT	91B	ARG	$e^+e^- \to \Upsilon(4S)$
<580	90	[4] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$
<960	90	[5] AVERY	87	CLEO	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042R15;LINKAGE=EP

[2] Assumes a helicity 00 configuration. For a helicity 11 configuration, the limit decreases to 2.4×10^{-5}. NODE=S042R15;LINKAGE=Z1

[3] ABE 00C assumes B($Z \to b\overline{b}$)=(21.7 ± 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})$% and $f_{B_s}=(10.5^{+1.8}_{-2.2})$%. NODE=S042R15;LINKAGE=KQ

[4] AVERY 89B reports $< 6.7 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%. NODE=S042R15;LINKAGE=A1

[5] AVERY 87 reports $< 1.2 \times 10^{-3}$ assuming the $\Upsilon(4S)$ decays 40% to $B^0\overline{B}^0$. We rescale to 50%. NODE=S042R15;LINKAGE=AV

$\Gamma(K^*(892)^0 f_0(980),\ f_0 \to \pi\pi)/\Gamma_{total}$ — Γ_{275}/Γ

NODE=S042R43
NODE=S042R43

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
$3.9^{+2.1}_{-1.8}$ OUR AVERAGE Error includes scale factor of 3.9.					
YOUR DATA $5.7 \pm 0.6 \pm 0.4$		[1] LEES	12K	BABR	$e^+e^- \to \Upsilon(4S)$
$1.4^{+0.6}_{-0.5}{}^{+0.6}_{-0.4}$		[1,2] KYEONG	09	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 4.3	90	[1] AUBERT,B	06G	BABR	$e^+e^- \to \Upsilon(4S)$
<170	90	[3] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042R43;LINKAGE=EP

[2] The upper limit is 2.2×10^{-6} at 90% CL. NODE=S042R43;LINKAGE=LE

[3] AVERY 89B reports $< 2.0 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%. NODE=S042R43;LINKAGE=A1

$\Gamma(K^*(892)^+\rho^-)/\Gamma_{total}$ — Γ_{279}/Γ

NODE=S042T11
NODE=S042T11

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**10.3±2.3±1.3**		[1] LEES	12K	BABR	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	<12.0	90	[1] AUBERT,B	06G	BABR	Repl. by LEES 12K

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042T11;LINKAGE=EP

$\Gamma(K_0^*(1430)^+\rho^-)/\Gamma_{total}$ — Γ_{280}/Γ

NODE=S042T86
NODE=S042T86

	VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**28±10±6**	[1] LEES	12K	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042T86;LINKAGE=EP

$\Gamma(K_0^*(1430)^0\rho^0)/\Gamma_{total}$ — Γ_{282}/Γ

NODE=S042T83
NODE=S042T83

	VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**27±4±4**	[1] LEES	12K	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042T83;LINKAGE=EP

$\Gamma(K_0^*(1430)^0 f_0(980),\ f_0 \to \pi\pi)/\Gamma_{total}$ — Γ_{283}/Γ

NODE=S042T84
NODE=S042T84

	VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**2.7±0.7±0.6**	[1] LEES	12K	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042T84;LINKAGE=EP

$\Gamma(K_2^*(1430)^0 f_0(980),\ f_0 \to \pi\pi)/\Gamma_{total}$ — Γ_{284}/Γ

NODE=S042T85
NODE=S042T85

	VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**8.6±1.7±1.0**	[1] LEES	12K	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042T85;LINKAGE=EP

POLARIZATION IN B^0 DECAY

NODE=S042223

NODE=S042223

In decays involving two vector mesons, one can distinguish among the states in which meson polarizations are both longitudinal (L) or both are transverse and parallel ($\|$) or perpendicular ($\perp$) to each other with the parameters Γ_L/Γ, $\Gamma_\perp/\Gamma$, and the relative phases $\phi_\|$ and $\phi_\perp$. See the definitions in the note on "Polarization in B Decays" review in the B^0 Particle Listings.

Γ_L/Γ in $B^0 \to K^*(892)^0\rho^0$

NODE=S042P8
NODE=S042P8

	VALUE	DOCUMENT ID		TECN	COMMENT
	0.40±0.14 OUR AVERAGE [0.57 ± 0.12 OUR 2012 AVERAGE]				
YOUR DATA	**0.40±0.08±0.11**	LEES	12K	BABR	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	0.57±0.09±0.08	AUBERT,B	06G	BABR	Repl. by LEES 12K

NEW

Γ_L/Γ in $B^0 \to K^{*+}\rho^-$

NODE=S042P15
NODE=S042P15

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.38±0.13±0.03**	LEES	12K	BABR	$e^+e^- \to \Upsilon(4S)$

CP VIOLATION PARAMETERS

NODE=S042229

$A_{CP}(B^0 \to K^*(892)^0\rho^0)$

NODE=S042AC9
NODE=S042AC9

	VALUE	DOCUMENT ID		TECN	COMMENT
	−0.06±0.09 OUR AVERAGE [0.09 ± 0.19 OUR 2012 AVERAGE]				
YOUR DATA	**−0.06±0.09±0.02**	LEES	12K	BABR	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	0.09±0.19±0.02	AUBERT,B	06G	BABR	Repl. by LEES 12K

NEW

$A_{CP}(B^0 \to K^{*0} f_0(980))$

NODE=S042AD0
NODE=S042AD0

	VALUE	DOCUMENT ID		TECN	COMMENT
	0.07±0.10 OUR AVERAGE [−0.17 ± 0.28 OUR 2012 AVERAGE]				
YOUR DATA	**0.07±0.10±0.02**	LEES	12K	BABR	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	−0.17±0.28±0.02	AUBERT,B	06G	BABR	Repl. by LEES 12K

NEW

$A_{CP}(B^0 \to K^{*+}\rho^-)$

NODE=S042CT6
NODE=S042CT6

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.21±0.15±0.02**	LEES	12K	BABR	$e^+e^- \to \Upsilon(4S)$

B^0 REFERENCES

NODE=S042

YOUR PAPER	LEES	12K	PR D85 072005	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54378
	KYEONG	09	PR D80 051103	S.-H. Kyeong *et al.*	(BELLE Collab.)	REFID=53017
	AUBERT,B	06G	PRL 97 201801	B. Aubert *et al.*	(BABAR Collab.)	REFID=51485
	GODANG	02	PRL 88 021802	R. Godang *et al.*	(CLEO Collab.)	REFID=48519
	ABE	00C	PR D62 071101	K. Abe *et al.*	(SLD Collab.)	REFID=47762
	ALBRECHT	91B	PL B254 288	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=41451
	AVERY	89B	PL B223 470	P. Avery *et al.*	(CLEO Collab.)	REFID=40820
	AVERY	87	PL B183 429	P. Avery *et al.*	(CLEO Collab.)	REFID=40387

Reference = LEES 12O; PR D85 112010
Verifier code = BABAR

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Fabio Anulli

EMAIL: anulli@slac.stanford.edu

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
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FAX: 1-(510)-486–4799
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BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(\chi_{c0}(1P)K^+)/\Gamma_{total}$ — **Γ_{239}/Γ**

NODE=S041B41
NODE=S041B41

	VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
	$1.49^{+0.15}_{-0.13}$ OUR AVERAGE					
	$[(1.34^{+0.19}_{-0.16}) \times 10^{-4}$ OUR 2012 AVERAGE]					
YOUR DATA	$1.84 \pm 0.25 \pm 0.14$		[1,2] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
YOUR DATA	$1.68 \pm 0.32 \pm 0.16$		[1,3] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
	$1.8 \pm 0.8 \pm 0.1$		[4] LEES	11I	BABR	$e^+e^- \to \Upsilon(4S)$
	$1.24^{+0.28}_{-0.25} \pm 0.06$		[1,5] AUBERT	08AI	BABR	$e^+e^- \to \Upsilon(4S)$
	$4.7 \pm 2.2 \pm 0.3$		[6] AUBERT,BE	06M	BABR	$e^+e^- \to \Upsilon(4S)$
	$1.12 \pm 0.12^{+0.30}_{-0.20}$		[1] GARMASH	06	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	<5	90	[1,7] WICHT	08	BELL	$e^+e^- \to \Upsilon(4S)$
	<1.8	90	[8] AUBERT	06E	BABR	$e^+e^- \to \Upsilon(4S)$
	$1.84 \pm 0.32 \pm 0.31$		[1,9] AUBERT	06O	BABR	Repl. by LEES 12O
	<8.9	90	[1] AUBERT	05K	BABR	$e^+e^- \to \Upsilon(4S)$
	$1.39 \pm 0.49 \pm 0.11$		[10] AUBERT,B	05N	BABR	Repl. by AUBERT 08AI
	$1.96 \pm 0.35^{+2.00}_{-0.42}$		[1] GARMASH	05	BELL	Repl. by GARMASH 06
	2.7 ± 0.7		[11] AUBERT	04T	BABR	Repl. by AUBERT,B 04P
	$3.0 \pm 0.8 \pm 0.3$		[12] AUBERT,B	04P	BABR	Repl. by AUBERT,B 05N
	$6.0 \,^{+2.1}_{-1.8} \pm 1.1$		[13] ABE	02B	BELL	Repl. by GARMASH 05
	<4.8	90	[14] EDWARDS	01	CLE2	$e^+e^- \to \Upsilon(4S)$

NEW

OCCUR=2

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S041B41;LINKAGE=EP

[2] Measured in the $B^+ \to K^+K^-K^+$ decay. NODE=S041B41;LINKAGE=LA

[3] Measured in the $B^+ \to K^+K^0_SK^0_S$ decay. NODE=S041B41;LINKAGE=LB

[4] LEES 11I reports $[\Gamma(B^+ \to \chi_{c0}(1P)K^+)/\Gamma_{total}] \times [B(\chi_{c0}(1P) \to \pi\pi)] = (1.53 \pm 0.66 \pm 0.27) \times 10^{-6}$ which we divide by our best value $B(\chi_{c0}(1P) \to \pi\pi) = (8.5 \pm 0.4) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=S041B41;LINKAGE=LE

[5] AUBERT 08AI reports $(0.70 \pm 0.10^{+0.12}_{-0.10}) \times 10^{-6}$ for $B(B^+ \to \chi_{c0}K^+) \times B(\chi_{c0} \to \pi^+\pi^-)$. We compute $B(B^+ \to \chi_{c0}K^+)$ using the PDG value $B(\chi_{c0} \to \pi\pi) = (8.5 \pm 0.4) \times 10^{-3}$ and 2/3 for the $\pi^+\pi^-$ fraction. Our first error is their experiment's error and the second error is systematic error from using our best value. NODE=S041B41;LINKAGE=UB

[6] AUBERT,BE 06M reports $[\Gamma(B^+ \to \chi_{c0}(1P)K^+)/\Gamma_{total}] \times [B(\chi_{c0}(1P) \to \gamma J/\psi(1S))] = (6.1 \pm 2.6 \pm 1.1) \times 10^{-6}$ which we divide by our best value $B(\chi_{c0}(1P) \to \gamma J/\psi(1S)) = (1.30 \pm 0.07) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. The significance of the observed signal is 2.4 σ. NODE=S041B41;LINKAGE=AP

[7] WICHT 08 reports $[\Gamma(B^+ \to \chi_{c0}(1P)K^+)/\Gamma_{total}] \times [B(\chi_{c0}(1P) \to \gamma\gamma)] < 0.11 \times 10^{-6}$ which we divide by our best value $B(\chi_{c0}(1P) \to \gamma\gamma) = 2.27 \times 10^{-4}$. NODE=S041B41;LINKAGE=WI

[8] Perform measurements of absolute branching fractions using a missing mass technique. NODE=S041B41;LINKAGE=UT

[9] Measured in the $B^+ \to K^+K^-K^+$ decay. NODE=S041B41;LINKAGE=AE

[10] AUBERT,B 05N reports $(0.66 \pm 0.22 \pm 0.08) \times 10^{-6}$ for $B(B^+ \to \chi_c^0 K^+) \times B(\chi_c^0 \to \pi^+\pi^-)$. We compute $B(B^+ \to \chi_c^0 K^+)$ using the PDG value $B(\chi_c^0 \to \pi^+\pi^-) = (7.1 \pm 0.6) \times 10^{-3}$ and 2/3 for the $\pi^+\pi^-$ fraction. NODE=S041B41;LINKAGE=AT

[11] The measurement performed using decay channels $\chi_c^0 \to \pi^+\pi^-$ and $\chi_c^0 \to K^+K^-$. The ratio of the branching ratios for these channels is found to be consistent with world average. NODE=S041B41;LINKAGE=AU

[12] AUBERT 04P reports $B(B^+ \to \chi_c^0 K^+) \times B(\chi_c^0 \to \pi^+\pi^-) = (1.5 \pm 0.4 \pm 0.1) \times 10^{-6}$ and used PDG value of $B(\chi_c^0 \to \pi\pi) = (7.4 \pm 0.8) \times 10^{-3}$ and Clebsh-Gordan coefficient to compute $B(B^\pm -> \chi_c^0 K^+)$. NODE=S041B41;LINKAGE=AB

[13] ABE 02B measures the ratio of $B(B^+ \to \chi_c^0 K^+)/B(B^+ \to J/\psi(1S) K^+) = 0.60 + 0.21 - 0.18 \pm 0.05 \pm 0.08$, where the third error is due to the uncertainty in the $B(\chi_c^0 \to \pi^+\pi^-)$, and uses $B(B^+ \to J/\psi(1S) K^+) = (10.0 \pm 1.0) \times 10^{-4}$ to obtain the result. NODE=S041B41;LINKAGE=B4

[14] EDWARDS 01 assumes equal production of B^0 and B^+ at the $\Upsilon(4S)$. The correlated uncertainties (28.3)% from $B(J/\psi(1S) \to \gamma\eta_c)$ in those modes have been accounted for. NODE=S041B41;LINKAGE=A

$\Gamma(f_0(1500) K^+)/\Gamma_{total}$ — Γ_{267}/Γ

NODE=S041T03
NODE=S041T03

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	3.7± 2.2 OUR AVERAGE					NEW
	[$(0.7 \pm 0.5) \times 10^{-6}$ OUR 2012 AVERAGE]					
YOUR DATA	$17 \pm 4 \pm 12$		[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
YOUR DATA	$20 \pm 10 \pm 27$		[2] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$ OCCUR=2
	$3.1^{+2.2}_{-2.3} \pm 0.2$		[3,4] AUBERT	08AI	BABR	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	<19	90	[4,5] AUBERT,B	05N	BABR	Repl. by AUBERT 08AI

[1] Measured in the $B^+ \to K^+K^-K^+$ decay. NODE=S041T03;LINKAGE=LA

[2] Measured in the $B^+ \to K^+K^0_SK^0_S$ decay. NODE=S041T03;LINKAGE=LB

[3] AUBERT 08AI reports $B(B^+ \to f_0(1500) K^+) \cdot B(f_0(1500) \to \pi^+\pi^-) = (0.73 \pm 0.21^{+0.47}_{-0.48}) \times 10^{-6}$. We divide this result by our best value of $B(f_0(1500) \to \pi\pi) = (34.9 \pm 2.3) \times 10^{-2}$ multiplied by 2/3 to account for the $\pi^+\pi^-$ fraction. Our first quoted uncertainty is the combined experiment's uncertainty and our second is the systematic uncertainty from using out best value. NODE=S041T03;LINKAGE=AU

[4] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S041T03;LINKAGE=EP

[5] AUBERT,B 05N reports $B(B^+ \to f_0(1500) K^+) \cdot B(f_0(1500) \to \pi^+\pi^-) < 4.4 \times 10^{-6}$. We divide this result by our best value of $B(f_0(1500) \to \pi\pi) = (34.9 \pm 2.3) \times 10^{-2}$ multiplied by 2/3 to account for the $\pi^+\pi^-$ fraction. Our first quoted uncertainty is the combined experiment's uncertainty and our second is the systematic uncertainty from using out best value. NODE=S041T03;LINKAGE=AB

$\Gamma(K^+K^0_SK^0_S)/\Gamma_{total}$ — Γ_{311}/Γ

NODE=S041C6
NODE=S041C6

	VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
	10.8±0.6 OUR AVERAGE				NEW
	[$(11.5 \pm 1.3) \times 10^{-6}$ OUR 2012 AVERAGE]				
YOUR DATA	$10.6 \pm 0.5 \pm 0.3$	[1,2] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
	$13.4 \pm 1.9 \pm 1.5$	[1] GARMASH	04	BELL	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	$10.7 \pm 1.2 \pm 1.0$	[1] AUBERT,B	04V	BABR	Repl. by LEES 12O

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S041C6;LINKAGE=EP

[2] All intermediate charmonium and charm resonances are removed, except of χ_{c0}. NODE=S041C6;LINKAGE=LE

$\Gamma(f_0(980) K^+,\ f_0 \to K^0_SK^0_S)/\Gamma_{total}$ — Γ_{312}/Γ

NODE=S041T88
NODE=S041T88

	VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**14.7±2.8±1.8**	[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S041T88;LINKAGE=EP

$\Gamma(f_0(1710) K^+,\ f_0 \to K^0_SK^0_S)/\Gamma_{total}$ — Γ_{313}/Γ

NODE=S041T89
NODE=S041T89

	VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$\mathbf{0.48^{+0.40}_{-0.24} \pm 0.11}$	[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S041T89;LINKAGE=EP

$\Gamma(K^+ K^0_S K^0_S \text{nonresonant})/\Gamma_{total}$ — Γ_{314}/Γ

NODE=S041T90
NODE=S041T90

	VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**19.8±3.7±2.5**	[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041T90;LINKAGE=EP

$\Gamma(f'_2(1525) K^+)/\Gamma_{total}$ — Γ_{322}/Γ

NODE=S041Q67
NODE=S041Q67

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	1.8 ±0.5 OUR AVERAGE Error includes scale factor of 1.1.					
YOUR DATA	1.56±0.36±0.30		[1,2] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
YOUR DATA	2.8 $\pm0.9\ ^{+0.5}_{-0.4}$		[1,3] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	<8	90	[1,4] GARMASH	05	BELL	$e^+e^- \to \Upsilon(4S)$

OCCUR=2

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[2] Measured in the $B^+ \to K^+K^-K^+$ decay.
[3] Measured in the $B^+ \to K^+K^0_SK^0_S$ decay.
[4] GARMASH 05 reports $B(B^+ \to f'_2(1525)K^+) \cdot B(f'_2(1525) \to K^+K^-) < 4.9\times10^{-6}$ at 90% CL. We divide this result by our best value of $B(f'_2(1525) \to K\overline{K}) = 88.7\times10^{-2}$ multiplied by 2/3 to account for the K^+K^- fraction.

NODE=S041Q67;LINKAGE=EP
NODE=S041Q67;LINKAGE=LA
NODE=S041Q67;LINKAGE=LB
NODE=S041Q67;LINKAGE=GA

$\Gamma(K^+K^-K^+)/\Gamma_{total}$ — Γ_{327}/Γ

NODE=S041R80
NODE=S041R80

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	34.0±1.4 OUR AVERAGE Error includes scale factor of 1.4. [(33.7 ± 2.2) × 10^{-6} OUR 2012 AVERAGE Scale factor = 1.4]					
YOUR DATA	34.6±0.6±0.9		[1,2] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
	30.6±1.2±2.3		[1] GARMASH	05	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	35.2±0.9±1.6		[1] AUBERT	06O	BABR	Repl. by LEES 12O
	32.8±1.8±2.8		[1] GARMASH	04	BELL	Repl. by GARMASH 05
	29.6±2.1±1.6		[3] AUBERT	03M	BABR	Repl. by AUBERT 06O
	35.3±3.7±4.5		[4] GARMASH	02	BELL	Repl. by GARMASH 04
	<200	90	[5] ADAM	96D	DLPH	$e^+e^- \to Z$
	<320	90	[5] ABREU	95N	DLPH	Sup. by ADAM 96D
	<350	90	ALBRECHT	91E	ARG	$e^+e^- \to \Upsilon(4S)$

NEW

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[2] All intermediate charmonium and charm resonances are removed, except of χ_{c0}.
[3] Assumes equal production of B^0 and B^+ at the $\Upsilon(4S)$; charm and charmonium contributions are subtracted, otherwise no assumptions about intermediate resonances.
[4] Uses a reference decay mode $B^+ \to \overline{D}^0\pi^+$ and $\overline{D}^0 \to K^+\pi^-$ with $B(B^+ \to \overline{D}^0\pi^+)\cdot B(\overline{D}^0 \to K^+\pi^-) = (20.3 \pm 2.0) \times 10^{-5}$.
[5] Assumes B^0 and B^- production fractions of 0.39, and B_s production fraction of 0.12.

NODE=S041R80;LINKAGE=EP
NODE=S041R80;LINKAGE=LE
NODE=S041R80;LINKAGE=TM
NODE=S041R80;LINKAGE=GM
NODE=S041R80;LINKAGE=SR

$\Gamma(K^+\phi)/\Gamma_{total}$ — Γ_{328}/Γ

NODE=S041R8
NODE=S041R8

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	8.8 $^{+0.7}_{-0.6}$ OUR AVERAGE Error includes scale factor of 1.1. [(8.3 ± 0.7) × 10^{-6} OUR 2012 AVERAGE]					
YOUR DATA	9.2 $\pm0.4\ ^{+0.7}_{-0.5}$		[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
	7.6 ±1.3 ±0.6		[2] ACOSTA	05J	CDF	$p\overline{p}$ at 1.96 TeV
	9.60±0.92$^{+1.05}_{-0.85}$		[1] GARMASH	05	BELL	$e^+e^- \to \Upsilon(4S)$
	5.5 $^{+2.1}_{-1.8}$ ±0.6		[1] BRIERE	01	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	8.4 ±0.7 ±0.7		[1] AUBERT	06O	BABR	Repl. by LEES 12O
	10.0 $^{+0.9}_{-0.8}$ ±0.5		[1] AUBERT	04A	BABR	Repl. by AUBERT 06O
	9.4 ±1.1 ±0.7		[1] CHEN	03B	BELL	Repl. by GARMASH 05
	14.6 $^{+3.0}_{-2.8}$ ±2.0		[3] GARMASH	02	BELL	Repl. by CHEN 03B
	7.7 $^{+1.6}_{-1.4}$ ±0.8		[1] AUBERT	01D	BABR	$e^+e^- \to \Upsilon(4S)$
	<144	90	[4] ABE	00C	SLD	$e^+e^- \to Z$
	< 5	90	[1] BERGFELD	98	CLE2	

NEW

<280	90	[5] ADAM	96D	DLPH	$e^+e^- \to Z$
< 12	90	ASNER	96	CLE2	$e^+e^- \to \Upsilon(4S)$
<440	90	[6] ABREU	95N	DLPH	Sup. by ADAM 96D
<180	90	ALBRECHT	91B	ARG	$e^+e^- \to \Upsilon(4S)$
< 90	90	[7] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$
<210	90	AVERY	87	CLEO	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S041R8;LINKAGE=EP

[2] Uses $B(B^+ \to J/\psi K^+) = (1.00 \pm 0.04) \times 10^{-3}$ and $B(J/\psi \to \mu^+\mu^-) = 0.0588 \pm 0.0010$. NODE=S041R8;LINKAGE=AC

[3] Uses a reference decay mode $B^+ \to \overline{D}^0\pi^+$ and $\overline{D}^0 \to K^+\pi^-$ with $B(B^+ \to \overline{D}^0\pi^+)\cdot B(\overline{D}^0 \to K^+\pi^-) = (20.3 \pm 2.0) \times 10^{-5}$. NODE=S041R8;LINKAGE=GM

[4] ABE 00C assumes $B(Z \to b\overline{b})=(21.7 \pm 0.1)\%$ and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})\%$ and $f_{B_s}=(10.5^{+1.8}_{-2.2})\%$. NODE=S041R8;LINKAGE=KQ

[5] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$. NODE=S041R8;LINKAGE=DQ

[6] Assumes a B^0, B^- production fraction of 0.39 and a B_s production fraction of 0.12. NODE=S041R8;LINKAGE=SR

[7] AVERY 89B reports $< 8 \times 10^{-5}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%. NODE=S041R8;LINKAGE=A1

$\Gamma(f_0(980)K^+ \times B(f_0(980) \to K^+K^-))/\Gamma_{total}$ — Γ_{329}/Γ

NODE=S041Q65
NODE=S041Q65

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**9.4±1.6±2.8**		[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	6.5±2.5±1.6		[1] AUBERT	06O	BABR	$e^+e^- \to \Upsilon(4S)$
	<2.9	90	[1] GARMASH	05	BELL	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S041Q65;LINKAGE=EP

$\Gamma(f_0(1710)K^+ \times B(f_0(1710) \to K^+K^-))/\Gamma_{total}$ — Γ_{333}/Γ

NODE=S041T08
NODE=S041T08

	VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
	1.1 ±0.6 OUR AVERAGE [$(1.7 \pm 1.0) \times 10^{-6}$ OUR 2012 AVERAGE]				NEW
YOUR DATA	**1.12±0.25±0.50**	[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
	1.7 ±1.0 ±0.3	[1] AUBERT	06O	BABR	Repl. by LEES 12O

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S041T08;LINKAGE=EP

$\Gamma(K^+K^-K^+ \text{nonresonant})/\Gamma_{total}$ — Γ_{334}/Γ

NODE=S041B5
NODE=S041B5

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	$23.8^{+2.8}_{-5.0}$ OUR AVERAGE					NEW
	[$(28^{+9}_{-16}) \times 10^{-6}$ OUR 2012 AVERAGE Scale factor = 3.3]					
YOUR DATA	22.8±2.7±7.6		[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
	$24.0 \pm 1.5^{+2.6}_{-6.0}$		[1] GARMASH	05	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	50.0±6.0±4.0		[1] AUBERT	06O	BABR	Repl. by LEES 12O
	<38	90	BERGFELD	96B	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S041B5;LINKAGE=EP

CP VIOLATION

NODE=S041220

A_{CP} is defined as NODE=S041220

$$\frac{B(B^- \to \overline{f}) - B(B^+ \to f)}{B(B^- \to \overline{f}) + B(B^+ \to f)},$$

the *CP*-violation charge asymmetry of exclusive B^- and B^+ decay.

$A_{CP}(B^+ \to K^+K^-K^+ \text{nonresonant})$

NODE=S041CU6
NODE=S041CU6

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.060±0.044±0.019**	LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$

$A_{CP}(B^+ \to f(980)^0K^+)$

NODE=S041CU7
NODE=S041CU7

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**−0.08±0.08±0.04**	[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Measured in the $B^+ \to K^+K^-K^+$ decay. NODE=S041CU7;LINKAGE=LE

$A_{CP}(B^+ \to f'_2(1525)^0 K^+)$

NODE=S041CQ5
NODE=S041CQ5

VALUE	DOCUMENT ID		TECN	COMMENT
$-0.08\ ^{+0.05}_{-0.04}$ OUR AVERAGE				
[$-0.09^{+0.05}_{-0.04}$ OUR 2012 AVERAGE Scale factor = 1.1]				
$0.18 \pm 0.18 \pm 0.04$	[1] LEES	11I	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.106 \pm 0.050 ^{+0.036}_{-0.015}$	AUBERT	08AI	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.077 \pm 0.065 ^{+0.046}_{-0.026}$	GARMASH	06	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
YOUR DATA $0.14 \pm 0.10 \pm 0.04$	[2] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.31 \pm 0.25 \pm 0.08$	[3] AUBERT	06O	BABR	Repl. by LEES 12O
$0.088 \pm 0.095 ^{+0.097}_{-0.056}$	AUBERT,B	05N	BABR	Repl. by AUBERT 08AI

NEW

[1] Measured in $B^+ \to f_0 K^+$ with $f_0 \to \pi^0\pi^0$ decay. NODE=S041CQ5;LINKAGE=LE

[2] Measured in the $B^+ \to K^+K^-K^+$ decay assuming $A_{CP}(B^+ \to f'_2(1525)^0 K^+) = A_{CP}(B^+ \to f_0(1500)^0 K^+) = A_{CP}(B^+ \to f_0(1710)^0 K^+)$ NODE=S041CQ5;LINKAGE=LA

[3] Measured in the $B^+ \to K^+K^-K^+$ decay. NODE=S041CQ5;LINKAGE=AE

$A_{CP}(B^+ \to K^+ K^0_S K^0_S)$

NODE=S041AY8
NODE=S041AY8

VALUE	DOCUMENT ID		TECN	COMMENT
$0.04^{+0.04}_{-0.05}$ OUR AVERAGE [-0.04 ± 0.11 OUR 2012 AVERAGE]				
YOUR DATA **$0.04^{+0.04}_{-0.05} \pm 0.02$**	LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.04 \pm 0.11 \pm 0.02$	[1] AUBERT,B	04V	BABR	Repl. by LEES 12O

NEW

[1] Corresponds to 90% confidence range $-0.23 < A_{CP} < 0.15$. NODE=S041AY8;LINKAGE=AU

$A_{CP}(B^+ \to K^+K^-K^+)$

NODE=S041AY7
NODE=S041AY7

VALUE	DOCUMENT ID		TECN	COMMENT
$-0.017^{+0.024}_{-0.020}$ OUR AVERAGE [-0.017 ± 0.030 OUR 2012 AVERAGE]				
YOUR DATA **$-0.017^{+0.019}_{-0.014} \pm 0.014$**	[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.017 \pm 0.026 \pm 0.015$	AUBERT	06O	BABR	Repl. by LEES 12O
$0.02 \pm 0.07 \pm 0.03$	AUBERT	03M	BABR	Repl. by AUBERT 06O

NEW

[1] All intermediate charmonium and charm resonances are removed, except of χ_{c0}. NODE=S041AY7;LINKAGE=LE

$A_{CP}(B^+ \to \phi K^+)$

NODE=S041AX7
NODE=S041AX7

VALUE	DOCUMENT ID		TECN	COMMENT
0.10 ± 0.04 OUR AVERAGE				
[-0.01 ± 0.06 OUR 2012 AVERAGE]				
YOUR DATA $0.128 \pm 0.044 \pm 0.013$	LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.07 \pm 0.17\ ^{+0.03}_{-0.02}$	ACOSTA	05J	CDF	$p\overline{p}$ at 1.96 TeV
$0.01 \pm 0.12 \pm 0.05$	[1] CHEN	03B	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.00 \pm 0.08 \pm 0.02$	AUBERT	06O	BABR	Repl. by LEES 12O
$0.04 \pm 0.09 \pm 0.01$	[2] AUBERT	04A	BABR	Repl. by AUBERT 06O
$-0.05 \pm 0.20 \pm 0.03$	[3] AUBERT	02E	BABR	$e^+e^- \to \Upsilon(4S)$

NEW

[1] Corresponds to 90% confidence range $-0.20 < A_{CP} < 0.22$. NODE=S041AX7;LINKAGE=CH

[2] Corresponds to 90% confidence range $-0.10 < A_{CP} < 0.18$. NODE=S041AX7;LINKAGE=AU

[3] Corresponds to 90% confidence range $-0.37 < A_{CP} < 0.28$. NODE=S041AX7;LINKAGE=AY

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER	LEES	12O	PR D85 112010	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54382
	LEES	11I	PR D84 092007	J.P. Lees *et al.*	(BABAR Collab.)	REFID=53891
	AUBERT	08AI	PR D78 012004	B. Aubert *et al.*	(BABAR Collab.)	REFID=52358
	WICHT	08	PL B662 323	J. Wicht *et al.*	(BELLE Collab.)	REFID=52204
	AUBERT	06E	PRL 96 052002	B. Aubert *et al.*	(BABAR Collab.)	REFID=51059
	AUBERT	06O	PR D74 032003	B. Aubert *et al.*	(BABAR Collab.)	REFID=51141
	AUBERT,BE	06M	PR D74 071101	B. Aubert *et al.*	(BABAR Collab.)	REFID=51454
	GARMASH	06	PRL 96 251803	A. Garmash *et al.*	(BELLE Collab.)	REFID=51162
	ACOSTA	05J	PRL 95 031801	D. Acosta *et al.*	(CDF Collab.)	REFID=50685
	AUBERT	05K	PRL 94 171801	B. Aubert *et al.*	(BABAR Collab.)	REFID=50591

AUBERT,B	05N	PR D72 072003	B. Aubert *et al.*	(BABAR Collab.)	REFID=50838
Also		PR D74 099903 (errat.)	B. Aubert *et al.*	(BABAR Collab.)	REFID=51506
GARMASH	05	PR D71 092003	A. Garmash *et al.*	(BELLE Collab.)	REFID=50641
AUBERT	04A	PR D69 011102	B. Aubert *et al.*	(BABAR Collab.)	REFID=49719
AUBERT	04P	PRL 92 241802	B. Aubert *et al.*	(BABAR Collab.)	REFID=49931
AUBERT	04T	PR D69 071103	B. Aubert *et al.*	(BABAR Collab.)	REFID=49958
AUBERT,B	04P	PR D70 092001	B. Aubert *et al.*	(BABAR Collab.)	REFID=50193
AUBERT,B	04V	PRL 93 181805	B. Aubert *et al.*	(BABAR Collab.)	REFID=50265
GARMASH	04	PR D69 012001	A. Garmash *et al.*	(BELLE Collab.)	REFID=49642
AUBERT	03M	PRL 91 051801	B. Aubert *et al.*	(BaBar Collab.)	REFID=49513
CHEN	03B	PRL 91 201801	K.-F. Chen *et al.*	(BELLE Collab.)	REFID=49639
ABE	02B	PRL 88 031802	K. Abe *et al.*	(BELLE Collab.)	REFID=48520
AUBERT	02E	PR D65 051101	B. Aubert *et al.*	(BaBar Collab.)	REFID=48636
GARMASH	02	PR D65 092005	A. Garmash *et al.*	(BELLE Collab.)	REFID=48634
AUBERT	01D	PRL 87 151801	B. Aubert *et al.*	(BaBar Collab.)	REFID=48377
BRIERE	01	PRL 86 3718	R.A. Biere *et al.*	(CLEO Collab.)	REFID=48119
EDWARDS	01	PRL 86 30	K.W. Edwards *et al.*	(CLEO Collab.)	REFID=47903
ABE	00C	PR D62 071101	K. Abe *et al.*	(SLD Collab.)	REFID=47762
BERGFELD	98	PRL 81 272	T. Bergfeld *et al.*	(CLEO Collab.)	REFID=46091
ADAM	96D	ZPHY C72 207	W. Adam *et al.*	(DELPHI Collab.)	REFID=45276
ASNER	96	PR D53 1039	D.M. Asner *et al.*	(CLEO Collab.)	REFID=44734
BERGFELD	96B	PRL 77 4503	T. Bergfeld *et al.*	(CLEO Collab.)	REFID=44956
ABREU	95N	PL B357 255	P. Abreu *et al.*	(DELPHI Collab.)	REFID=44417
ALBRECHT	91B	PL B254 288	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=41451
ALBRECHT	91E	PL B262 148	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=41549
AVERY	89B	PL B223 470	P. Avery *et al.*	(CLEO Collab.)	REFID=40820
AVERY	87	PL B183 429	P. Avery *et al.*	(CLEO Collab.)	REFID=40387

NODE=S042

B^0

$$I(J^P) = \tfrac{1}{2}(0^-)$$

Quantum numbers not measured. Values shown are quark-model predictions. NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section. NODE=S042220

$\Gamma(\chi_{c0}(1P)K^0)/\Gamma_{total}$ — Γ_{212}/Γ

NODE=S042S89
NODE=S042S89

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	147± 27 OUR AVERAGE					NEW
	$[(140^{+60}_{-50}) \times 10^{-6}$ OUR 2012 AVERAGE]					
	$148^{+105}_{-87} \pm 8$		[1,2] LEES	12I	BABR	$e^+e^- \to \Upsilon(4S)$
YOUR DATA	$148 \pm 30 \pm 13$		[1,3] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
	$142^{+55}_{-44} \pm 22$		[1,4] AUBERT	09AU	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	< 113	90	[4] GARMASH	07	BELL	$e^+e^- \to \Upsilon(4S)$
	<1240	90	[1] AUBERT	05K	BABR	$e^+e^- \to \Upsilon(4S)$
	< 500	90	[5] EDWARDS	01	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042S89;LINKAGE=EP

[2] LEES 12I reports $[\Gamma(B^0 \to \chi_{c0}(1P)K^0)/\Gamma_{total}] \times [B(\chi_{c0}(1P) \to K^0_S K^0_S)] = (0.46^{+0.25}_{-0.17} \pm 0.21) \times 10^{-6}$ which we divide by our best value $B(\chi_{c0}(1P) \to K^0_S K^0_S) = (3.10 \pm 0.18) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=S042S89;LINKAGE=LE

[3] Measured in the $B^0 \to K^0_S K^+ K^-$ decay. NODE=S042S89;LINKAGE=LA

[4] Uses Dalitz plot analysis of the $B^0 \to K^0 \pi^+ \pi^-$ final state decays. NODE=S042S89;LINKAGE=GM

[5] EDWARDS 01 assumes equal production of B^0 and B^+ at the $\Upsilon(4S)$. The correlated uncertainties (28.3)% from $B(J/\psi(1S) \to \gamma\eta_c)$ in those modes have been accounted for. NODE=S042S89;LINKAGE=A

$\Gamma(K^0 K^+ K^-)/\Gamma_{total}$ — Γ_{293}/Γ

NODE=S042R81
NODE=S042R81

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
26.6±1.2 OUR AVERAGE					
[(24.7 ± 2.3) × 10^{-6} OUR 2012 AVERAGE]					
YOUR DATA 26.5±0.9±0.8		[1,2] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
28.3±3.3±4.0		[1] GARMASH	04	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
23.8±2.0±1.6		[1] AUBERT,B	04V	BABR	Repl. by LEES 12O
<1300	90	ALBRECHT	91E	ARG	$e^+e^- \to \Upsilon(4S)$

NEW

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[2] All intermediate charmonium and charm resonances are removed, except of χ_{c0}.

NODE=S042R81;LINKAGE=EP
NODE=S042R81;LINKAGE=LE

$\Gamma(K^0 \phi)/\Gamma_{total}$ — Γ_{294}/Γ

NODE=S042R13
NODE=S042R13

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
7.3±0.7 OUR AVERAGE					
[($8.6^{+1.3}_{-1.1}$) × 10^{-6} OUR 2012 AVERAGE]					
YOUR DATA $7.1 \pm 0.6^{+0.4}_{-0.3}$		[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
$9.0^{+2.2}_{-1.8} \pm 0.7$		[1] CHEN	03B	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$8.4^{+1.5}_{-1.3} \pm 0.5$		[1] AUBERT	04A	BABR	Repl. by LEES 12O
$8.1^{+3.1}_{-2.5} \pm 0.8$		[1] AUBERT	01D	BABR	$e^+e^- \to \Upsilon(4S)$
< 12.3	90	[1] BRIERE	01	CLE2	$e^+e^- \to \Upsilon(4S)$
< 31	90	[1] BERGFELD	98	CLE2	
< 88	90	ASNER	96	CLE2	$e^+e^- \to \Upsilon(4S)$
< 720	90	ALBRECHT	91B	ARG	$e^+e^- \to \Upsilon(4S)$
< 420	90	[2] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$
<1000	90	[3] AVERY	87	CLEO	$e^+e^- \to \Upsilon(4S)$

NEW

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[2] AVERY 89B reports < 4.9 × 10^{-4} assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.
[3] AVERY 87 reports < 1.3 × 10^{-3} assuming the $\Upsilon(4S)$ decays 40% to $B^0\overline{B}^0$. We rescale to 50%.

NODE=S042R13;LINKAGE=EP
NODE=S042R13;LINKAGE=A1
NODE=S042R13;LINKAGE=AV

$\Gamma(f_0(980) K^0,\ f_0 \to K^+K^-)/\Gamma_{total}$ — Γ_{295}/Γ

NODE=S042T87
NODE=S042T87

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
YOUR DATA $\mathbf{7.0^{+2.6}_{-1.8} \pm 2.4}$	[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042T87;LINKAGE=EP

$\Gamma(f_0(1500) K^0)/\Gamma_{total}$ — Γ_{296}/Γ

NODE=S042T88
NODE=S042T88

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
YOUR DATA $\mathbf{13.3^{+5.8}_{-4.4} \pm 3.2}$	[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042T88;LINKAGE=EP

$\Gamma(f'_2(1525)^0 K^0)/\Gamma_{total}$ — Γ_{297}/Γ

NODE=S042T89
NODE=S042T89

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
YOUR DATA $\mathbf{0.29^{+0.27}_{-0.18} \pm 0.36}$	[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042T89;LINKAGE=EP

$\Gamma(f_0(1710) K^0,\ f_0 \to K^+K^-)/\Gamma_{total}$ — Γ_{298}/Γ

NODE=S042T90
NODE=S042T90

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
YOUR DATA **4.4±0.7±0.5**	[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042T90;LINKAGE=EP

$\Gamma(K^0 K^+ K^- \text{nonresonant})/\Gamma_{total}$ — Γ_{299}/Γ

NODE=S042T95
NODE=S042T95

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
YOUR DATA **33±5±9**	[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042T95;LINKAGE=EP

CP VIOLATION PARAMETERS

NODE=S042229

$C_{f_0(980)K^0_S}$ ($B^0 \to f_0(980)K^0_S$)

NODE=S042CF1

VALUE	DOCUMENT ID		TECN	COMMENT
0.29±0.20 OUR AVERAGE				
[0.14 ± 0.17 OUR 2012 AVERAGE]				
YOUR DATA 0.28±0.24±0.09	[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
0.30±0.29±0.14	[2,3] NAKAHAMA	10	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.08±0.19±0.05	[4] AUBERT	09AU	BABR	Repl. by LEES 12O
0.06±0.17±0.11	[2,5] DALSENO	09	BELL	Repl. by NAKAHAMA 10
−0.41±0.23±0.07	[2] AUBERT	07AX	BABR	Repl. by AUBERT 09AU
0.15±0.15±0.07	[2] CHAO	07	BELL	Repl. by DALSENO 09
0.39±0.27±0.09	[2] CHEN	05B	BELL	Repl. by CHAO 07

NODE=S042CF1 NODE=S042CF1 NEW

[1] Uses Dalitz plot analysis of the $B^0 \to K^0_S K^+ K^-$ decay. NODE=S042CF1;LINKAGE=LA

[2] Quotes $A_{f_0(980)K^0_S}$ which is equal to $-C_{f_0(980)K^0_S}$. NODE=S042CF1;LINKAGE=BA

[3] Uses Dalitz plot analysis of $B^0 \to K^0_S K^+ K^-$ decays and the first of four consistent solutions that may be preferred. NODE=S042CF1;LINKAGE=NA

[4] Uses Dalitz plot analysis of $B^0 \to K^0 \pi^+ \pi^-$ decays and the first of two equivalent solutions is used. NODE=S042CF1;LINKAGE=AU

[5] Uses Dalitz plot analysis of $B^0 \to K^0 \pi^+ \pi^-$ decays and the first of two consistent solutions that may be preferred. NODE=S042CF1;LINKAGE=DL

$S_{f_0(980)K^0_S}$ ($B^0 \to f_0(980)K^0_S$)

NODE=S042SF1

VALUE	DOCUMENT ID		TECN	COMMENT
−0.50±0.16 OUR AVERAGE				
[$-0.73^{+0.27}_{-0.09}$ OUR 2012 AVERAGE Scale factor = 1.6]				
YOUR DATA −0.55±0.18±0.12	[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.43^{+0.22}_{-0.20}\pm0.14$	[2] DALSENO	09	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.96^{+0.21}_{-0.04}\pm0.04$	[3] AUBERT	09AU	BABR	Repl. by LEES 12O
−0.25±0.26±0.10	[4] AUBERT	07AX	BABR	Repl. by AUBERT 09AU
0.18±0.23±0.11	CHAO	07	BELL	Repl. by DALSENO 09
0.47±0.41±0.08	CHEN	05B	BELL	Repl. by CHAO 07

NODE=S042SF1 NODE=S042SF1 NEW

[1] Uses Dalitz plot analysis of the $B^0 \to K^0_S K^+ K^-$ decay. NODE=S042SF1;LINKAGE=LA

[2] Uses Dalitz plot analysis of $B^0 \to K^0 \pi^+ \pi^-$ decays and the first of two consistent solutions that may be preferred. NODE=S042SF1;LINKAGE=DL

[3] Uses Dalitz plot analysis of $B^0 \to K^0 \pi^+ \pi^-$ decays and the first of two equivalent solutions is used. NODE=S042SF1;LINKAGE=AU

[4] Reports β_{eff}. We quote S obtained from epaps: E-PRLTAO-99-076741. NODE=S042SF1;LINKAGE=AX

$C_{K^+K^-K^0_S}$ ($B^0 \to K^+K^-K^0_S$ nonresonant)

NODE=S042CX2

VALUE	DOCUMENT ID		TECN	COMMENT
0.06 ±0.08 OUR AVERAGE				
[0.09 ± 0.09 OUR 2012 AVERAGE]				
YOUR DATA 0.02 ±0.09 ±0.03	[1,2] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
0.14 ±0.11 ±0.09	[3,4] NAKAHAMA	10	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.054±0.102±0.060	[3,5] AUBERT	07AX	BABR	Repl. by LEES 12O
0.09 ±0.10 ±0.05	[3,5] CHAO	07	BELL	Repl. by NAKAHAMA 10
0.10 ±0.14 ±0.04	[5] AUBERT	05T	BABR	Repl. by AUBERT 07AX
0.09 ±0.12 ±0.07	[3] CHEN	05B	BELL	Repl. by CHAO 07
−0.10 ±0.19 ±0.10	[5] AUBERT,B	04V	BABR	Repl. by AUBERT 05T
$0.40 \pm0.33 ^{+0.28}_{-0.10}$	[3] ABE	03C	BELL	Repl. by ABE 03H
0.17 ±0.16 ±0.04	[3,5] ABE	03H	BELL	Repl. by CHEN 05B

NODE=S042CX2 NODE=S042CX2 NEW

[1] Uses Dalitz plot analysis of the $B^0 \to K^0_S K^+ K^-$ decay. NODE=S042CX2;LINKAGE=LA

[2] This measurement is performed on all the isobar components, excluding ϕK^0_S and $f_0(980)K^0_S$. NODE=S042CX2;LINKAGE=LB

[3] Quotes $A_{K^+K^-K^0_S}$ which is equal to $-C_{K^+K^-K^0_S}$. NODE=S042CX2;LINKAGE=A

[4] Uses Dalitz plot analysis of $B^0 \to K^0_S K^+ K^-$ decays and the first of four consistent solutions that may be preferred. NODE=S042CX2;LINKAGE=NA

[5] Excludes the events from $B^0 \to \phi K^0_S$ decay. The results are derived from a combined sample of $K^+K^-K^0_S$ and $K^+K^-K^0_L$ decays. NODE=S042CX2;LINKAGE=AB

$S_{K^+K^-K^0_S}$ ($B^0 \to K^+K^-K^0_S$ nonresonant)

NODE=S042SX2
NODE=S042SX2

VALUE	DOCUMENT ID		TECN	COMMENT
-0.66 ± 0.11 OUR AVERAGE				NEW
[$-0.74^{+0.12}_{-0.10}$ OUR 2012 AVERAGE]				
YOUR DATA $-0.65 \pm 0.12 \pm 0.03$	[1,2] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.68 \pm 0.15 \; ^{+0.21}_{-0.13}$	[3] CHAO	07	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.764 \pm 0.111 \; ^{+0.071}_{-0.040}$	[3,4] AUBERT	07AX	BABR	Repl. by LEES 12O
$-0.42 \pm 0.17 \pm 0.03$	[3,5] AUBERT	05T	BABR	Repl. by AUBERT 07AX
$-0.49 \pm 0.18 \pm 0.04$	CHEN	05B	BELL	Repl. by CHAO 07
$-0.56 \pm 0.25 \pm 0.04$	[3,6] AUBERT,B	04V	BABR	Repl. by AUBERT 05T
$-0.49 \pm 0.43 \pm 0.11$	ABE	03C	BELL	Repl. by ABE 03H
$-0.51 \pm 0.26 \pm 0.05$	[3,7] ABE	03H	BELL	Repl. by CHEN 05B

[1] Uses Dalitz plot analysis of the $B^0 \to K^0_S K^+K^-$ decay. NODE=S042SX2;LINKAGE=LA

[2] This measurement is performed on all the isobar components, excluding ϕK^0_S and $f_0(980)K^0_S$. Note that the nonresonant component is not a *CP* eigenstate. NODE=S042SX2;LINKAGE=LB

[3] Excludes events from $B^0 \to \phi K^0_S$ decay. The results are derived from a combined sample of $K^+K^-K^0_S$ and $K^+K^-K^0_L$ decays. NODE=S042SX2;LINKAGE=AA

[4] Reports β_{eff}. We quote S obtained from epaps: E-PRLTAO-99-076741. NODE=S042SX2;LINKAGE=AX

[5] The measured *CP*-even final states fraction is 0.89 ± 0.08 ± 0.06. NODE=S042SX2;LINKAGE=AE

[6] The measured *CP*-even final states fraction is 0.98 ± 0.15 ± 0.04. NODE=S042SX2;LINKAGE=AU

[7] The measured *CP*-even final states fraction is 1.03 ± 0.15 ± 0.05. NODE=S042SX2;LINKAGE=AB

$C_{\phi K^0_S}$ ($B^0 \to \phi K^0_S$)

NODE=S042CX1
NODE=S042CX1

VALUE	DOCUMENT ID		TECN	COMMENT
0.01 ± 0.14 OUR AVERAGE				NEW
[0.03 ± 0.14 OUR 2012 AVERAGE]				
YOUR DATA $0.05 \pm 0.18 \pm 0.05$	[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.04 \pm 0.20 \pm 0.10$	[2,3] NAKAHAMA	10	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.08 \pm 0.18 \pm 0.04$	[2,4] AUBERT	07AX	BABR	Repl. by LEES 12O
$-0.07 \pm 0.15 \pm 0.05$	[2,4] CHEN	07	BELL	Repl. by NAKAHAMA 10
$0.00 \pm 0.23 \pm 0.05$	[4] AUBERT	05T	BABR	Repl. by AUBERT 07AX
$-0.08 \pm 0.22 \pm 0.09$	[2,4] CHEN	05B	BELL	Repl. by CHEN 07
$0.01 \pm 0.33 \pm 0.10$	[4] AUBERT,B	04G	BABR	Repl. by AUBERT 05T
$0.56 \pm 0.41 \pm 0.16$	[2] ABE	03C	BELL	Repl. by ABE 03H
$0.15 \pm 0.29 \pm 0.07$	[2] ABE	03H	BELL	Repl. by CHEN 05B

[1] Uses Dalitz plot analysis of the $B^0 \to K^0_S K^+K^-$ decay. NODE=S042CX1;LINKAGE=LA

[2] Quotes $A_{\phi K^0_S}$ which is equal to $-C_{\phi K^0_S}$. NODE=S042CX1;LINKAGE=A

[3] Uses Dalitz plot analysis of $B^0 \to K^0_S K^+K^-$ decays and the first of four consistent solutions that may be preferred. NODE=S042CX1;LINKAGE=NA

[4] Result combines B-meson final states ϕK^0_S and ϕK^0_L by assuming $S_{\phi K^0_S} = -S_{\phi K^0_L}$ NODE=S042CX1;LINKAGE=AU

$S_{\phi K^0_S}$ ($B^0 \to \phi K^0_S$)

NODE=S042SX1
NODE=S042SX1

VALUE	DOCUMENT ID		TECN	COMMENT
0.59 ± 0.14 OUR AVERAGE				NEW
[0.39 ± 0.17 OUR 2012 AVERAGE]				
YOUR DATA $0.66 \pm 0.17 \pm 0.07$	[1] LEES	12O	BABR	$e^+e^- \to \Upsilon(4S)$
$0.50 \pm 0.21 \pm 0.06$	[2] CHEN	07	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.21 \pm 0.26 \pm 0.11$	[2,3] AUBERT	07AX	BABR	Repl. by LEES 12O
$0.50 \pm 0.25 \; ^{+0.07}_{-0.04}$	[2] AUBERT	05T	BABR	Repl. by AUBERT 07AX
$0.08 \pm 0.33 \pm 0.09$	[2] CHEN	05B	BELL	Repl. by CHEN 07
$0.47 \pm 0.34 \; ^{+0.08}_{-0.06}$	[2] AUBERT,B	04G	BABR	Repl. by AUBERT 05T
$-0.73 \pm 0.64 \pm 0.22$	ABE	03C	BELL	Repl. by ABE 03H
$-0.96 \pm 0.50 \; ^{+0.09}_{-0.11}$	ABE	03H	BELL	Repl. by CHEN 05B

[1] Uses Dalitz plot analysis of the $B^0 \rightarrow K^0_S K^+ K^-$ decay.

[2] Result combines B-meson final states ϕK^0_S and ϕK^0_L by assuming $S_{\phi K^0_S} = -S_{\phi K^0_L}$

[3] Reports β_{eff}. We quote S obtained from epaps: E-PRLTAO-99-076741.

NODE=S042SX1;LINKAGE=LA

NODE=S042SX1;LINKAGE=AU

NODE=S042SX1;LINKAGE=AX

B^0 REFERENCES

NODE=S042

	LEES	12I	PR D85 054023	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54376
YOUR PAPER	LEES	12O	PR D85 112010	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54382
	NAKAHAMA	10	PR D82 073011	Y. Nakahama *et al.*	(BELLE Collab.)	REFID=53467
	AUBERT	09AU	PR D80 112001	B. Aubert *et al.*	(BABAR Collab.)	REFID=53180
	DALSENO	09	PR D79 072004	J. Dalseno *et al.*	(BELLE Collab.)	REFID=52807
	AUBERT	07AX	PRL 99 161802	B. Aubert *et al.*	(BABAR Collab.)	REFID=51984
	CHAO	07	PR D76 091103	Y. Chao *et al.*	(BELLE Collab.)	REFID=52000
	CHEN	07	PRL 98 031802	K.-F. Chen *et al.*	(BELLE Collab.)	REFID=51609
	GARMASH	07	PR D75 012006	A. Garmash *et al.*	(BELLE Collab.)	REFID=51594
	AUBERT	05K	PRL 94 171801	B. Aubert *et al.*	(BABAR Collab.)	REFID=50591
	AUBERT	05T	PR D71 091102	B. Aubert *et al.*	(BABAR Collab.)	REFID=50634
	CHEN	05B	PR D72 012004	K.-F. Chen *et al.*	(BELLE Collab.)	REFID=50706
	AUBERT	04A	PR D69 011102	B. Aubert *et al.*	(BABAR Collab.)	REFID=49719
	AUBERT,B	04G	PRL 93 071801	B. Aubert *et al.*	(BABAR Collab.)	REFID=50070
	AUBERT,B	04V	PRL 93 181805	B. Aubert *et al.*	(BABAR Collab.)	REFID=50265
	GARMASH	04	PR D69 012001	A. Garmash *et al.*	(BELLE Collab.)	REFID=49642
	ABE	03C	PR D67 031102	K. Abe *et al.*	(BELLE Collab.)	REFID=49208
	ABE	03H	PRL 91 261602	K. Abe *et al.*	(BELLE Collab.)	REFID=49635
	CHEN	03B	PRL 91 201801	K.-F. Chen *et al.*	(BELLE Collab.)	REFID=49639
	AUBERT	01D	PRL 87 151801	B. Aubert *et al.*	(BaBar Collab.)	REFID=48377
	BRIERE	01	PRL 86 3718	R.A. Biere *et al.*	(CLEO Collab.)	REFID=48119
	EDWARDS	01	PRL 86 30	K.W. Edwards *et al.*	(CLEO Collab.)	REFID=47903
	BERGFELD	98	PRL 81 272	T. Bergfeld *et al.*	(CLEO Collab.)	REFID=46091
	ASNER	96	PR D53 1039	D.M. Asner *et al.*	(CLEO Collab.)	REFID=44734
	ALBRECHT	91B	PL B254 288	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=41451
	ALBRECHT	91E	PL B262 148	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=41549
	AVERY	89B	PL B223 470	P. Avery *et al.*	(CLEO Collab.)	REFID=40820
	AVERY	87	PL B183 429	P. Avery *et al.*	(CLEO Collab.)	REFID=40387

Reference = LEES 12P; PR D86 012004
Verifier code = BABAR

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Fabio Anulli

EMAIL: anulli@slac.stanford.edu

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(\pi^+ e^+ \tau^-)/\Gamma_{total}$ — **Γ_{470}/Γ**

NODE=S041T77

Test of lepton family number conservation.

NODE=S041T77

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<74**	90	[1] LEES	12P	BABR	$e^+e^- \to \Upsilon(4S)$

NODE=S041T77

[1] Uses a fully reconstructed hadronic B decay as a tag on the recoil side.

NODE=S041T77;LINKAGE=LE

$\Gamma(\pi^+ e^- \tau^+)/\Gamma_{total}$ — **Γ_{471}/Γ**

NODE=S041T78

Test of lepton family number conservation.

NODE=S041T78

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<20**	90	[1] LEES	12P	BABR	$e^+e^- \to \Upsilon(4S)$

NODE=S041T78

[1] Uses a fully reconstructed hadronic B decay as a tag on the recoil side.

NODE=S041T78;LINKAGE=LE

$\Gamma(\pi^+ e^\pm \tau^\mp)/\Gamma_{total}$ — **Γ_{472}/Γ**

NODE=S041T79

Test of lepton family number conservation.

NODE=S041T79

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<75**	90	[1,2] LEES	12P	BABR	$e^+e^- \to \Upsilon(4S)$

NODE=S041T79

[1] Assumes $B(B^+ \to h^+\ell^+\tau^-) = B(B^+ \to h^+\ell^-\tau^+)$.

[2] Uses a fully reconstructed hadronic B decay as a tag on the recoil side.

NODE=S041T79;LINKAGE=ES

NODE=S041T79;LINKAGE=LE

$\Gamma(\pi^+ \mu^+ \tau^-)/\Gamma_{total}$ — **Γ_{473}/Γ**

NODE=S041T80

Test of lepton family number conservation.

NODE=S041T80

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<62**	90	[1] LEES	12P	BABR	$e^+e^- \to \Upsilon(4S)$

NODE=S041T80

[1] Uses a fully reconstructed hadronic B decay as a tag on the recoil side.

NODE=S041T80;LINKAGE=LE

$\Gamma(\pi^+ \mu^- \tau^+)/\Gamma_{total}$ — **Γ_{474}/Γ**

NODE=S041T81

Test of lepton family number conservation.

NODE=S041T81

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<45**	90	[1] LEES	12P	BABR	$e^+e^- \to \Upsilon(4S)$

NODE=S041T81

[1] Uses a fully reconstructed hadronic B decay as a tag on the recoil side.

NODE=S041T81;LINKAGE=LE

$\Gamma(\pi^+ \mu^\pm \tau^\mp)/\Gamma_{total}$ — **Γ_{475}/Γ**

NODE=S041T82

Test of lepton family number conservation.

NODE=S041T82

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<72**	90	[1,2] LEES	12P	BABR	$e^+e^- \to \Upsilon(4S)$

NODE=S041T82

[1] Assumes $B(B^+ \to h^+\ell^+\tau^-) = B(B^+ \to h^+\ell^-\tau^+)$.

[2] Uses a fully reconstructed hadronic B decay as a tag on the recoil side.

NODE=S041T82;LINKAGE=ES

NODE=S041T82;LINKAGE=LE

$\Gamma(K^+ e^+ \tau^-)/\Gamma_{total}$ — **Γ_{479}/Γ**

NODE=S041T83

Test of lepton family number conservation.

NODE=S041T83

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<43**	90	[1] LEES	12P	BABR	$e^+e^- \to \Upsilon(4S)$

NODE=S041T83

[1] Uses a fully reconstructed hadronic B decay as a tag on the recoil side.

NODE=S041T83;LINKAGE=LE

$\Gamma(K^+ e^- \tau^+)/\Gamma_{total}$ — Γ_{480}/Γ

NODE=S041T84

Test of lepton family number conservation.

NODE=S041T84

NODE=S041T84

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<15**	90	[1] LEES	12P	BABR	$e^+ e^- \to \Upsilon(4S)$

[1] Uses a fully reconstructed hadronic B decay as a tag on the recoil side. NODE=S041T84;LINKAGE=LE

$\Gamma(K^+ e^\pm \tau^\mp)/\Gamma_{total}$ — Γ_{481}/Γ

NODE=S041T85

Test of lepton family number conservation.

NODE=S041T85

NODE=S041T85

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<30**	90	[1,2] LEES	12P	BABR	$e^+ e^- \to \Upsilon(4S)$

[1] Assumes $B(B^+ \to h^+ \ell^+ \tau^-) = B(B^+ \to h^+ \ell^- \tau^+)$. NODE=S041T85;LINKAGE=ES

[2] Uses a fully reconstructed hadronic B decay as a tag on the recoil side. NODE=S041T85;LINKAGE=LE

$\Gamma(K^+ \mu^+ \tau^-)/\Gamma_{total}$ — Γ_{482}/Γ

NODE=S041T86

Test of lepton family number conservation.

NODE=S041T86

NODE=S041T86

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<45**	90	[1] LEES	12P	BABR	$e^+ e^- \to \Upsilon(4S)$

[1] Uses a fully reconstructed hadronic B decay as a tag on the recoil side. NODE=S041T86;LINKAGE=LE

$\Gamma(K^+ \mu^- \tau^+)/\Gamma_{total}$ — Γ_{483}/Γ

NODE=S041T87

Test of lepton family number conservation.

NODE=S041T87

NODE=S041T87

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<28**	90	[1] LEES	12P	BABR	$e^+ e^- \to \Upsilon(4S)$

[1] Uses a fully reconstructed hadronic B decay as a tag on the recoil side. NODE=S041T87;LINKAGE=LE

$\Gamma(K^+ \mu^\pm \tau^\mp)/\Gamma_{total}$ — Γ_{484}/Γ

NODE=S041T22

Test of lepton family number conservation.

NODE=S041T22

NODE=S041T22

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	<48 (CL = 90%) [<77 × 10^{-6} (CL = 90%) OUR 2012 BEST LIMIT]					
YOUR DATA	**<48**	90	[1,2] LEES	12P	BABR	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	<77	90	[1] AUBERT	07AZ	BABR	Repl. by LEES 12P

[1] Uses a fully reconstructed hadronic B decay as a tag on the recoil side. NODE=S041T22;LINKAGE=AU

[2] Assumes $B(B^+ \to h^+ \ell^+ \tau^-) = B(B^+ \to h^+ \ell^- \tau^+)$. NODE=S041T22;LINKAGE=ES

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER LEES 12P PR D86 012004 J.P. Lees *et al.* (BABAR Collab.) REFID=54383

AUBERT 07AZ PRL 99 201801 B. Aubert *et al.* (BABAR Collab.) REFID=51986

Reference = LEES 12R; PR D86 032004
Verifier code = BABAR

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Fabio Anulli

EMAIL: anulli@slac.stanford.edu

June 4, 2013

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Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS ($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

$B^\pm/B^0$ ADMIXTURE

NODE=S049

$B^\pm/B^0$ ADMIXTURE BRANCHING RATIOS

NODE=S049215

$\Gamma(X_u \ell^+ \nu_\ell)/\Gamma_{total}$ **Γ_{24}/Γ**

NODE=S049S95

NODE=S049S95

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements.

NODE=S049S95

NEW;→ UNCHECKED ←

	VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
	2.12 ±0.31 OUR EVALUATION				
	[(2.08 ± 0.30) × 10^{-3} OUR 2012 EVALUATION]				
YOUR DATA	2.01 ±0.15 ±0.25	[1] LEES	12R	BABR	$e^+e^- \to \Upsilon(4S)$
	2.27 ±0.26 $^{+0.37}_{-0.33}$	[2] AUBERT	06H	BABR	$e^+e^- \to \Upsilon(4S)$
	2.53 ±0.24 ±0.24	[3] AUBERT,B	05X	BABR	$e^+e^- \to \Upsilon(4S)$
	2.80 ±0.52 ±0.41	[4] LIMOSANI	05	BELL	$e^+e^- \to \Upsilon(4S)$
	1.77 ±0.29 ±0.38	[5] BORNHEIM	02	CLE2	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	1.963±0.173±0.159	[6] URQUIJO	10	BELL	$e^+e^- \to \Upsilon(4S)$
	1.18 ±0.09 ±0.07	[7] AUBERT	08AS	BABR	Repl. by LEES 12R
	2.24 ±0.27 ±0.47	[8,9] AUBERT	04I	BABR	Repl. by AUBERT,B 05X

[1] Measures several partial branching fractions in different phase space regions. The most precise result on the full branching fraction is obtained in the region for lepton momentum in B rest frame $p^*_\ell > 1$ GeV/c, where the measured partial branching fraction is $\Delta B = (1.80 \pm 0.13 \pm 0.15) \times 10^{-3}$. The acceptance in that region is reported in a private communication by the Authors to be 0.894. The corresponding $|V_{ub}|$ from the BLNP method is $(4.28 \pm 0.15 \pm 0.18 \pm 0.19) \times 10^{-3}$, where the last uncertainty comes from theoretical prediction. NODE=S049S95;LINKAGE=LE

[2] Obtained from the partial rate $\Delta B = (0.572 \pm 0.041 \pm 0.065) \times 10^{-3}$ for the electron momentum interval 2.0–2.6 GeV/c based on BLNP method. NODE=S049S95;LINKAGE=AT

[3] Determined from the partial rate $\Delta B = (4.41 \pm 0.42 \pm 0.42) \times 10^{-4}$ measured for electron energy > 2 GeV and hadronic mass squared < 3.5 GeV^2, and calculated acceptance 0.174 in that region. The V_{ub} is measured as $(4.41 \pm 0.30^{+0.65}_{-0.47} \pm 0.28) \times 10^{-3}$. NODE=S049S95;LINKAGE=AE

[4] Uses electrons in the momentum interval 1.9–2.6 GeV/c in the center-of-mass frame. The V_{ub} is found to be $(5.08 \pm 0.47^{+0.49}_{-0.48}) \times 10^{-3}$. NODE=S049S95;LINKAGE=LI

[5] BORNHEIM 02 uses the observed yield of leptons from semileptonic B decays in the end-point momentum interval 2.2–2.6 GeV/c with recent CLEO-2 data on $B \to X_s\gamma$. The V_{ub} is found to be $(4.08 \pm 0.34 \pm 0.53) \times 10^{-3}$. NODE=S049S95;LINKAGE=BO

[6] Uses a multivariate analysis method and requires lepton momentum in the B rest frame, $p_l^{*B} > 1.0$ GeV/c. NODE=S049S95;LINKAGE=UR

[7] Measures several partial branching fractions in different phase space regions. The most precise result is obtained in the region for hadronic mass $M_X < 1.55$ GeV/c^2, and is $\Delta B = (1.18 \pm 0.09 \pm 0.07) \times 10^{-3}$. The corresponding $|V_{ub}|$ from the BLNP method is $(4.27 \pm 0.16 \pm 0.13 \pm 0.30) \times 10^{-3}$, where the last uncertainty comes from the theoretical prediction of the partial rate in the given phase-space region. NODE=S049S95;LINKAGE=UB

[8] Used BaBar measurement of Semileptonic branching fraction $B(B \to X\ell\nu_\ell) = (10.87 \pm 0.18 \pm 0.30)\%$ to convert the ratio of rates to branching fraction. NODE=S049S95;LINKAGE=AB

[9] The third error includes the systematics and theoretical errors summed in quadrature. NODE=S049S95;LINKAGE=AU

$B^{\pm}/B^{0}$ ADMIXTURE REFERENCES

NODE=S049

YOUR PAPER	LEES	12R	PR D86 032004	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54385
	URQUIJO	10	PRL 104 021801	P. Urquijo *et al.*	(BELLE Collab.)	REFID=53190
	AUBERT	08AS	PRL 100 171802	B. Aubert *et al.*	(BABAR Collab.)	REFID=52367
	AUBERT	06H	PR D73 012006	B. Aubert *et al.*	(BABAR Collab.)	REFID=51088
	AUBERT,B	05X	PRL 95 111801	B. Aubert *et al.*	(BABAR Collab.)	REFID=50918
	Also		PRL 97 019903 (errat.)	B. Aubert *et al.*	(BABAR Collab.)	REFID=51243
	LIMOSANI	05	PL B621 28	A. Limosani *et al.*	(BELLE Collab.)	REFID=50678
	AUBERT	04I	PRL 92 071802	B. Aubert *et al.*	(BABAR Collab.)	REFID=49873
	BORNHEIM	02	PRL 88 231803	A. Bornheim *et al.*	(CLEO Collab.)	REFID=48709

Reference = LEES 12S; PR D86 032012
Verifier code = BABAR

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Fabio Anulli

EMAIL: anulli@slac.stanford.edu

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS ($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

CP VIOLATION

NODE=S041220

A_{CP} is defined as

NODE=S041220

$$\frac{B(B^- \to \overline{f}) - B(B^+ \to f)}{B(B^- \to \overline{f}) + B(B^+ \to f)},$$

the *CP*-violation charge asymmetry of exclusive B^- and B^+ decay.

$A_{CP}(B^+ \to K^+\ell^+\ell^-)$

NODE=S041CR1

VALUE	DOCUMENT ID		TECN	COMMENT
-0.02 ± 0.08 OUR AVERAGE				
[-0.01 ± 0.09 OUR 2012 AVERAGE Scale factor = 1.1]				
YOUR DATA $-0.03\pm0.14\pm0.01$	[1] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.18\pm0.18\pm0.01$	AUBERT	09T	BABR	$e^+e^- \to \Upsilon(4S)$
$+0.04\pm0.10\pm0.02$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.07\pm0.22\pm0.02$	AUBERT,B	06J	BABR	Repl. by AUBERT 09T

NODE=S041CR1

NODE=S041CR1

NEW

[1] Measured in the union of $0.10 < q^2 < 8.12$ GeV^2/c^4 and $q^2 > 10.11$ GeV^2/c^4. LEES 12S reports also individual measurements $A_{CP}(B^+ \to K^+\ell^+\ell^-) = 0.02 \pm 0.18 \pm 0.01$ for $0.10 < q^2 < 8.12$ GeV^2/c^4 and $A_{CP}(B^+ \to K^+\ell^+\ell^-) = -0.06^{+0.22}_{-0.21} \pm 0.01$ for $q^2 > 10.11$ GeV^2/c^4.

NODE=S041CR1;LINKAGE=LE

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER LEES	12S	PR D86 032012	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54386
AUBERT	09T	PRL 102 091803	B. Aubert *et al.*	(BABAR Collab.)	REFID=52829
Also		EPAPS Document No. E-PRLTAO-102-060910		(BABAR Collab.)	REFID=53060;ERROR=1
WEI	09A	PRL 103 171801	J.-T. Wei *et al.*	(BELLE Collab.)	REFID=53061
Also		EPAPS Supplement EPAPS_appendix.pdf		(BELLE Collab.)	REFID=53240;ERROR=2
AUBERT,B	06J	PR D73 092001	B. Aubert *et al.*	(BABAR Collab.)	REFID=51305

$B^\pm/B^0$ ADMIXTURE

NODE=S049

$B^\pm/B^0$ ADMIXTURE BRANCHING RATIOS

NODE=S049215

$\Gamma(K\mu^+\mu^-)/\Gamma(Ke^+e^-)$ — $\Gamma_{125}/\Gamma_{123}$

NODE=S049R76

VALUE	DOCUMENT ID		TECN	COMMENT
1.01 ± 0.15 OUR AVERAGE				
[1.02 ± 0.18 OUR 2012 AVERAGE]				
YOUR DATA $1.00^{+0.31}_{-0.25}\pm0.07$	[1] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$0.96^{+0.44}_{-0.34}\pm0.05$	AUBERT	09T	BABR	$e^+e^- \to \Upsilon(4S)$
$1.03\pm0.19\pm0.06$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.06\pm0.48\pm0.08$	AUBERT,B	06J	BABR	Repl. by AUBERT 09T

NODE=S049R76

NEW

[1] Measured in the union of $0.10 < q^2 < 8.12$ GeV^2/c^4 and $q^2 > 10.11$ GeV^2/c^4. LEES 12S reports also individual measurements $\Gamma(B \to K\mu^+\mu^-)/\Gamma(B \to Ke^+e^-) = 0.74^{+0.40}_{-0.31} \pm 0.06$ for $0.10 < q^2 < 8.12$ GeV^2/c^4 and $\Gamma(B \to K\mu^+\mu^-)/\Gamma(B \to Ke^+e^-) = 1.43^{+0.65}_{-0.44} \pm 0.12$ for $q^2 > 10.11$ GeV^2/c^4. NODE=S049R76;LINKAGE=LE

$\Gamma(K^*(892)\mu^+\mu^-)/\Gamma(K^*(892)e^+e^-)$ — $\Gamma_{126}/\Gamma_{124}$

NODE=S049R77
NODE=S049R77

VALUE	DOCUMENT ID		TECN	COMMENT
0.98±0.15 OUR AVERAGE				
[0.92 ± 0.21 OUR 2012 AVERAGE Scale factor = 1.2]				
YOUR DATA $1.13^{+0.34}_{-0.26} \pm 0.10$	[1] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$1.37^{+0.53}_{-0.40} \pm 0.09$	AUBERT	09T	BABR	$e^+e^- \to \Upsilon(4S)$
$0.83 \pm 0.17 \pm 0.08$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.91 \pm 0.45 \pm 0.06$	AUBERT,B	06J	BABR	Repl. by AUBERT 09T

NEW

[1] Measured in the union of $0.10 < q^2 < 8.12$ GeV^2/c^4 and $q^2 > 10.11$ GeV^2/c^4. LEES 12S reports also individual measurements $\Gamma(B \to K^*(892)\mu^+\mu^-)/\Gamma(B \to K^*(892)e^+e^-) = 1.06^{+0.48}_{-0.33} \pm 0.08$ for $0.10 < q^2 < 8.12$ GeV^2/c^4 and $\Gamma(B \to K^*(892)\mu^+\mu^-)/\Gamma(B \to K^*(892)e^+e^-) = 1.18^{+0.55}_{-0.37} \pm 0.11$ for $q^2 > 10.11$ GeV^2/c^4. NODE=S049R77;LINKAGE=LE

$\Gamma(K\ell^+\ell^-)/\Gamma_{total}$ — Γ_{127}/Γ

NODE=S049R61
NODE=S049R61

Test for $\Delta B = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

NODE=S049R61

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
4.8±0.4 OUR AVERAGE					
[(4.5 ± 0.4) × 10^{-7} OUR 2012 AVERAGE]					
YOUR DATA $4.7 \pm 0.6 \pm 0.2$		LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$4.8^{+0.5}_{-0.4} \pm 0.3$		WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$3.9 \pm 0.7 \pm 0.2$		[1] AUBERT	09T	BABR	Repl. by LEES 12S
$3.4 \pm 0.7 \pm 0.2$		[1] AUBERT,B	06J	BABR	Repl. by AUBERT 09T
$6.5^{+1.4}_{-1.3} \pm 0.4$		[2] AUBERT	03U	BABR	Repl. by AUBERT,B 06J
$4.8^{+1.0}_{-0.9} \pm 0.3$		[3] ISHIKAWA	03	BELL	Repl. by WEI 09A
$7.5^{+2.5}_{-2.1} \pm 0.6$		[4] ABE	02	BELL	Repl. by ISHIKAWA 03
< 5.1	90	[1] AUBERT	02L	BABR	$e^+e^- \to \Upsilon(4S)$
<17	90	[5] ANDERSON	01B	CLE2	$e^+e^- \to \Upsilon(4S)$

NEW

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S049R61;LINKAGE=EP
[2] Assumes all four $B \to K\ell^+\ell^-$ modes having equal partial widths in the fit. NODE=S049R61;LINKAGE=UA
[3] Assumes equal production rate for charge and neutral B meson pairs, isospin invariance, lepton universality for $B \to K\ell^+\ell^-$, and $B(B \to K^*(892)\mu^+\mu^-) = 1.33$. The second error is total systematic uncertainties including model dependence. NODE=S049R61;LINKAGE=IK
[4] Assumes lepton universality. NODE=S049R61;LINKAGE=LU
[5] The result is for di-lepton masses above 0.5 GeV. NODE=S049R61;LINKAGE=A

$\Gamma(K^*(892)\ell^+\ell^-)/\Gamma_{total}$ — Γ_{128}/Γ

NODE=S049R62
NODE=S049R62

Test for $\Delta B = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

NODE=S049R62

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
10.5±1.0 OUR AVERAGE					
[(10.8 ± 1.1) × 10^{-7} OUR 2012 AVERAGE]					
YOUR DATA $10.2^{+1.4}_{-1.3} \pm 0.5$		LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$10.7^{+1.1}_{-1.0} \pm 0.9$		WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$11.1^{+1.9}_{-1.8} \pm 0.7$		[1] AUBERT	09T	BABR	Repl. by LEES 12S
$7.8^{+1.9}_{-1.7} \pm 1.1$		[1] AUBERT,B	06J	BABR	Repl. by AUBERT 09T
$8.8^{+3.3}_{-2.9} \pm 1.0$		[2] AUBERT	03U	BABR	Repl. by AUBERT,B 06J

NEW

$11.5^{+2.6}_{-2.4}\pm0.8$		[3] ISHIKAWA	03	BELL	Repl. by WEI 09A
<31	90	[1,4] AUBERT	02L	BABR	Repl. by AUBERT 03U
<33	90	[5] ANDERSON	01B	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S049R62;LINKAGE=EP

[2] Assumes the partial width ratio of electron and muon modes to be $\Gamma(B \to K^*(892)e^+e^-)/\Gamma(B \to K^*(892)\mu^+\mu^-) = 1.33$. NODE=S049R62;LINKAGE=AU

[3] Assumes equal production rate for charge and neutral B meson pairs, isospin invariance, lepton universality for $B \to K\ell^+\ell^-$, and $B(B \to K^*(892)\mu^+\mu^-) = 1.33$. The second error is total systematic uncertainties including model dependence. NODE=S049R62;LINKAGE=IK

[4] For averaging $K^*(892)\mu^+\mu^-$ and $K^*(892)e^+e^-$ modes, AUBERT 02L assumed $B(B \to K^*(892)e^+e^-)/B(B \to K^*(892)\mu^+\mu^-) = 1.2$. NODE=S049R62;LINKAGE=H3

[5] The result is for di-lepton masses above 0.5 GeV. NODE=S049R62;LINKAGE=A

CP VIOLATION

NODE=S049225

A_{CP} is defined as NODE=S049225

$$\frac{B(\overline{B} \to \overline{f}) - B(B \to f)}{B(\overline{B} \to \overline{f}) + B(B \to f)},$$

the *CP*-violation charge asymmetry of inclusive $B^\pm$ and B^0 decay.

$A_{CP}(B \to K^*\ell^+\ell^-)$

NODE=S049CP5

VALUE	DOCUMENT ID		TECN	COMMENT
-0.04 ± 0.07 OUR AVERAGE				
[-0.07 ± 0.08 OUR 2012 AVERAGE]				
YOUR DATA $0.03\pm0.13\pm0.01$	[1] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$+0.01^{+0.16}_{-0.15}\pm0.01$	AUBERT	09T	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.10\pm0.10\pm0.01$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$

[1] Measured in the union of $0.10 < q^2 < 8.12$ GeV^2/c^4 and $q^2 > 10.11$ GeV^2/c^4. LEES 12S reports also individual measurements $A_{CP}(B \to K^*\ell^+\ell^-) = -0.13^{+0.18}_{-0.19} \pm 0.01$ for $0.10 < q^2 < 8.12$ GeV^2/c^4 and $A_{CP}(B \to K^*\ell^+\ell^-) = 0.16^{+0.18}_{-0.19} \pm 0.01$ for $q^2 > 10.11$ GeV^2/c^4. NODE=S049CP5;LINKAGE=LE

PARTIAL BRANCHING FRACTIONS IN $B \to K^{(*)}\ell^+\ell^-$

NODE=S049223

$B(B \to K^*\ell^+\ell^-)$ ($q^2 < 2.0$ GeV^2/c^2)

NODE=S049PB1

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
1.68 ± 0.23 OUR AVERAGE				
[$(1.61 \pm 0.26) \times 10^{-7}$ OUR 2012 AVERAGE]				
YOUR DATA $1.89^{+0.52}_{-0.46}\pm0.06$	[1] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$1.73\pm0.33\pm0.10$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$1.46^{+0.40}_{-0.35}\pm0.11$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.98\pm0.40\pm0.09$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

[1] The value reported here from LEES 12S refers to $0.1 < q^2 < 2.0$ GeV^2/c^2. NODE=S049PB1;LINKAGE=LE

$B(B \to K^*\ell^+\ell^-)$ ($2.0 < q^2 < 4.3$ GeV^2/c^2)

NODE=S049PB2

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
0.87 ± 0.17 OUR AVERAGE				
[$(0.84 \pm 0.20) \times 10^{-7}$ OUR 2012 AVERAGE]				
YOUR DATA $0.95^{+0.35}_{-0.30}\pm0.04$	LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$0.82\pm0.26\pm0.06$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$0.86^{+0.31}_{-0.27}\pm0.07$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.00\pm0.38\pm0.09$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

$B(B \to K^* \ell^+ \ell^-)$ $(4.3 < q^2 < 8.68\ \mathrm{GeV}^2/c^2)$

NODE=S049PB3
NODE=S049PB3

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
1.67±0.29 OUR AVERAGE				
[(1.60 ± 0.35) × 10^{-7} OUR 2012 AVERAGE]				
YOUR DATA $1.82^{+0.56}_{-0.52} \pm 0.09$	[1] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$1.72 \pm 0.41 \pm 0.14$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$1.37^{+0.47}_{-0.42} \pm 0.39$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.69 \pm 0.57 \pm 0.15$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

NEW

[1] The value reported here from LEES 12S refers to $4.3 < q^2 < 8.12\ \mathrm{GeV}^2/c^2$.

NODE=S049PB3;LINKAGE=LE

$B(B \to K^* \ell^+ \ell^-)$ $(10.09 < q^2 < 12.86\ \mathrm{GeV}^2/c^2)$

NODE=S049PB4
NODE=S049PB4

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
1.93±0.25 OUR AVERAGE				
[(1.95 ± 0.28) × 10^{-7} OUR 2012 AVERAGE]				
YOUR DATA $1.86^{+0.52}_{-0.48} \pm 0.10$	[1] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$1.77 \pm 0.34 \pm 0.11$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$2.24^{+0.44}_{-0.40} \pm 0.19$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.97 \pm 0.47 \pm 0.17$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

NEW

[1] The value reported here from LEES 12S refers to $10.11 < q^2 < 12.89\ \mathrm{GeV}^2/c^2$.

NODE=S049PB4;LINKAGE=LE

$B(B \to K^* \ell^+ \ell^-)$ $(14.18 < q^2 < 16.0\ \mathrm{GeV}^2/c^2)$

NODE=S049PB5
NODE=S049PB5

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
1.21±0.17 OUR AVERAGE				
[(1.14 ± 0.19) × 10^{-7} OUR 2012 AVERAGE]				
YOUR DATA $1.46^{+0.41}_{-0.36} \pm 0.06$	[1] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$1.21 \pm 0.24 \pm 0.07$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$1.05^{+0.29}_{-0.26} \pm 0.08$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.51 \pm 0.36 \pm 0.13$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

NEW

[1] The value reported here from LEES 12S refers to $14.21 < q^2 < 16.0\ \mathrm{GeV}^2/c^2$.

NODE=S049PB5;LINKAGE=LE

$B(B \to K^* \ell^+ \ell^-)$ $(16.0 < q^2\ \mathrm{GeV}^2/c^2)$

NODE=S049PB6
NODE=S049PB6

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
1.3 ±0.4 OUR AVERAGE Error includes scale factor of 2.3. See the ideogram below.				
[(1.3 ± 0.6) × 10^{-7} OUR 2012 AVERAGE Scale factor = 3.2]				
YOUR DATA $1.02^{+0.47}_{-0.42} \pm 0.06$	LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$0.88 \pm 0.22 \pm 0.05$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$2.04^{+0.27}_{-0.24} \pm 0.16$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.35 \pm 0.37 \pm 0.12$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

NEW

$B(B \to K^* \ell^+ \ell^-)$ $(1.0 < q^2 < 6.0\ \mathrm{GeV}^2/c^2)$

NODE=S049PB7
NODE=S049PB7

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
1.64±0.26 OUR AVERAGE				
[(1.48 ± 0.30) × 10^{-7} OUR 2012 AVERAGE]				
YOUR DATA $2.05^{+0.53}_{-0.48} \pm 0.07$	LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$1.48 \pm 0.39 \pm 0.12$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$1.49^{+0.45}_{-0.40} \pm 0.12$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.60 \pm 0.54 \pm 0.14$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

NEW

$B(B \to K\ell^+\ell^-)$ ($q^2 < 2.0$ GeV^2/c^2)

NODE=S049PB9
NODE=S049PB9

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
0.51±0.16 OUR AVERAGE Error includes scale factor of 1.9. See the ideogram below. [(0.46 ± 0.22) × 10^{-7} OUR 2012 AVERAGE Scale factor = 2.4]				
YOUR DATA $0.71^{+0.20}_{-0.18}\pm0.02$	[1] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$0.33\pm0.10\pm0.02$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$0.81^{+0.18}_{-0.16}\pm0.05$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.38\pm0.16\pm0.03$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

NEW

[1] The value reported here from LEES 12S refers to $0.1 < q^2 < 2.0$ GeV^2/c^2.

NODE=S049PB9;LINKAGE=LE

$B(B \to K\ell^+\ell^-)$ ($2.0 < q^2 < 4.3$ GeV^2/c^2)

NODE=S049PBA
NODE=S049PBA

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
$0.57^{+0.10}_{-0.09}$ OUR AVERAGE Error includes scale factor of 1.2. [(0.61 ± 0.15) × 10^{-7} OUR 2012 AVERAGE Scale factor = 1.5]				
YOUR DATA $0.49^{+0.15}_{-0.13}\pm0.01$	LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$0.77\pm0.14\pm0.05$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$0.46^{+0.14}_{-0.12}\pm0.03$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.58\pm0.19\pm0.04$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

NEW

$B(B \to K\ell^+\ell^-)$ ($4.3 < q^2 < 8.68$ GeV^2/c^2)

NODE=S049PBB
NODE=S049PBB

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
1.00±0.11 OUR AVERAGE [(1.03 ± 0.13) × 10^{-7} OUR 2012 AVERAGE]				
YOUR DATA $0.94^{+0.20}_{-0.19}\pm0.02$	[1] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$1.05\pm0.17\pm0.07$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$1.00^{+0.19}_{-0.18}\pm0.06$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.93\pm0.25\pm0.06$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

NEW

[1] The value reported here from LEES 12S refers to $4.3 < q^2 < 8.12$ GeV^2/c^2.

NODE=S049PBB;LINKAGE=LE

$B(B \to K\ell^+\ell^-)$ ($10.09 < q^2 < 12.86$ GeV^2/c^2)

NODE=S049PBC
NODE=S049PBC

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
0.57±0.11 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below. [(0.50 ± 0.09) × 10^{-7} OUR 2012 AVERAGE]				
YOUR DATA $0.90^{+0.20}_{-0.19}\pm0.04$	[1] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$0.48\pm0.10\pm0.03$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$0.55^{+0.16}_{-0.14}\pm0.03$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.72\pm0.17\pm0.05$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

NEW

[1] The value reported here from LEES 12S refers to $10.11 < q^2 < 12.89$ GeV^2/c^2.

NODE=S049PBC;LINKAGE=LE

$B(B \to K\ell^+\ell^-)$ ($14.18 < q^2 < 16.0$ GeV^2/c^2)

NODE=S049PBD
NODE=S049PBD

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
0.49±0.07 OUR AVERAGE [$(0.49^{+0.08}_{-0.07})$ × 10^{-7} OUR 2012 AVERAGE]				
YOUR DATA $0.49^{+0.15}_{-0.14}\pm0.02$	[1] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$0.52\pm0.09\pm0.03$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$0.38^{+0.19}_{-0.12}\pm0.02$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.38\pm0.12\pm0.03$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

NEW

[1] The value reported here from LEES 12S refers to $14.21 < q^2 < 16.0$ GeV^2/c^2.

NODE=S049PBD;LINKAGE=LE

$B(B \to K\ell^+\ell^-)$ $(16.0 < q^2$ GeV$^2/c^2)$

NODE=S049PBE
NODE=S049PBE

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
0.52±0.16 OUR AVERAGE Error includes scale factor of 2.1. See the ideogram below.				
[$(0.49 \pm 0.24) \times 10^{-7}$ OUR 2012 AVERAGE Scale factor = 2.8]				
YOUR DATA $0.67^{+0.23}_{-0.21} \pm 0.05$	LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$0.38 \pm 0.09 \pm 0.02$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$0.98^{+0.20}_{-0.18} \pm 0.06$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.35 \pm 0.13 \pm 0.02$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

NEW

$B(B \to K\ell^+\ell^-)$ $(1.0 < q^2 < 6.0$ GeV$^2/c^2)$

NODE=S049PBF
NODE=S049PBF

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
1.33±0.13 OUR AVERAGE				
[$(1.32 \pm 0.15) \times 10^{-7}$ OUR 2012 AVERAGE]				
YOUR DATA $1.36^{+0.27}_{-0.24} \pm 0.03$	LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$1.29 \pm 0.18 \pm 0.08$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$1.36^{+0.23}_{-0.21} \pm 0.08$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.01 \pm 0.26 \pm 0.07$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

NEW

ISOSPIN ASYMMETRY

NODE=S049245

Δ_{0-} is defined as

NODE=S049245

$$\frac{\Gamma(B^0 \to f_d) - \Gamma(B^+ \to f_u)}{\Gamma(B^0 \to f) + \Gamma(B^+ \to f)},$$

the isospin asymmetry of inclusive neutral and charged B decay.

$\Delta_{0-}(B(B \to K\ell^+\ell^-))$

NODE=S049IA3
NODE=S049IA3

VALUE	DOCUMENT ID		TECN	COMMENT
−0.37±0.13 OUR AVERAGE				
[$-0.40^{+0.34}_{-0.30}$ OUR 2012 AVERAGE Scale factor = 1.9]				
$-0.35^{+0.23}_{-0.27}$	[1] AAIJ	12AH	LHCB	pp at 7 TeV
YOUR DATA $-0.58^{+0.29}_{-0.37} \pm 0.02$	[2] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.31^{+0.17}_{-0.14} \pm 0.08$	[3] WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-1.43^{+0.56}_{-0.85} \pm 0.05$	[4,5] AUBERT	09T	BABR	Repl. by LEES 12S

NEW

[1] For $1 < q^2 < 6$ GeV$^2/c^4$. NODE=S049IA3;LINKAGE=AA
[2] For $0.10 < q^2 < 8.12$ GeV$^2/c^4$. Measurements in other q^2 bins are also reported. NODE=S049IA3;LINKAGE=LE
[3] For $q^2 < 8.68$ GeV$^2/c^4$. NODE=S049IA3;LINKAGE=WE
[4] For $0.1 < m^2_{\ell^+\ell^-} < 7.02$ GeV$^2/c^4$. NODE=S049IA3;LINKAGE=AU
[5] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S049IA3;LINKAGE=EP

$\Delta_{0-}(B(B \to K^*\ell^+\ell^-))$

NODE=S049IA4
NODE=S049IA4

VALUE	DOCUMENT ID		TECN	COMMENT
−0.22±0.10 OUR AVERAGE				
[-0.44 ± 0.13 OUR 2012 AVERAGE Scale factor = 1.1]				
-0.15 ± 0.16	[1] AAIJ	12AH	LHCB	pp at 7 TeV
YOUR DATA $-0.25^{+0.20}_{-0.17} \pm 0.03$	[2] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.29 \pm 0.16 \pm 0.09$	[3] WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.56^{+0.17}_{-0.15} \pm 0.03$	[4,5] AUBERT	09T	BABR	Repl. by LEES 12S

NEW

[1] For $1 < q^2 < 6$ GeV$^2/c^4$. NODE=S049IA4;LINKAGE=AA
[2] For $0.10 < q^2 < 8.12$ GeV$^2/c^4$. Measurements in other q^2 bins are also reported. NODE=S049IA4;LINKAGE=LE
[3] For $q^2 < 8.68$ GeV$^2/c^4$. NODE=S049IA4;LINKAGE=WE
[4] For $0.1 < m^2_{\ell^+\ell^-} < 7.02$ GeV$^2/c^4$. NODE=S049IA4;LINKAGE=AU
[5] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S049IA4;LINKAGE=EP

$B^{\pm}/B^{0}$ ADMIXTURE REFERENCES

NODE=S049

	AAIJ	12AH	JHEP 1207 133	R. Aaij *et al.*	(LHCb Collab.)	REFID=54472
YOUR PAPER	LEES	12S	PR D86 032012	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54386
	AALTONEN	11AI	PRL 107 201802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53836
	AALTONEN	11L	PRL 106 161801	T. Aaltonen *et al.*	(CDF Collab.)	REFID=16443
	AUBERT	09T	PRL 102 091803	B. Aubert *et al.*	(BABAR Collab.)	REFID=52829
	Also		EPAPS Document No. E-PRLTAO-102-060910		(BABAR Collab.)	REFID=53060;ERROR=3
	WEI	09A	PRL 103 171801	J.-T. Wei *et al.*	(BELLE Collab.)	REFID=53061
	Also		EPAPS Supplement EPAPS_appendix.pdf		(BELLE Collab.)	REFID=53240;ERROR=4
	AUBERT,B	06J	PR D73 092001	B. Aubert *et al.*	(BABAR Collab.)	REFID=51305
	AUBERT	03U	PRL 91 221802	B. Aubert *et al.*	(BaBar Collab.)	REFID=49648
	ISHIKAWA	03	PRL 91 261601	A. Ishikawa *et al.*	(BELLE Collab.)	REFID=49641
	ABE	02	PRL 88 021801	K. Abe *et al.*	(BELLE Collab.)	REFID=48518
	AUBERT	02L	PRL 88 241801	B. Aubert *et al.*	(BaBar Collab.)	REFID=48751
	ANDERSON	01B	PRL 87 181803	S. Anderson *et al.*	(CLEO Collab.)	REFID=48389

Reference = LEES 12T; PR D86 051105
Verifier code = BABAR

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Fabio Anulli

EMAIL: anulli@slac.stanford.edu

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(\text{invisible})/\Gamma_{\text{total}}$ — Γ_{480}/Γ

NODE=S042SN1
NODE=S042SN1

	VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
	< 2.4 (CL = 90%)	[<22 × 10^{-5} (CL = 90%) OUR 2012 BEST LIMIT]				
YOUR DATA	**< 2.4**	90	[1] LEES	12T	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	<13	90	[2] HSU	12	BELL	$e^+e^- \to \Upsilon(4S)$
	<22	90	[1] AUBERT,B	04J	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Uses the fully reconstructed $B^0 \to D^{(*)-}\ell^+\nu_\ell$ events as a tag. NODE=S042SN1;LINKAGE=AU

[2] Identified by fully reconstructing a hadronic decay of the accompanying B meson and requiring no other particles in the event. NODE=S042SN1;LINKAGE=HS

$\Gamma(\nu\overline{\nu}\gamma)/\Gamma_{\text{total}}$ — Γ_{481}/Γ

NODE=S042SN2
NODE=S042SN2

	VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
	<1.7 (CL = 90%)	[<4.7 × 10^{-5} (CL = 90%) OUR 2012 BEST LIMIT]				
YOUR DATA	**<1.7**	90	[1] LEES	12T	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	<4.7	90	[1] AUBERT,B	04J	BABR	Repl. by LEES 12T

[1] Uses the fully reconstructed $B^0 \to D^{(*)-}\ell^+\nu_\ell$ events as a tag. NODE=S042SN2;LINKAGE=AU

B^0 REFERENCES

NODE=S042

	HSU	12	PR D86 032002	C.-L. Hsu *et al.*	(BELLE Collab.) REFID=54427
YOUR PAPER	LEES	12T	PR D86 051105	J.P. Lees *et al.*	(BABAR Collab.) REFID=54612
	AUBERT,B	04J	PRL 93 091802	B. Aubert *et al.*	(BABAR Collab.) REFID=50074

Reference = LEES 12U; PR D86 052012
Verifier code = BABAR

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June 4, 2013

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BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

$B^\pm/B^0$ ADMIXTURE

NODE=S049

$B^\pm/B^0$ ADMIXTURE BRANCHING RATIOS

NODE=S049215

$\Gamma(\overline{b} \to \overline{s}\gamma)/\Gamma_{total}$ **Γ_{77}/Γ**

NODE=S049R15

NODE=S049R15

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
3.37±0.21 OUR AVERAGE				
[(3.53 ± 0.24) × 10^{-4} OUR 2012 AVERAGE]				
YOUR DATA 3.29±0.19±0.48	[1,2] LEES	12U	BABR	$e^+e^- \to \Upsilon(4S)$
3.31±0.16±0.31	[1,3] LEES	12V	BABR	$e^+e^- \to \Upsilon(4S)$
3.47±0.15±0.40	[1,4] LIMOSANI	09	BELL	$e^+e^- \to \Upsilon(4S)$
3.91±0.91±0.64	[1,5] AUBERT	08O	BABR	$e^+e^- \to \Upsilon(4S)$
$3.36 \pm 0.53^{+0.65}_{-0.68}$	[6] ABE	01F	BELL	$e^+e^- \to \Upsilon(4S)$
3.29±0.44±0.29	[1,7] CHEN	01C	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.30±0.08±0.30	[8] DEL-AMO-SA..	10M	BABR	$e^+e^- \to \Upsilon(4S)$
4.3 ±0.3 ±0.7	[9] AUBERT	09U	BABR	Repl. by DEL-AMO-SANCHEZ 10M
3.92±0.31±0.47	[1,10] AUBERT,BE	06B	BABR	Repl. by LEES 12V
$3.49 \pm 0.20^{+0.59}_{-0.46}$	[1,11] AUBERT,B	05R	BABR	Repl. by LEES 12U
3.50±0.32±0.31	[1,12] KOPPENBURG	04	BELL	Repl. by LIMOSANI 09
2.32±0.57±0.35	ALAM	95	CLE2	Repl. by CHEN 01C

NEW

[1] We correct it to E_γ >1.6 GeV using the method of BUCHMULLER 06 (average of three theoretical models). NODE=S049R15;LINKAGE=AA

[2] Reports (3.29 ± 0.19 ± 0.48) × 10^{-4} for E_γ > 1.9 GeV. NODE=S049R15;LINKAGE=LS

[3] Reports (3.21 ± 0.15 ± 0.29 ± 0.08) × 10^{-4} for 1.8 < E_γ < 2.8 GeV, where the last systematic uncertainty is for model dependency. Results with other cutoffs are also reported. NODE=S049R15;LINKAGE=LE

[4] The measurement reported is (3.45 ± 0.15 ± 0.40) × 10^{-4} for E_γ > 1.7 GeV. NODE=S049R15;LINKAGE=LI

[5] Uses a fully reconstructed B meson as a tag on the recoil side. The measurement reported is (3.66 ± 0.85 ± 0.60) × 10^{-4} for E_γ > 1.9 GeV. NODE=S049R15;LINKAGE=UB

[6] ABE 01F reports their systematic errors $(\pm 0.42^{+0.50}_{-0.54}) \times 10^{-4}$, where the second error is due to the theoretical uncertainty. We combine them in quadrature. NODE=S049R15;LINKAGE=FA

[7] The measurement reported is $(3.21 \pm 0.43^{+0.32}_{-0.29}) \times 10^{-4}$ for E_γ > 2.0 GeV. NODE=S049R15;LINKAGE=KO

[8] Measured using sums of seven exclusive final states $B \to X_{d(s)}\gamma$ where $X_{d(s)}$ is a nonstrange (strange) charmless hadronic system in mass range 0.5–2.0 GeV/c^2. NODE=S049R15;LINKAGE=DE

[9] Measured using sums of seven exclusive final states $B \to X_{d(s)}\gamma$ where $X_{d(s)}$ is a nonstrange (strange) charmless hadronic system in mass range 0.6–1.8 GeV/c^2. NODE=S049R15;LINKAGE=AE

[10] The measurement reported is (3.67 ± 0.29 ± 0.45) × 10^{-4} for E_γ > 1.9 GeV. NODE=S049R15;LINKAGE=AB

[11] The measurement reported is $(3.27 \pm 0.18^{+0.55}_{-0.42}) \times 10^{-4}$ for E_γ > 1.9 GeV. NODE=S049R15;LINKAGE=AU

[12] The measurement reported is (3.55 ± 0.32 ± 0.32) × 10^{-4} for E_γ > 1.8 GeV. NODE=S049R15;LINKAGE=CE

$B \to X_s\gamma$ PHOTON ENERGY MOMENTS

NODE=S049250

$\langle E_\gamma \rangle$

NODE=S049GM1

NODE=S049GM1

VALUE (GeV)	DOCUMENT ID		TECN	COMMENT
2.314±0.011 OUR AVERAGE				
[2.306 ± 0.014 GeV OUR 2012 AVERAGE]				
YOUR DATA $2.346 \pm 0.018^{+0.027}_{-0.022}$	[1,2] LEES	12U	BABR	$e^+e^- \to \Upsilon(4S)$

NEW

$2.304 \pm 0.014 \pm 0.017$	[2,3] LEES	12V	BABR	$e^+ e^- \to \Upsilon(4S)$	
$2.311 \pm 0.009 \pm 0.015$	[3] LIMOSANI	09	BELL	$e^+ e^- \to \Upsilon(4S)$	
$2.289 \pm 0.058 \pm 0.027$	[3,4] AUBERT	08O	BABR	$e^+ e^- \to \Upsilon(4S)$	
$2.309 \pm 0.023 \pm 0.023$	[2,3] SCHWANDA	08	BELL	$e^+ e^- \to \Upsilon(4S)$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$2.288 \pm 0.025 \pm 0.023$	[3] AUBERT,BE	06B	BABR	Repl. by LEES 12V	

[1] LEES 12U uses $E_\gamma > 1.897$ GeV to calculate the moments; the moments are used to calculate the HQET parameters $m_b = 4.579^{+0.032}_{-0.029}$ GeV/c^2 and $\mu_\pi^2 = 0.257^{+0.034}_{-0.039}$ GeV^2 in the shape function model. The same HQET parameters are also determined in the kinetic model. NODE=S049GM1;LINKAGE=LE

[2] Results for different E_γ threshold values are also measured. NODE=S049GM1;LINKAGE=SC

[3] The result is for $E_\gamma > 1.9$ GeV. NODE=S049GM1;LINKAGE=AU

[4] Uses a fully reconstructed B meson as a tag on the recoil side. NODE=S049GM1;LINKAGE=UB

$\langle E_\gamma^2 \rangle - \langle E_\gamma \rangle^2$

NODE=S049GM2

NODE=S049GM2

VALUE (10^{-2} GeV^2)	DOCUMENT ID		TECN	COMMENT
3.03±0.25 OUR AVERAGE				NEW
[$(2.99 \pm 0.28) \times 10^{-2}$ GeV^2 OUR 2012 AVERAGE]				
YOUR DATA $2.11 \pm 0.57^{+0.55}_{-0.69}$	[1,2] LEES	12U	BABR	$e^+ e^- \to \Upsilon(4S)$
$3.62 \pm 0.33 \pm 0.33$	[2,3] LEES	12V	BABR	$e^+ e^- \to \Upsilon(4S)$
$3.02 \pm 0.19 \pm 0.30$	[3] LIMOSANI	09	BELL	$e^+ e^- \to \Upsilon(4S)$
$3.34 \pm 1.24 \pm 0.62$	[3,4] AUBERT	08O	BABR	$e^+ e^- \to \Upsilon(4S)$
$2.17 \pm 0.60 \pm 0.55$	[2,3] SCHWANDA	08	BELL	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$3.28 \pm 0.40 \pm 0.43$	[3] AUBERT,BE	06B	BABR	Repl. by LEES 12V

[1] LEES 12U uses $E_\gamma > 1.897$ GeV to calculate the moments; the moments are used to calculate the HQET parameters $m_b = 4.579^{+0.032}_{-0.029}$ GeV/c^2 and $\mu_\pi^2 = 0.257^{+0.034}_{-0.039}$ GeV^2 in the shape function model. The same HQET parameters are also determined in the kinetic model. NODE=S049GM2;LINKAGE=LE

[2] Results for different E_γ threshold values are also measured. NODE=S049GM2;LINKAGE=SC

[3] The result is for $E_\gamma > 1.9$ GeV. NODE=S049GM2;LINKAGE=AU

[4] Uses a fully reconstructed B meson as a tag on the recoil side. NODE=S049GM2;LINKAGE=UB

$B^\pm/B^0$ ADMIXTURE REFERENCES

NODE=S049

YOUR PAPER LEES	12U	PR D86 052012	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54613
LEES	12V	PRL 109 191801	J.P. Lees	(BABAR Collab.)	REFID=54614
Also		PR D86 112008	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54802
DEL-AMO-SA...	10M	PR D82 051101	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53500
AUBERT	09U	PRL 102 161803	B. Aubert *et al.*	(BABAR Collab.)	REFID=52830
LIMOSANI	09	PRL 103 241801	A. Limosani *et al.*	(BELLE Collab.)	REFID=53155
AUBERT	08O	PR D77 051103	B. Aubert *et al.*	(BABAR Collab.)	REFID=52223
SCHWANDA	08	PR D78 032016	C. Schwanda *et al.*	(BELLE Collab.)	REFID=52422
AUBERT,BE	06B	PRL 97 171803	B. Aubert *et al.*	(BABAR Collab.)	REFID=51435
BUCHMULLER	06	PR D73 073008	O.L. Buchmuller, H.U. Flacher	(RHBL)	REFID=52217
AUBERT,B	05R	PR D72 052004	B. Aubert *et al.*	(BABAR Collab.)	REFID=50896
KOPPENBURG	04	PRL 93 061803	P. Koppenburg *et al.*	(BELLE Collab.)	REFID=50069
ABE	01F	PL B511 151	K. Abe *et al.*	(BELLE Collab.)	REFID=48171
CHEN	01C	PRL 87 251807	S. Chen *et al.*	(CLEO Collab.)	REFID=48532
ALAM	95	PRL 74 2885	M.S. Alam *et al.*	(CLEO Collab.)	REFID=44192

Reference = LEES 12V; PRL 109 191801
Verifier code = BABAR

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PLEASE REPLY WITHIN ONE WEEK

Fabio Anulli

EMAIL: anulli@slac.stanford.edu

June 4, 2013

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Thank you for helping us make the Review accurate and useful.

Sincerely,

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Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

$B^\pm/B^0$ ADMIXTURE

NODE=S049

$B^\pm/B^0$ ADMIXTURE BRANCHING RATIOS

NODE=S049215

$\Gamma(\overline{b} \to \overline{s}\gamma)/\Gamma_{total}$ **Γ_{77}/Γ**

NODE=S049R15

NODE=S049R15

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
3.37±0.21 OUR AVERAGE				
[(3.53 ± 0.24) × 10^{-4} OUR 2012 AVERAGE]				
3.29±0.19±0.48	[1,2] LEES	12U	BABR	$e^+e^- \to \Upsilon(4S)$
YOUR DATA 3.31±0.16±0.31	[1,3] LEES	12V	BABR	$e^+e^- \to \Upsilon(4S)$
3.47±0.15±0.40	[1,4] LIMOSANI	09	BELL	$e^+e^- \to \Upsilon(4S)$
3.91±0.91±0.64	[1,5] AUBERT	08O	BABR	$e^+e^- \to \Upsilon(4S)$
$3.36 \pm 0.53^{+0.65}_{-0.68}$	[6] ABE	01F	BELL	$e^+e^- \to \Upsilon(4S)$
3.29±0.44±0.29	[1,7] CHEN	01C	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.30±0.08±0.30	[8] DEL-AMO-SA..	10M	BABR	$e^+e^- \to \Upsilon(4S)$
4.3 ±0.3 ±0.7	[9] AUBERT	09U	BABR	Repl. by DEL-AMO-SANCHEZ 10M
3.92±0.31±0.47	[1,10] AUBERT,BE	06B	BABR	Repl. by LEES 12V
$3.49 \pm 0.20^{+0.59}_{-0.46}$	[1,11] AUBERT,B	05R	BABR	Repl. by LEES 12U
3.50±0.32±0.31	[1,12] KOPPENBURG	04	BELL	Repl. by LIMOSANI 09
2.32±0.57±0.35	ALAM	95	CLE2	Repl. by CHEN 01C

NEW

[1] We correct it to E_γ >1.6 GeV using the method of BUCHMULLER 06 (average of three theoretical models). NODE=S049R15;LINKAGE=AA

[2] Reports (3.29 ± 0.19 ± 0.48) × 10^{-4} for E_γ > 1.9 GeV. NODE=S049R15;LINKAGE=LS

[3] Reports (3.21 ± 0.15 ± 0.29 ± 0.08) × 10^{-4} for 1.8 < E_γ < 2.8 GeV, where the last systematic uncertainty is for model dependency. Results with other cutoffs are also reported. NODE=S049R15;LINKAGE=LE

[4] The measurement reported is (3.45 ± 0.15 ± 0.40) × 10^{-4} for E_γ > 1.7 GeV. NODE=S049R15;LINKAGE=LI

[5] Uses a fully reconstructed B meson as a tag on the recoil side. The measurement reported is (3.66 ± 0.85 ± 0.60) × 10^{-4} for E_γ > 1.9 GeV. NODE=S049R15;LINKAGE=UB

[6] ABE 01F reports their systematic errors $(\pm 0.42^{+0.50}_{-0.54}) \times 10^{-4}$, where the second error is due to the theoretical uncertainty. We combine them in quadrature. NODE=S049R15;LINKAGE=FA

[7] The measurement reported is $(3.21 \pm 0.43^{+0.32}_{-0.29}) \times 10^{-4}$ for E_γ > 2.0 GeV. NODE=S049R15;LINKAGE=KO

[8] Measured using sums of seven exclusive final states $B \to X_{d(s)}\gamma$ where $X_{d(s)}$ is a nonstrange (strange) charmless hadronic system in mass range 0.5–2.0 GeV/c^2. NODE=S049R15;LINKAGE=DE

[9] Measured using sums of seven exclusive final states $B \to X_{d(s)}\gamma$ where $X_{d(s)}$ is a nonstrange (strange) charmless hadronic system in mass range 0.6–1.8 GeV/c^2. NODE=S049R15;LINKAGE=AE

[10] The measurement reported is (3.67 ± 0.29 ± 0.45) × 10^{-4} for E_γ > 1.9 GeV. NODE=S049R15;LINKAGE=AB

[11] The measurement reported is $(3.27 \pm 0.18^{+0.55}_{-0.42}) \times 10^{-4}$ for E_γ > 1.9 GeV. NODE=S049R15;LINKAGE=AU

[12] The measurement reported is (3.55 ± 0.32 ± 0.32) × 10^{-4} for E_γ > 1.8 GeV. NODE=S049R15;LINKAGE=CE

CP VIOLATION

NODE=S049225

A_{CP} is defined as NODE=S049225

$$\frac{B(\overline{B} \to \overline{f}) - B(B \to f)}{B(\overline{B} \to \overline{f}) + B(B \to f)},$$

the *CP*-violation charge asymmetry of inclusive $B^\pm$ and B^0 decay.

$A_{CP}(b \to (s+d)\gamma)$

NODE=S049CP4
NODE=S049CP4

VALUE	DOCUMENT ID		TECN	COMMENT
-0.01 ± 0.05 OUR AVERAGE				
[-0.09 ± 0.07 OUR 2012 AVERAGE]				
YOUR DATA $0.057 \pm 0.060 \pm 0.018$	LEES	12V	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.10 \pm 0.18 \pm 0.05$	[1] AUBERT	08O	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.110 \pm 0.115 \pm 0.017$	AUBERT,BE	06B	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.079 \pm 0.108 \pm 0.022$	[2] COAN	01	CLE2	$e^+e^- \to \Upsilon(4S)$

NEW

[1] Uses a fully reconstructed B meson as a tag on the recoil side. Requires $E_\gamma > 2.2$ GeV. NODE=S049CP4;LINKAGE=UB

[2] Corresponds to $-0.27 < A_{CP} < 0.10$ at 90% CL. NODE=S049CP4;LINKAGE=A

$B \to X_s\gamma$ PHOTON ENERGY MOMENTS

NODE=S049250

$\langle E_\gamma \rangle$

NODE=S049GM1
NODE=S049GM1

VALUE (GeV)	DOCUMENT ID		TECN	COMMENT
2.314 ± 0.011 OUR AVERAGE				
[2.306 ± 0.014 GeV OUR 2012 AVERAGE]				
$2.346 \pm 0.018^{+0.027}_{-0.022}$	[1,2] LEES	12U	BABR	$e^+e^- \to \Upsilon(4S)$
YOUR DATA $2.304 \pm 0.014 \pm 0.017$	[2,3] LEES	12V	BABR	$e^+e^- \to \Upsilon(4S)$
$2.311 \pm 0.009 \pm 0.015$	[3] LIMOSANI	09	BELL	$e^+e^- \to \Upsilon(4S)$
$2.289 \pm 0.058 \pm 0.027$	[3,4] AUBERT	08O	BABR	$e^+e^- \to \Upsilon(4S)$
$2.309 \pm 0.023 \pm 0.023$	[2,3] SCHWANDA	08	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$2.288 \pm 0.025 \pm 0.023$	[3] AUBERT,BE	06B	BABR	Repl. by LEES 12V

NEW

[1] LEES 12U uses $E_\gamma > 1.897$ GeV to calculate the moments; the moments are used to calculate the HQET parameters $m_b = 4.579^{+0.032}_{-0.029}$ GeV/c^2 and $\mu_\pi^2 = 0.257^{+0.034}_{-0.039}$ GeV^2 in the shape function model. The same HQET parameters are also determined in the kinetic model. NODE=S049GM1;LINKAGE=LE

[2] Results for different E_γ threshold values are also measured. NODE=S049GM1;LINKAGE=SC

[3] The result is for $E_\gamma > 1.9$ GeV. NODE=S049GM1;LINKAGE=AU

[4] Uses a fully reconstructed B meson as a tag on the recoil side. NODE=S049GM1;LINKAGE=UB

$\langle E_\gamma^2 \rangle - \langle E_\gamma \rangle^2$

NODE=S049GM2
NODE=S049GM2

VALUE (10^{-2} GeV^2)	DOCUMENT ID		TECN	COMMENT
3.03 ± 0.25 OUR AVERAGE				
[$(2.99 \pm 0.28) \times 10^{-2}$ GeV^2 OUR 2012 AVERAGE]				
$2.11 \pm 0.57^{+0.55}_{-0.69}$	[1,2] LEES	12U	BABR	$e^+e^- \to \Upsilon(4S)$
YOUR DATA $3.62 \pm 0.33 \pm 0.33$	[2,3] LEES	12V	BABR	$e^+e^- \to \Upsilon(4S)$
$3.02 \pm 0.19 \pm 0.30$	[3] LIMOSANI	09	BELL	$e^+e^- \to \Upsilon(4S)$
$3.34 \pm 1.24 \pm 0.62$	[3,4] AUBERT	08O	BABR	$e^+e^- \to \Upsilon(4S)$
$2.17 \pm 0.60 \pm 0.55$	[2,3] SCHWANDA	08	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$3.28 \pm 0.40 \pm 0.43$	[3] AUBERT,BE	06B	BABR	Repl. by LEES 12V

NEW

[1] LEES 12U uses $E_\gamma > 1.897$ GeV to calculate the moments; the moments are used to calculate the HQET parameters $m_b = 4.579^{+0.032}_{-0.029}$ GeV/c^2 and $\mu_\pi^2 = 0.257^{+0.034}_{-0.039}$ GeV^2 in the shape function model. The same HQET parameters are also determined in the kinetic model. NODE=S049GM2;LINKAGE=LE

[2] Results for different E_γ threshold values are also measured. NODE=S049GM2;LINKAGE=SC

[3] The result is for $E_\gamma > 1.9$ GeV. NODE=S049GM2;LINKAGE=AU

[4] Uses a fully reconstructed B meson as a tag on the recoil side. NODE=S049GM2;LINKAGE=UB

$B^\pm/B^0$ ADMIXTURE REFERENCES

NODE=S049

LEES	12U	PR D86 052012	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54613
YOUR PAPER LEES	12V	PRL 109 191801	J.P. Lees	(BABAR Collab.)	REFID=54614
Also		PR D86 112008	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54802
DEL-AMO-SA...	10M	PR D82 051101	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53500
AUBERT	09U	PRL 102 161803	B. Aubert *et al.*	(BABAR Collab.)	REFID=52830
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AUBERT	08O	PR D77 051103	B. Aubert *et al.*	(BABAR Collab.)	REFID=52223
SCHWANDA	08	PR D78 032016	C. Schwanda *et al.*	(BELLE Collab.)	REFID=52422
AUBERT,BE	06B	PRL 97 171803	B. Aubert *et al.*	(BABAR Collab.)	REFID=51435
BUCHMULLER	06	PR D73 073008	O.L. Buchmuller, H.U. Flacher	(RHBL)	REFID=52217

AUBERT,B	05R	PR D72 052004	B. Aubert *et al.*	(BABAR Collab.)	REFID=50896
KOPPENBURG	04	PRL 93 061803	P. Koppenburg *et al.*	(BELLE Collab.)	REFID=50069
ABE	01F	PL B511 151	K. Abe *et al.*	(BELLE Collab.)	REFID=48171
CHEN	01C	PRL 87 251807	S. Chen *et al.*	(CLEO Collab.)	REFID=48532
COAN	01	PRL 86 5661	T.E. Coan *et al.*	(CLEO Collab.)	REFID=48240
ALAM	95	PRL 74 2885	M.S. Alam *et al.*	(CLEO Collab.)	REFID=44192

Reference = LEES 12W; PRL 109 211801
Verifier code = BABAR

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BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

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NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

T and *CPT* VIOLATION PARAMETERS

NODE=S042235

Measured values of the T-, CP-, and CPT-asymmetry parameters, defined as the differences in $S^\pm_{\alpha,\beta}$ and $C^\pm_{\alpha,\beta}$ between symmetry-transformed transitions. The indices $\alpha = \ell^+, \ell^-$ and $\beta = K^0_S, K^0_L$ stand for reconstructed the flavor final state and the CP final states from $\Upsilon(4S)$ decay. The sign $\pm$ indicates whether the decay to the flavor final state α occurs before or after the decay to the CP final state.

NODE=S042235

$\Delta S^+_T\ (S^-_{\ell^-,K^0_S} - S^+_{\ell^+,K^0_S})$

NODE=S042TVA
NODE=S042TVA

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**−1.37±0.14±0.06**	LEES	12W	BABR	$e^+e^- \to \Upsilon(4S)$

$\Delta S^-_T\ (S^+_{\ell^-,K^0_S} - S^-_{\ell^+,K^0_S})$

NODE=S042TVB
NODE=S042TVB

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**1.17±0.18±0.11**	LEES	12W	BABR	$e^+e^- \to \Upsilon(4S)$

$\Delta C^+_T\ (C^-_{\ell^-,K^0_S} - C^+_{\ell^+,K^0_S})$

NODE=S042TVC
NODE=S042TVC

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.10±0.14±0.08**	LEES	12W	BABR	$e^+e^- \to \Upsilon(4S)$

$\Delta C^-_T\ (C^+_{\ell^-,K^0_S} - C^-_{\ell^+,K^0_S})$

NODE=S042TVD
NODE=S042TVD

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.04±0.14±0.08**	LEES	12W	BABR	$e^+e^- \to \Upsilon(4S)$

$\Delta S^+_{CP}\ (S^+_{\ell^-,K^0_S} - S^+_{\ell^+,K^0_S})$

NODE=S042TVE
NODE=S042TVE

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**−1.30±0.11±0.07**	LEES	12W	BABR	$e^+e^- \to \Upsilon(4S)$

$\Delta S^-_{CP}\ (S^-_{\ell^-,K^0_S} - S^-_{\ell^+,K^0_S})$

NODE=S042TVF
NODE=S042TVF

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**1.33±0.12±0.06**	LEES	12W	BABR	$e^+e^- \to \Upsilon(4S)$

$\Delta C^+_{CP}\ (C^+_{\ell^-,K^0_S} - C^+_{\ell^+,K^0_S})$

NODE=S042TVG
NODE=S042TVG

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.07±0.09±0.03**	LEES	12W	BABR	$e^+e^- \to \Upsilon(4S)$

$\Delta C^-_{CP}\ (C^-_{\ell^-,K^0_S} - C^-_{\ell^+,K^0_S})$

NODE=S042TVH
NODE=S042TVH

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.08±0.10±0.04**	LEES	12W	BABR	$e^+e^- \to \Upsilon(4S)$

ΔS^{+}_{CPT} $(S^{-}_{\ell^+,K^0_S} - S^{+}_{\ell^+,K^0_S})$ NODE=S042TVI

	VALUE	DOCUMENT ID		TECN	COMMENT	
YOUR DATA	**0.16±0.21±0.09**	LEES	12W	BABR	$e^+e^- \to \Upsilon(4S)$	NODE=S042TVI

ΔS^{-}_{CPT} $(S^{+}_{\ell^+,K^0_S} - S^{-}_{\ell^+,K^0_S})$ NODE=S042TVJ

	VALUE	DOCUMENT ID		TECN	COMMENT	
YOUR DATA	**−0.03±0.13±0.06**	LEES	12W	BABR	$e^+e^- \to \Upsilon(4S)$	NODE=S042TVJ

ΔC^{+}_{CPT} $(C^{-}_{\ell^+,K^0_S} - C^{+}_{\ell^+,K^0_S})$ NODE=S042TVK

	VALUE	DOCUMENT ID		TECN	COMMENT	
YOUR DATA	**0.14±0.15±0.07**	LEES	12W	BABR	$e^+e^- \to \Upsilon(4S)$	NODE=S042TVK

$\Delta C^{=}_{CPT}$ $(C^{+}_{\ell^+,K^0_S} - C^{=}_{\ell^+,K^0_S})$ NODE=S042TVL

	VALUE	DOCUMENT ID		TECN	COMMENT	
YOUR DATA	**0.03±0.12±0.08**	LEES	12W	BABR	$e^+e^- \to \Upsilon(4S)$	NODE=S042TVL

B^0 REFERENCES NODE=S042

YOUR PAPER LEES 12W PRL 109 211801 J.P. Lees *et al.* (BABAR Collab.) REFID=54682

Reference = LEES 12Z; PR D86 091102
Verifier code = BABAR

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Berkeley, CA 94720-8153
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PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

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($B = \pm 1$)

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$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(\overline{\Sigma}_c(2455)^{--}p\pi^+\pi^+)/\Gamma_{total}$ — Γ_{450}/Γ

NODE=S041B77
NODE=S041B77

	VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT	
	3.0±0.8 OUR AVERAGE					NEW
	[(2.8 ± 1.2) × 10^{-4} OUR 2012 AVERAGE]					
YOUR DATA	3.0±0.2±0.8	[1,2] LEES	12Z	BABR	$e^+e^- \to \Upsilon(4S)$	
	2.8±0.9±0.9	[1,3] DYTMAN	02	CLE2	$e^+e^- \to \Upsilon(4S)$	

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S041B77;LINKAGE=EP

[2] LEES 12Z reports $(2.98 \pm 0.16 \pm 0.15 \pm 0.77) \times 10^{-4}$ from a measurement of $[\Gamma(B^+ \to \overline{\Sigma}_c(2455)^{--}p\pi^+\pi^+)/\Gamma_{total}] \times [B(\Lambda_c^+ \to pK^-\pi^+)]$ assuming $B(\Lambda_c^+ \to pK^-\pi^+) = (5.0 \pm 1.3) \times 10^{-2}$. NODE=S041B77;LINKAGE=LE

[3] DYTMAN 02 reports $(2.8 \pm 0.9 \pm 0.5 \pm 0.7) \times 10^{-4}$ from a measurement of $[\Gamma(B^+ \to \overline{\Sigma}_c(2455)^{--}p\pi^+\pi^+)/\Gamma_{total}] \times [B(\Lambda_c^+ \to pK^-\pi^+)]$ assuming $B(\Lambda_c^+ \to pK^-\pi^+) = (5.0 \pm 1.3) \times 10^{-2}$. NODE=S041B77;LINKAGE=B9

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER	LEES	12Z	PR D86 091102	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54716
	DYTMAN	02	PR D66 091101	S.A. Dytman *et al.*	(CLEO Collab.)	REFID=49070

Reference = LEES 12AA; PR D86 092004
Verifier code = BABAR

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Fabio Anulli

EMAIL: anulli@slac.stanford.edu

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(\pi^0 \ell^+ \nu_\ell)/\Gamma_{total}$ — Γ_{19}/Γ

NODE=S041Q53

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements.

NODE=S041Q53

NODE=S041Q53

	VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
	0.778±0.028 OUR EVALUATION				→ UNCHECKED ←
	0.742±0.031 OUR AVERAGE				NEW
	[(0.72 ± 0.04) × 10^{-4} OUR 2012 AVERAGE]				
YOUR DATA	0.77 ±0.04 ±0.03	[1] LEES	12AA	BABR	$e^+e^- \to \Upsilon(4S)$
	0.705±0.025±0.035	[2] DEL-AMO-SA..	11C	BABR	$e^+e^- \to \Upsilon(4S)$
	0.82 ±0.09 ±0.05	[2] AUBERT	08AV	BABR	$e^+e^- \to \Upsilon(4S)$
	0.77 ±0.14 ±0.08	[3] HOKUUE	07	BELL	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	0.74 ±0.05 ±0.10	[4] AUBERT,B	05O	BABR	Repl. by DEL-AMO-SANCHEZ 11C

[1] Uses loose neutrino reconstruction technique. Assumes B($Y(4S) \to B^+B^-$) = (51.6 ± 0.6)% and B($Y(4S) \to B^0\overline{B}^0$) = (48.4 ± 0.6)%. NODE=S041Q53;LINKAGE=LE

[2] Using the isospin symmetry relation, B^+ and B^0 branching fractions are combined. NODE=S041Q53;LINKAGE=AB

[3] The signal events are tagged by a second B meson reconstructed in the semileptonic mode $B \to D^{(*)}\ell\nu_\ell$. NODE=S041Q53;LINKAGE=HO

[4] B^+ and B^0 decays combined assuming isospin symmetry. Systematic errors include both experimental and form-factor uncertainties. NODE=S041Q53;LINKAGE=IS

$\Gamma(\eta \ell^+ \nu_\ell)/\Gamma_{total}$ — Γ_{21}/Γ

NODE=S041T10

NODE=S041T10

NEW

	VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
	0.38±0.06 OUR AVERAGE					
	[(0.39 ± 0.08) × 10^{-4} OUR 2012 AVERAGE Scale factor = 1.3]					
YOUR DATA	0.38±0.05±0.05		[1] LEES	12AA	BABR	$e^+e^- \to \Upsilon(4S)$
	0.31±0.06±0.08		[1] AUBERT	09Q	BABR	$e^+e^- \to \Upsilon(4S)$
	0.64±0.20±0.03		[2] AUBERT	08AV	BABR	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	0.36±0.05±0.04		[1] DEL-AMO-SA..	11F	BABR	Repl. by LEES 12AA
	<1.01	90	[3] ADAM	07	CLE2	$e^+e^- \to \Upsilon(4S)$
	0.84±0.31±0.18		[4] ATHAR	03	CLE2	Repl. by ADAM 07

[1] Uses loose neutrino reconstruction technique. Assumes B($\Upsilon(4S) \to B^+B^-$) = (51.6 ± 0.6)% and B($\Upsilon(4S) \to B^0\overline{B}^0$) = (48.4 ± 0.6)%. NODE=S041T10;LINKAGE=AU

[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S041T10;LINKAGE=EP

[3] The B^0 and B^+ results are combined assuming the isospin, B lifetimes, and relative charged/neutral B production at the $\Upsilon(4S)$. NODE=S041T10;LINKAGE=AD

[4] ATHAR 03 reports systematic errors 0.16 ± 0.09, which are experimental systematic and systematic due to model dependence. We combine these in quadrature. NODE=S041T10;LINKAGE=AT

$\Gamma(\eta' \ell^+ \nu_\ell)/\Gamma_{total}$ — Γ_{22}/Γ

NODE=S041Q88
NODE=S041Q88

	VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
	0.23±0.08 OUR AVERAGE				
YOUR DATA	$0.24 \pm 0.08 \pm 0.03$	[1] LEES	12AA	BABR	$e^+ e^- \to \Upsilon(4S)$
	$0.04 \pm 0.22^{+0.05}_{-0.02}$	[2] AUBERT	08AV	BABR	$e^+ e^- \to \Upsilon(4S)$
	$2.66 \pm 0.80 \pm 0.56$	[3] ADAM	07	CLE2	$e^+ e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	$0.24 \pm 0.08 \pm 0.03$	[1] DEL-AMO-SA...	11F	BABR	Repl. by LEES 12AA

[1] Uses loose neutrino reconstruction technique. Assumes $B(\Upsilon(4S) \to B^+ B^-) = (51.6 \pm 0.6)\%$ and $B(\Upsilon(4S) \to B^0 \overline{B}^0) = (48.4 \pm 0.6)\%$. NODE=S041Q88;LINKAGE=DE

[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S041Q88;LINKAGE=EP

[3] The B^0 and B^+ results are combined assuming the isospin, B lifetimes, and relative charged/neutral B production at the $\Upsilon(4S)$. Corresponds to 90% CL interval $(1.20–4.46) \times 10^{-4}$. NODE=S041Q88;LINKAGE=AD

$\Gamma(\omega \ell^+ \nu_\ell)/\Gamma_{total}$ — Γ_{23}/Γ

NODE=S041S47

$\ell = e$ or μ, not sum over e and μ modes. NODE=S041S47

NODE=S041S47

	VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
	1.21±0.14 OUR AVERAGE					
	$[(1.15 \pm 0.17) \times 10^{-4}$ OUR 2012 AVERAGE]					
	$1.20 \pm 0.11 \pm 0.09$		[1,2] LEES	13A	BABR	$e^+ e^- \to \Upsilon(4S)$
	$1.3 \pm 0.4 \pm 0.4$		[3] SCHWANDA	04	BELL	$e^+ e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA	$1.19 \pm 0.16 \pm 0.09$		[2,4] LEES	12AA	BABR	Repl. by LEES 13A
	$1.14 \pm 0.16 \pm 0.08$		[2] AUBERT	09Q	BABR	Repl. by LEES 13A
	<2.1	90	[5] BEAN	93B	CLE2	$e^+ e^- \to \Upsilon(4S)$

NEW

[1] LEES 13A reports $(1.20 \pm 0.11 \pm 0.09) \times 10^{-4}$ from a measurement of $[\Gamma(B^+ \to \omega \ell^+ \nu_\ell)/\Gamma_{total}] \times [B(\omega(782) \to \pi^+ \pi^- \pi^0)]$ assuming $B(\omega(782) \to \pi^+ \pi^- \pi^0) = (89.2 \pm 0.7) \times 10^{-2}$. NODE=S041S47;LINKAGE=LS

[2] Uses $B(\Upsilon(4S) \to B^+ B^-) = (51.6 \pm 0.6)\%$ and $B(\Upsilon(4S) \to B^0 \overline{B}^0) = (48.4 \pm 0.6)\%$. NODE=S041S47;LINKAGE=NE

[3] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S041S47;LINKAGE=EP

[4] Uses loose neutrino reconstruction technique. NODE=S041S47;LINKAGE=LE

[5] BEAN 93B limit set using ISGW Model. Using isospin and the quark model to combine $\Gamma(\rho^0 \ell^+ \nu_\ell)$ and $\Gamma(\rho^- \ell^+ \nu_\ell)$ with this result, they obtain a limit $<(1.6–2.7) \times 10^{-4}$ at 90% CL for $B^+ \to \omega \ell^+ \nu_\ell$. The range corresponds to the ISGW, WSB, and KS models. An upper limit on $|V_{ub}/V_{cb}| < 0.8–0.13$ at 90% CL is derived as well. NODE=S041S47;LINKAGE=A

$B^\pm$ REFERENCES

NODE=S041

LEES	13A	PR D87 032004	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54854
YOUR PAPER LEES	12AA	PR D86 092004	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54717
DEL-AMO-SA...	11C	PR D83 032007	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53666
DEL-AMO-SA...	11F	PR D83 052011	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53673
AUBERT	09Q	PR D79 052011	B. Aubert *et al.*	(BABAR Collab.)	REFID=52797
AUBERT	08AV	PRL 101 081801	B. Aubert *et al.*	(BABAR Collab.)	REFID=52370
ADAM	07	PRL 99 041802	N.E. Adam *et al.*	(CLEO Collab.)	REFID=51868
Also		PR D76 012007	D.M. Asner *et al.*	(CLEO Collab.)	REFID=51855
HOKUUE	07	PL B648 139	T. Hokuue *et al.*	(BELLE Collab.)	REFID=51672
AUBERT,B	05O	PR D72 051102	B. Aubert *et al.*	(BABAR Collab.)	REFID=50892
SCHWANDA	04	PRL 93 131803	C. Schwanda *et al.*	(BELLE Collab.)	REFID=50086
ATHAR	03	PR D68 072003	S.B. Athar *et al.*	(CLEO Collab.)	REFID=49666
BEAN	93B	PRL 70 2681	A. Bean *et al.*	(CLEO Collab.)	REFID=43356

NODE=S042

B^0

$$I(J^P) = \tfrac{1}{2}(0^-)$$

Quantum numbers not measured. Values shown are quark-model predictions. NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^{\pm}$ section.

NODE=S042220

$\Gamma(\pi^- \ell^+ \nu_\ell)/\Gamma_{total}$ — Γ_{17}/Γ

NODE=S042S48

"OUR EVALUATION" is provided by the Heavy Flavor Averaging Group (HFAG) and the procedure is described at http://www.slac.stanford.edu/xorg/hfag/.

NODE=S042S48

NODE=S042S48

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
1.443±0.048 OUR EVALUATION				
[(1.441 ± 0.052) × 10^{-4} OUR 2012 EVALUATION]				
1.46 ±0.04 OUR AVERAGE				
[(1.44 ± 0.05) × 10^{-4} OUR 2012 AVERAGE]				
YOUR DATA 1.47 ±0.05 ±0.06	[1,2] LEES	12AA	BABR	$e^+e^- \to \Upsilon(4S)$
1.41 ±0.05 ±0.07	[3] DEL-AMO-SA...	11C	BABR	$e^+e^- \to \Upsilon(4S)$
1.49 ±0.04 ±0.07	[1] HA	11	BELL	$e^+e^- \to \Upsilon(4S)$
1.54 ±0.17 ±0.09	[3] AUBERT	08AV	BABR	$e^+e^- \to \Upsilon(4S)$
1.37 ±0.15 ±0.11	[4,5] ADAM	07	CLE2	$e^+e^- \to \Upsilon(4S)$
1.38 ±0.19 ±0.14	[6] HOKUUE	07	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.42 ±0.05 ±0.08	[1] DEL-AMO-SA...	11F	BABR	Repl. by LEES 12AA
1.46 ±0.07 ±0.08	[7] AUBERT	07J	BABR	Repl. by DEL-AMO-SANCHEZ 11F
1.33 ±0.17 ±0.11	[8] AUBERT,B	06K	BABR	Repl. by AUBERT 08AV
1.38 ±0.10 ±0.18	[9] AUBERT,B	05O	BABR	Repl. by DEL-AMO-SANCHEZ 11C
1.33 ±0.18 ±0.13	[10] ATHAR	03	CLE2	Repl. by ADAM 07
1.8 ±0.4 ±0.4	[11] ALEXANDER	96T	CLE2	Repl. by ATHAR 03

NEW;→ UNCHECKED ←

NEW

[1] Uses loose neutrino reconstruction technique. Assumes B($\Upsilon(4S) \to B^+B^-$) = (51.6 ± 0.6)% and B($\Upsilon(4S) \to B^0\overline{B}^0$) = (48.4 ± 0.6)%.

NODE=S042S48;LINKAGE=DE

[2] Reports also a branching fraction value B($B^0 \to \pi^- \ell^+ \nu$) = (1.45 ± 0.04 ± 0.06) × 10^{-4} from the decays of B^+ and B^0 that are combined using the isospin symmetry relation.

NODE=S042S48;LINKAGE=LE

[3] Using the isospin symmetry relation, B^+ and B^0 branching fractions are combined.

NODE=S042S48;LINKAGE=AB

[4] The B^0 and B^+ results are combined assuming the isospin, B lifetimes, and relative charged/neutral B production at the $\Upsilon(4S)$.

NODE=S042S48;LINKAGE=AD

[5] Also report the rate for $q^2 > 16$ GeV^2 of (0.41 ± 0.08 ± 0.04) × 10^{-4} from which they obtain $|V_{ub}| = 3.6 \pm 0.4 \pm 0.2^{+0.6}_{-0.4}$ (last error is from theory).

NODE=S042S48;LINKAGE=AM

[6] The signal events are tagged by a second B meson reconstructed in the semileptonic mode $B \to D^{(*)} \ell \nu_\ell$.

NODE=S042S48;LINKAGE=HO

[7] The analysis uses events in which the signal B decays are reconstructed with an innovative loose neutrino reconstruction technique.

NODE=S042S48;LINKAGE=AU

[8] The signals are tagged by a second B meson reconstructed in a semileptonic or hadronic decay. The B^0 and B^+ results are combined assuming the isospin symmetry.

NODE=S042S48;LINKAGE=RT

[9] B^+ and B^0 decays combined assuming isospin symmetry. Systematic errors include both experimental and form-factor uncertainties.

NODE=S042S48;LINKAGE=IS

[10] ATHAR 03 reports systematic errors 0.11 ± 0.01 ± 0.07, which are experimental systematic, systematic due to residual form-factor uncertainties in the signal, and systematic due to residual form-factor uncertainties in the cross-feed modes, respectively. We combine these in quadrature.

NODE=S042S48;LINKAGE=AT

[11] ALEXANDER 96T gives systematic errors ±0.3 ± 0.2 where the second error reflects the estimated model dependence. We combine these in quadrature. Assumes isospin symmetry: $\Gamma(B^0 \to \pi^- \ell^+ \nu) = 2 \times \Gamma(B^+ \to \pi^0 \ell^+ \nu)$.

NODE=S042S48;LINKAGE=B

B^0 REFERENCES

NODE=S042

YOUR PAPER LEES	12AA	PR D86 092004	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54717
DEL-AMO-SA...	11C	PR D83 032007	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53666
DEL-AMO-SA...	11F	PR D83 052011	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53673
HA	11	PR D83 071101	H. Ha *et al.*	(BELLE Collab.)	REFID=16513
AUBERT	08AV	PRL 101 081801	B. Aubert *et al.*	(BABAR Collab.)	REFID=52370
ADAM	07	PRL 99 041802	N.E. Adam *et al.*	(CLEO Collab.)	REFID=51868
Also		PR D76 012007	D.M. Asner *et al.*	(CLEO Collab.)	REFID=51855
AUBERT	07J	PRL 98 091801	B. Aubert *et al.*	(BABAR Collab.)	REFID=51671
HOKUUE	07	PL B648 139	T. Hokuue *et al.*	(BELLE Collab.)	REFID=51672
AUBERT,B	06K	PRL 97 211801	B. Aubert *et al.*	(BABAR Collab.)	REFID=51489
AUBERT,B	05O	PR D72 051102	B. Aubert *et al.*	(BABAR Collab.)	REFID=50892
ATHAR	03	PR D68 072003	S.B. Athar *et al.*	(CLEO Collab.)	REFID=49666
ALEXANDER	96T	PRL 77 5000	J.P. Alexander *et al.*	(CLEO Collab.)	REFID=44972

Reference = LEES 12AF; PR D86 112006
Verifier code = BABAR

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Fabio Anulli

EMAIL: anulli@slac.stanford.edu

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

CP VIOLATION PARAMETERS

NODE=S042229

$C_{D^{*+}D^{*-}}$ ($B^0 \to D^{*+}D^{*-}$)

NODE=S042LD1

VALUE	DOCUMENT ID		TECN	COMMENT
0.01±0.09 OUR AVERAGE Error includes scale factor of 1.6. See the ideogram below. [−0.01 ± 0.09 OUR 2012 AVERAGE Scale factor = 1.2]				
−0.15±0.08±0.04	[1,2] KRONENBITT.12		BELL	$e^+e^- \to \Upsilon(4S)$
YOUR DATA +0.15±0.09±0.04	[3] LEES	12AF	BABR	$e^+e^- \to \Upsilon(4S)$
0.05±0.09±0.02	AUBERT	09C	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.15±0.13±0.04	[2] VERVINK	09	BELL	Repl. by KRONENBITTER 12
−0.02±0.11±0.02	[1] AUBERT	07BO	BABR	Repl. by AUBERT 09C
0.26±0.26±0.06	[2] MIYAKE	05	BELL	Repl. by VERVINK 09
0.28±0.23±0.02	[4] AUBERT	03Q	BABR	Repl. by AUBERT 07BO

NODE=S042LD1

NEW

[1] Assumes both *CP*-even and *CP*-odd states having the *CP* asymmetry. NODE=S042LD1;LINKAGE=AU

[2] Belle Collab. quotes $A_{D^{*+}D^{*-}}$ which is equal to $-C_{D^{*+}D^{*-}}$. NODE=S042LD1;LINKAGE=MI

[3] Measured partially reconstructed candidates when one D^0 meson is not excplicitely reconstructed. Analysis does not separate *CP*-even and *CP*-odd component. NODE=S042LD1;LINKAGE=LE

[4] AUBERT 03Q reports $|\lambda|$=0.75 ± 0.19 ± 0.02 and Im(λ)=0.05 ± 0.29 ± 0.10. We convert them to S and C parameters taking into account correlations. NODE=S042LD1;LINKAGE=AR

$S_{D^{*+}D^{*-}}$ ($B^0 \to D^{*+}D^{*-}$)

NODE=S042LD2

VALUE	DOCUMENT ID		TECN	COMMENT
−0.59±0.14 OUR AVERAGE Error includes scale factor of 1.8. See the ideogram below. [−0.76 ± 0.14 OUR 2012 AVERAGE]				
−0.79±0.13±0.03	[1] KRONENBITT.12		BELL	$e^+e^- \to \Upsilon(4S)$
YOUR DATA −0.34±0.12±0.05	[2] LEES	12AF	BABR	$e^+e^- \to \Upsilon(4S)$
−0.70±0.16±0.03	[1] AUBERT	09C	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.96\pm0.25^{+0.13}_{-0.16}$	VERVINK	09	BELL	Repl. by KRONENBITTER 12
−0.66±0.19±0.04	[1] AUBERT	07BO	BABR	Repl. by AUBERT 09C
−0.75±0.56±0.12	MIYAKE	05	BELL	Repl. by VERVINK 09
0.06±0.37±0.13	[3] AUBERT	03Q	BABR	Repl. by AUBERT 07BO

NODE=S042LD2

NEW

[1] Assumes both *CP*-even and *CP*-odd states having the *CP* asymmetry. NODE=S042LD2;LINKAGE=AU

[2] Measured partially reconstructed candidates when one D^0 meson is not excplicitely reconstructed. Analysis does not separate *CP*-even and *CP*-odd component. NODE=S042LD2;LINKAGE=LE

[3] AUBERT 03Q reports $|\lambda|$=0.75 ± 0.19 ± 0.02 and Im(λ)=0.05 ± 0.29 ± 0.10. We convert them to S and C parameters taking into account correlations. NODE=S042LD2;LINKAGE=AR

C_+ ($B^0 \to D^{*+}D^{*-}$)

NODE=S042CD+

See the note in the $C_{\pi\pi}$ datablock, but for *CP* even final state. NODE=S042CD+

VALUE	DOCUMENT ID		TECN	COMMENT
0.00±0.10 OUR AVERAGE Error includes scale factor of 1.6. See the ideogram below. [0.00 ± 0.12 OUR 2012 AVERAGE]				
−0.18±0.10±0.05	[1] KRONENBITT.12		BELL	$e^+e^- \to \Upsilon(4S)$

NODE=S042CD+

NEW

YOUR DATA	$+0.15 \pm 0.09 \pm 0.04$	[2] LEES	12AF	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
	$0.00 \pm 0.12 \pm 0.02$	AUBERT	09C	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
	$-0.05 \pm 0.14 \pm 0.02$	AUBERT	07BO	BABR	Repl. by AUBERT 09C
	$0.06 \pm 0.17 \pm 0.03$	[3] AUBERT,BE	05A	BABR	Repl. by AUBERT 07BO

[1] Belle Collab. quotes $A_{D^{*+} D^{*-}}$ which is equal to $-C_{D^{*+} D^{*-}}$. NODE=S042CD+;LINKAGE=KR

[2] Measured partially reconstructed candidates when one D^0 meson is not excplicitely reconstructed. Extracted under assumption of equal C_+ and C_-. NODE=S042CD+;LINKAGE=LE

[3] AUBERT,BE 05A reports a *CP*-odd fraction $R_\perp = 0.125 \pm 0.044 \pm 0.007$. NODE=S042CD+;LINKAGE=AU

S_+ ($B^0 \rightarrow D^{*+} D^{*-}$)

NODE=S042SD+

See the note in the $S_{\pi\pi}$ datablock, but for *CP* even final state. NODE=S042SD+

NODE=S042SD+

VALUE	DOCUMENT ID		TECN	COMMENT
-0.73 ± 0.09 OUR AVERAGE				
[-0.76 ± 0.16 OUR 2012 AVERAGE]				
$-0.81 \pm 0.13 \pm 0.03$	KRONENBITT	12	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
YOUR DATA $-0.49 \pm 0.18 \pm 0.08$	[1] LEES	12AF	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$-0.76 \pm 0.16 \pm 0.04$	AUBERT	09C	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.72 \pm 0.19 \pm 0.05$	AUBERT	07BO	BABR	Repl. by AUBERT 09C
$-0.75 \pm 0.25 \pm 0.03$	[2] AUBERT,BE	05A	BABR	Repl. by AUBERT 07BO

NEW

[1] Measured partially reconstructed candidates when one D^0 meson is not excplicitely reconstructed. Analysis does not separate *CP*-even and *CP*-odd component. Value is obtained from $S = -0.34 \pm 0.12 \pm 0.05$ using $S = S_+ (1 - 2 R_\perp)$ with $R_\perp = 0.158 \pm 0.029$. NODE=S042SD+;LINKAGE=LE

[2] AUBERT,BE 05A reports a *CP*-odd fraction $R_\perp = 0.125 \pm 0.044 \pm 0.007$. NODE=S042SD+;LINKAGE=AU

B^0 REFERENCES

NODE=S042

	KRONENBITT..12	PR D86 071103	B. Kronenbitter *et al.*	(BELLE Collab.)	REFID=54630
YOUR PAPER	LEES 12AF	PR D86 112006	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54801
	AUBERT 09C	PR D79 032002	B. Aubert *et al.*	(BABAR Collab.)	REFID=52643
	VERVINK 09	PR D80 111104	K. Vervink *et al.*	(BELLE Collab.)	REFID=53178
	AUBERT 07BO	PR D76 111102	B. Aubert *et al.*	(BABAR Collab.)	REFID=52097
	AUBERT,BE 05A	PRL 95 151804	B. Aubert *et al.*	(BABAR Collab.)	REFID=50922
	MIYAKE 05	PL B618 34	H. Miyake *et al.*	(BELLE Collab.)	REFID=50654
	AUBERT 03Q	PRL 91 131801	B. Aubert *et al.*	(BaBar Collab.)	REFID=49542

Reference = LEES 13A; PR D87 032004
Verifier code = BABAR

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Fabio Anulli

EMAIL: anulli@slac.stanford.edu

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(\omega\ell^+\nu_\ell)/\Gamma_{total}$ — Γ_{23}/Γ

NODE=S041S47

$\ell = e$ or μ, not sum over e and μ modes.

NODE=S041S47

NODE=S041S47

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
1.21±0.14 OUR AVERAGE					
[(1.15 ± 0.17) × 10^{-4} OUR 2012 AVERAGE]					
YOUR DATA 1.20±0.11±0.09		[1,2] LEES	13A	BABR	$e^+e^- \to \Upsilon(4S)$
1.3 ±0.4 ±0.4		[3] SCHWANDA	04	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.19±0.16±0.09		[2,4] LEES	12AA	BABR	Repl. by LEES 13A
1.14±0.16±0.08		[2] AUBERT	09Q	BABR	Repl. by LEES 13A
<2.1	90	[5] BEAN	93B	CLE2	$e^+e^- \to \Upsilon(4S)$

NEW

[1] LEES 13A reports (1.20 ± 0.11 ± 0.09) × 10^{-4} from a measurement of [$\Gamma(B^+ \to \omega\ell^+\nu_\ell)/\Gamma_{total}$] × [B($\omega$(782) → $\pi^+\pi^-\pi^0$)] assuming B(ω(782) → $\pi^+\pi^-\pi^0$) = (89.2 ± 0.7) × 10^{-2}.

NODE=S041S47;LINKAGE=LS

[2] Uses B($\Upsilon(4S) \to B^+B^-$) = (51.6 ± 0.6)% and B($\Upsilon(4S) \to B^0\overline{B}^0$) = (48.4 ± 0.6)%.

NODE=S041S47;LINKAGE=NE

[3] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041S47;LINKAGE=EP

[4] Uses loose neutrino reconstruction technique.

NODE=S041S47;LINKAGE=LE

[5] BEAN 93B limit set using ISGW Model. Using isospin and the quark model to combine $\Gamma(\rho^0\ell^+\nu_\ell)$ and $\Gamma(\rho^-\ell^+\nu_\ell)$ with this result, they obtain a limit <(1.6–2.7) × 10^{-4} at 90% CL for $B^+ \to \omega\ell^+\nu_\ell$. The range corresponds to the ISGW, WSB, and KS models. An upper limit on $|V_{ub}/V_{cb}| < 0.8$–0.13 at 90% CL is derived as well.

NODE=S041S47;LINKAGE=A

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER

LEES	13A	PR D87 032004	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54854
LEES	12AA	PR D86 092004	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54717
AUBERT	09Q	PR D79 052011	B. Aubert *et al.*	(BABAR Collab.)	REFID=52797
SCHWANDA	04	PRL 93 131803	C. Schwanda *et al.*	(BELLE Collab.)	REFID=50086
BEAN	93B	PRL 70 2681	A. Bean *et al.*	(CLEO Collab.)	REFID=43356

Reference = LEES 13B; PR D87 052015
Verifier code = BABAR

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June 4, 2013

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
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USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS ($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

CP VIOLATION

NODE=S041220

A_{CP} is defined as

NODE=S041220

$$\frac{B(B^- \to \overline{f}) - B(B^+ \to f)}{B(B^- \to \overline{f}) + B(B^+ \to f)},$$

the *CP*-violation charge asymmetry of exclusive B^- and B^+ decay.

$r_B(B^+ \to D^0 K^+)$

NODE=S041ARX

r_B and δ_B are the amplitude ratio and relative strong phase between the amplitudes of $A(B^+ \to D^0 K^+)$ and $A(B^+ \to \overline{D}^0 K^+)$,

NODE=S041ARX

NODE=S041ARX

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
0.096 ± 0.014 OUR AVERAGE Error includes scale factor of 1.2. [$0.113^{+0.024}_{-0.021}$ OUR 2012 AVERAGE]					
YOUR DATA $0.092^{+0.013}_{-0.012}$		[1] LEES	13B	BABR	$e^+e^- \to \Upsilon(4S)$
0.07 ± 0.04		[2,3] AAIJ	12AQ	LHCB	pp at 7 TeV
$0.160^{+0.040}_{-0.038}{}^{+0.051}_{-0.015}$		[4] POLUEKTOV	10	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.145 \pm 0.030 \pm 0.015$		[3,5] AIHARA	12	BELL	$e^+e^- \to \Upsilon(4S)$
<0.13	90	[6] LEES	11D	BABR	$e^+e^- \to \Upsilon(4S)$
$0.096 \pm 0.029 \pm 0.006$		[7] DEL-AMO-SA..	10F	BABR	Repl. by LEES 13B
$0.095^{+0.051}_{-0.041}$		[8] DEL-AMO-SA..	10H	BABR	Repl. by LEES 13B
$0.086 \pm 0.032 \pm 0.015$		[9] AUBERT	08AL	BABR	Repl. by DEL-AMO-SANCHEZ 10F
<0.19	90	HORII	08	BELL	$e^+e^- \to \Upsilon(4S)$
$0.159^{+0.054}_{-0.050} \pm 0.050$		[10] POLUEKTOV	06	BELL	Repl. by POLUEKTOV 10
$0.12 \pm 0.08 \pm 0.05$		[11] AUBERT,B	05Y	BABR	Repl. by AUBERT 08AL

NEW

[1] Reports combination of published measurements using GGSZ, GLW, and ADS methods. NODE=S041ARX;LINKAGE=LS

[2] Reports combined statistical and systematic uncertainties. NODE=S041ARX;LINKAGE=AA

[3] Uses binned Dalitz plot of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays from $B^+ \to \overline{D}^0 K^+$. Measurement of strong phases in $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ Dalitz plot from LIBBY 10 is used as input. NODE=S041ARX;LINKAGE=AH

[4] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays from $B^+ \to D^0 K^+$ modes. The corresponding two standard deviation interval is $0.084 < r_B < 0.239$. NODE=S041ARX;LINKAGE=PU

[5] We combined the systematics in quadrature. The authors report separately the contribution to the systematic uncertainty due to the uncertainty on the bin-averaged strong phase difference between D^0 and $\overline{D}^0$ amplitudes. NODE=S041ARX;LINKAGE=AI

[6] Uses decays of neutral D to $K^-\pi^+\pi^0$. NODE=S041ARX;LINKAGE=LE

[7] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$, $K^0_S K^+ K^-$ decays from $B^+ \to D^{(*)} K^{(*)+}$ modes. The corresponding two standard deviation interval is $0.037 < r_B < 0.155$. NODE=S041ARX;LINKAGE=DE

[8] Uses the Cabibbo suppressed decay of $B^+ \to \overline{D} K^+$ followed by $\overline{D} \to K^- \pi^+$. NODE=S041ARX;LINKAGE=DL

[9] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ and $\overline{D}^0 \to K^0_S K^+ K^-$ decays coming from $B^\pm \to D^{(*)} K^{(*)\pm}$ modes. NODE=S041ARX;LINKAGE=AB

[10] Uses a Dalitz plot analysis of the $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays; Combines the $D K^+$, $D^* K^+$ and $D K^{*+}$ modes. NODE=S041ARX;LINKAGE=PO

[11] Uses a Dalitz analysis of neutral D decays to $K^0_S \pi^+ \pi^-$ in the processes $B^\pm \to D^{(*)} K^\pm$, $D^* \to D\pi^0$, $D\gamma$. NODE=S041ARX;LINKAGE=AU

$\delta_B(B^+ \to D^0 K^+)$

NODE=S041DRX
NODE=S041DRX

VALUE (°)	DOCUMENT ID		TECN	COMMENT
115 ±13 OUR AVERAGE [(125 ± 16)° OUR 2012 AVERAGE]				NEW
YOUR DATA 105 $^{+16}_{-17}$	[1] LEES	13B	BABR	$e^+e^- \to \Upsilon(4S)$
137 $^{+35}_{-46}$	[2,3] AAIJ	12AQ	LHCB	pp at 7 TeV
136.7 $^{+13.0}_{-15.8}$ ±23.2	[4] POLUEKTOV	10	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
129.9 ±15.0 ± 6.0	[3,5] AIHARA	12	BELL	$e^+e^- \to \Upsilon(4S)$
119 $^{+19}_{-20}$ ± 4	[6] DEL-AMO-SA..	10F	BABR	Repl. by LEES 13B
109 $^{+27}_{-30}$ ± 8	[7] AUBERT	08AL	BABR	Repl. by DEL-AMO-SANCHEZ 10F
145.7 $^{+19.0}_{-19.7}$ ±23.1	[8] POLUEKTOV	06	BELL	Repl. by POLUEKTOV 10
104 ±45 $^{+23}_{-32}$	[9] AUBERT,B	05Y	BABR	Repl. by AUBERT 08AL

[1] Reports combination of published measurements using GGSZ, GLW, and ADS methods. NODE=S041DRX;LINKAGE=LE
[2] Reports combined statistical and systematic uncertainties. NODE=S041DRX;LINKAGE=AA
[3] Uses binned Dalitz plot of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays from $B^+ \to \overline{D}^0 K^+$. Measurement of strong phases in $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ Dalitz plot from LIBBY 10 is used as input. NODE=S041DRX;LINKAGE=AH
[4] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays from $B^+ \to \overline{D}^0 K^+$ modes. The corresponding two standard deviation interval is $102.2° < \delta_B < 162.3°$. NODE=S041DRX;LINKAGE=PU
[5] We combined the systematics in quadrature. The authors report separately the contribution to the systematic uncertainty due to the uncertainty on the bin-averaged strong phase difference between D^0 and $\overline{D}^0$ amplitudes. NODE=S041DRX;LINKAGE=AI
[6] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$, $K^0_S K^+ K^-$ decays from $B^+ \to D^{(*)} K^{(*)+}$ modes. The corresponding two standard deviation interval is $75° < \delta_B < 157°$. NODE=S041DRX;LINKAGE=DE
[7] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ and $\overline{D}^0 \to K^0_S K^+ K^-$ decays coming from $B^\pm \to D^{(*)} K^{(*)\pm}$ modes. NODE=S041DRX;LINKAGE=AB
[8] Uses a Dalitz plot analysis of the $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays; Combines the DK^+, D^*K^+ and DK^{*+} modes. NODE=S041DRX;LINKAGE=PO
[9] Uses a Dalitz analysis of neutral D decays to $K^0_S \pi^+ \pi^-$ in the processes $B^\pm \to D^{(*)} K^\pm$, $D^* \to D\pi^0$, $D\gamma$. NODE=S041DRX;LINKAGE=AU

$r_B(B^+ \to \overline{D}^0 K^{*+})$

NODE=S041ARZ

r_B and δ_B are the amplitude ratio and relative strong phase between the amplitudes of $A_{CP}(B^+ \to D^0 K^{*+})$ and $A_{CP}(B^+ \to \overline{D}^0 K^{*+})$, NODE=S041ARZ

VALUE	DOCUMENT ID		TECN	COMMENT
0.17 ±0.11 OUR AVERAGE Error includes scale factor of 2.3. [0.34 ± 0.09 OUR 2012 AVERAGE Scale factor = 1.3]				NEW
YOUR DATA 0.143 $^{+0.048}_{-0.049}$	[1] LEES	13B	BABR	$e^+e^- \to \Upsilon(4S)$
0.564 $^{+0.216}_{-0.155}$ ±0.093	[2] POLUEKTOV	06	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.166 $^{+0.073}_{-0.069}$	[3] DEL-AMO-SA..	10F	BABR	Repl. by LEES 13B
0.31 ±0.07	[4] AUBERT	09AJ	BABR	Repl. by LEES 13B
0.181 $^{+0.088}_{-0.108}$ ±0.042	[5] AUBERT	08AL	BABR	Repl. by AUBERT 09AJ

NODE=S041ARZ

[1] Reports combination of published measurements using GGSZ, GLW, and ADS methods. NODE=S041ARZ;LINKAGE=LE
[2] Uses a Dalitz plot analysis of the $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays; Combines the DK^+, D^*K^+ and DK^{*+} modes. NODE=S041ARZ;LINKAGE=PO
[3] DEL-AMO-SANCHEZ 10F reports $r_B \cdot k = 0.149 ^{+0.066}_{-0.062}$ for k = 0.9. NODE=S041ARZ;LINKAGE=DE
[4] Obtained by combining the GLW and ADS methods. The 2-sigma range corresponds to [0.17, 0.43]. NODE=S041ARZ;LINKAGE=AU
[5] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ and $\overline{D}^0 \to K^0_S K^+ K^-$ decays coming from $B^\pm \to D^{(*)} K^{(*)\pm}$ modes. NODE=S041ARZ;LINKAGE=AB

$\delta_B(B^+ \to D^0 K^{*+})$

NODE=S041DRZ
NODE=S041DRZ

VALUE (°)	DOCUMENT ID	TECN	COMMENT
155 ±70 OUR AVERAGE Error includes scale factor of 2.0. [(157 ± 70)° OUR 2012 AVERAGE Scale factor = 2.0]			NEW
YOUR DATA 101 ±43	[1] LEES 13B	BABR	$e^+e^- \to \Upsilon(4S)$
$242.6^{+20.2}_{-23.2} \pm 49.4$	[2] POLUEKTOV 06	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
111 ±32	DEL-AMO-SA..10F	BABR	Repl. by LEES 13B
$104 \; ^{+39}_{-37} \pm 18$	[3] AUBERT 08AL	BABR	Repl. by LEES 13B

[1] Reports combination of published measurements using GGSZ, GLW, and ADS methods. NODE=S041DRZ;LINKAGE=LE
[2] Uses a Dalitz plot analysis of the $\overline{D}^0 \to K^0_S \pi^+\pi^-$ decays; Combines the DK^+, D^*K^+ and DK^{*+} modes. NODE=S041DRZ;LINKAGE=PO
[3] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+\pi^-$ and $\overline{D}^0 \to K^0_S K^+K^-$ decays coming from $B^\pm \to D^{(*)}K^{(*)\pm}$ modes. NODE=S041DRZ;LINKAGE=AB

$r^*_B(B^+ \to D^{*0} K^+)$

NODE=S041ARY

r^*_B and δ^*_B are the amplitude ratio and relative strong phase between the amplitudes of $A(B^+ \to D^{*0}K^+)$ and $A(B^+ \to \overline{D}^{*0}K^+)$, NODE=S041ARY

VALUE	DOCUMENT ID	TECN	COMMENT
$0.114^{+0.023}_{-0.040}$ OUR AVERAGE Error includes scale factor of 1.2. [$0.123^{+0.026}_{-0.029}$ OUR 2012 AVERAGE]			NEW
YOUR DATA $0.106^{+0.019}_{-0.036}$	[1] LEES 13B	BABR	$e^+e^- \to \Upsilon(4S)$
$0.196^{+0.072}_{-0.069}{}^{+0.064}_{-0.017}$	[2] POLUEKTOV 10	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.133^{+0.042}_{-0.039} \pm 0.013$	[3] DEL-AMO-SA..10F	BABR	Repl. by LEES 13B
$0.096^{+0.035}_{-0.051}$	[4] DEL-AMO-SA..10H	BABR	Repl. by LEES 13B
$0.135 \pm 0.050 \pm 0.012$	[5] AUBERT 08AL	BABR	Repl. by DEL-AMO-SANCHEZ 10F
$0.175^{+0.108}_{-0.099} \pm 0.050$	[6] POLUEKTOV 06	BELL	Repl. by POLUEKTOV 10
0.17 ±0.10 ±0.04	[7] AUBERT,B 05Y	BABR	Repl. by AUBERT 08AL

[1] Reports combination of published measurements using GGSZ, GLW, and ADS methods. NODE=S041ARY;LINKAGE=LE
[2] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+\pi^-$ decays from $B^+ \to D^{*0}K^+$ modes. The corresponding two standard deviation interval is $0.061 < r^*_B < 0.271$. NODE=S041ARY;LINKAGE=PU
[3] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+\pi^-$, $K^0_S K^+K^-$ decays from $B^+ \to D^{(*)}K^{(*)+}$ modes. The corresponding two standard deviation interval is $0.049 < r^*_B < 0.215$. NODE=S041ARY;LINKAGE=DE
[4] Uses the Cabibbo suppressed decay of $B^+ \to \overline{D}^* K^+$ followed by $\overline{D}^* \to \overline{D}\pi^0$ or $\overline{D}\gamma$, and $\overline{D} \to K^-\pi^+$. NODE=S041ARY;LINKAGE=DL
[5] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+\pi^-$ and $\overline{D}^0 \to K^0_S K^+K^-$ decays coming from $B^\pm \to D^{(*)}K^{(*)\pm}$ modes. NODE=S041ARY;LINKAGE=AB
[6] Uses a Dalitz plot analysis of the $\overline{D}^0 \to K^0_S \pi^+\pi^-$ decays; Combines the DK^+, D^*K^+ and DK^{*+} modes. NODE=S041ARY;LINKAGE=PO
[7] Uses a Dalitz analysis of neutral D decays to $K^0_S \pi^+\pi^-$ in the processes $B^\pm \to D^{(*)}K^\pm$, $D^* \to D\pi^0$, $D\gamma$. NODE=S041ARY;LINKAGE=AU

$\delta^*_B(B^+ \to D^{*0} K^+)$

NODE=S041DRY
NODE=S041DRY

VALUE (°)	DOCUMENT ID	TECN	COMMENT
$310 \; ^{+22}_{-28}$ OUR AVERAGE Error includes scale factor of 1.3. [(300 ± 30)° OUR 2012 AVERAGE Scale factor = 1.7]			NEW
YOUR DATA $294 \; ^{+21}_{-31}$	[1] LEES 13B	BABR	$e^+e^- \to \Upsilon(4S)$
$341.9^{+18.0}_{-19.6} \pm 23.1$	[2] POLUEKTOV 10	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
278 ±21 ± 6	[3] DEL-AMO-SA..10F	BABR	Repl. by LEES 13B
$297 \; ^{+27}_{-29} \pm 6.4$	[4] AUBERT 08AL	BABR	Repl. by DEL-AMO-SANCHEZ 10F

$302.0^{+33.8}_{-35.1} \pm 23.7$	[5] POLUEKTOV 06	BELL	Repl. by POLUEKTOV 10	
$296 \pm 41 \; ^{+20}_{-19}$	[6] AUBERT,B 05Y	BABR	Repl. by AUBERT 08AL	

[1] Reports combination of published measurements using GGSZ, GLW, and ADS methods. We added 360° to the value of $(-66^{+21}_{-31})^\circ$ quoted by LEES 13B. NODE=S041DRY;LINKAGE=LE

[2] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays from $B^+ \to D^* K^+$ modes. The corresponding two standard deviation interval is $296.5^\circ < \delta^*_B < 382.7^\circ$. NODE=S041DRY;LINKAGE=PU

[3] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$, $K^0_S K^+ K^-$ decays from $B^+ \to D^{(*)} K^{(*)+}$ modes. The corresponding two standard deviation interval is $236^\circ < \delta^*_B < 322^\circ$. NODE=S041DRY;LINKAGE=DE

[4] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ and $\overline{D}^0 \to K^0_S K^+ K^-$ decays coming from $B^\pm \to D^{(*)} K^{(*)\pm}$ modes. NODE=S041DRY;LINKAGE=AB

[5] Uses a Dalitz plot analysis of the $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays; Combines the $D K^+$, $D^* K^+$ and $D K^{*+}$ modes. NODE=S041DRY;LINKAGE=PO

[6] Uses a Dalitz analysis of neutral D decays to $K^0_S \pi^+ \pi^-$ in the processes $B^\pm \to D^{(*)} K^\pm$, $D^* \to D \pi^0$, $D \gamma$. NODE=S041DRY;LINKAGE=AU

$\gamma(B^+ \to D^{(*)0} K^{(*)+})$

NODE=S041GAM

For angle $\gamma(\phi_3)$ of the CKM unitarity triangle, see the review on "*CP* Violation" in the Reviews section. NODE=S041GAM

NODE=S041GAM

VALUE (°)	CL%	DOCUMENT ID		TECN	COMMENT
72 ±11 OUR AVERAGE					NEW
[(73 ± 10)° OUR 2012 AVERAGE]					
YOUR DATA $69 \; ^{+17}_{-16}$		[1] LEES	13B	BABR	$e^+ e^- \to \Upsilon(4S)$
$44 \; ^{+43}_{-38}$		[2,3] AAIJ	12AQ	LHCB	pp at 7 TeV
$78.4^{+10.8}_{-11.6} \pm 9.6$		[4] POLUEKTOV	10	BELL	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$77.3^{+15.1}_{-14.9} \pm 5.9$		[3,5] AIHARA	12	BELL	$e^+ e^- \to \Upsilon(4S)$
$68 \pm 14 \pm 5$		[6] DEL-AMO-SA..	10F	BABR	Repl. by LEES 13B
7 to 173	95	[7] DEL-AMO-SA..	10G	BABR	$e^+ e^- \to \Upsilon(4S)$
$76 \; ^{+22}_{-23} \pm 7.1$		[8] AUBERT	08AL	BABR	Repl. by DEL-AMO-SANCHEZ 10F
$53 \; ^{+15}_{-18} \pm 10$		[9] POLUEKTOV	06	BELL	Repl. by POLUEKTOV 10
$70 \pm 31 \; ^{+18}_{-15}$		[10] AUBERT,B	05Y	BABR	Repl. by AUBERT 08AL
$77 \; ^{+17}_{-19} \pm 17$		[11] POLUEKTOV	04	BELL	Repl. by POLUEKTOV 06

[1] Reports combination of published measurements using GGSZ, GLW, and ADS methods. Reports also 2σ range of 41–102° and a 5.9σ significance for $\gamma(B^+ \to D^{(*)0} K^{(*)+}) \neq 0$ hypothesis. NODE=S041GAM;LINKAGE=LE

[2] Reports combined statistical and systematic uncertainties. NODE=S041GAM;LINKAGE=AA

[3] Uses binned Dalitz plot of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays from $B^+ \to \overline{D}^0 K^+$. Measurement of strong phases in $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ Dalitz plot from LIBBY 10 is used as input. NODE=S041GAM;LINKAGE=AH

[4] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays from $B^+ \to D^{(*)} K^+$ modes. The corresponding two standard deviation interval for γ is $54.2^\circ < \gamma < 100.5^\circ$. CP conservation in the combined result is ruled out with a significance of 3.5 standard deviations. NODE=S041GAM;LINKAGE=PU

[5] We combined the systematics in quadrature. The authors report separately the contribution to the systematic uncertainty due to the uncertainty on the bin-averaged strong phase difference between D^0 and $\overline{D}^0$ amplitudes. NODE=S041GAM;LINKAGE=AI

[6] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$, $K^0_S K^+ K^-$ decays from $B^+ \to D^{(*)} K^+$, $D K^{*+}$ modes. The corresponding two standard deviation interval for γ is $39^\circ < \gamma < 98^\circ$. CP conservation in the combined result is ruled out with a significance of 3.5 standard deviations. NODE=S041GAM;LINKAGE=DE

[7] Reports confidence intervals for the CKM angle γ from the measured values of the GLW parameters using $B^\pm \to D K^\pm$ decays with D mesons decaying to non-$CP(K\pi)$, CP-even ($K^+ K^-$, $\pi^+ \pi^-$), and CP-odd ($K^0_S \pi^0$, $K^0_S \omega$) states. NODE=S041GAM;LINKAGE=DA

[8] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ and $\overline{D}^0 \to K^0_S K^+ K^-$ decays coming from $B^\pm \to D^{(*)} K^{(*)\pm}$ modes. The corresponding two standard deviation interval is $29^\circ < \gamma < 122^\circ$. NODE=S041GAM;LINKAGE=AB

[9] Uses a Dalitz plot analysis of the $\overline{D}^0 \rightarrow K^0_S \pi^+ \pi^-$ decays; Combines the $D K^+$, $D^* K^+$ and $D K^{*+}$ modes. The corresponding two standard deviations interval for gamma is $8^\circ < \gamma < 111^\circ$. NODE=S041GAM;LINKAGE=PL

[10] Uses a Dalitz plot analysis of neutral $D \rightarrow K^0_S \pi^+ \pi^-$ decays coming from $B^\pm \rightarrow D K^\pm$ and $B^\pm \rightarrow D^{*0} K^\pm$ followed by $D^{*0} \rightarrow D \pi^0$, $D \gamma$. The corresponding two standard deviations interval for gamma is $12^\circ < \gamma < 137^\circ$. AUBERT,B 05Y also reports the amplitude ratios and the strong phases. NODE=S041GAM;LINKAGE=AU

[11] Uses a Dalitz plot analysis of the 3-body $D \rightarrow K^0_S \pi^+ \pi^-$ decays coming from $B^\pm \rightarrow D K^\pm$ and $B^\pm \rightarrow D^* K^\pm$ followed by $D^* \rightarrow D \pi^0$; here we use D to denote that the neutral D meson produced in the decay is an admixture of D^0 and $\overline{D}^0$. The corresponding two standard deviations interval for γ is $26^\circ < \gamma < 126^\circ$. POLUEKTOV 04 also reports the amplitude ratios and the strong phases. NODE=S041GAM;LINKAGE=PO

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER	LEES	13B	PR D87 052015	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54948
	AAIJ	12AQ	PL B718 43	R. Aaij *et al.*	(LHCb Collab.)	REFID=54594
	AIHARA	12	PR D85 112014	H. Aihara *et al.*	(BELLE Collab.)	REFID=54412
	LEES	11D	PR D84 012002	J.P. Lees *et al.*	(BABAR Collab.)	REFID=53751
	DEL-AMO-SA...	10F	PRL 105 121801	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53413
	DEL-AMO-SA...	10G	PR D82 072004	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53455
	DEL-AMO-SA...	10H	PR D82 072006	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53456
	LIBBY	10	PR D82 112006	J. Libby *et al.*	(CLEO Collab.)	REFID=53583
	POLUEKTOV	10	PR D81 112002	A. Poluektov *et al.*	(BELLE Collab.)	REFID=53340
	AUBERT	09AJ	PR D80 092001	B. Aubert *et al.*	(BABAR Collab.)	REFID=53077
	AUBERT	08AL	PR D78 034023	B. Aubert *et al.*	(BABAR Collab.)	REFID=52361
	HORII	08	PR D78 071901	Y. Horii *et al.*	(BELLE Collab.)	REFID=52533
	POLUEKTOV	06	PR D73 112009	A. Poluektov *et al.*	(BELLE Collab.)	REFID=51287
	AUBERT,B	05Y	PRL 95 121802	B. Aubert *et al.*	(BABAR Collab.)	REFID=50919
	POLUEKTOV	04	PR D70 072003	A. Poluektov *et al.*	(BELLE Collab.)	REFID=50223

Reference = LEES 13D; PR D87 052009
Verifier code = BABAR

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Fabio Anulli

EMAIL: anulli@slac.stanford.edu

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
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BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(K^0\pi^0)/\Gamma_{total}$ — Γ_{223}/Γ

NODE=S042S41
NODE=S042S41

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	9.9 ±0.5 OUR AVERAGE					
	[(9.5 ± 0.8) × 10^{-6} OUR 2012 AVERAGE Scale factor = 1.3]					
	9.68±0.46±0.50		[1] DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
YOUR DATA	10.1 ±0.6 ±0.4		[1] LEES	13D	BABR	$e^+e^- \to \Upsilon(4S)$
	$12.8\ ^{+4.0}_{-3.3}\ ^{+1.7}_{-1.4}$		[1] BORNHEIM	03	CLE2	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	8.7 ±0.5 ±0.6		[1] FUJIKAWA	10A	BELL	Repl. by DUH 13
	10.3 ±0.7 ±0.6		[1] AUBERT	08E	BABR	Repl. by LEES 13D
	9.2 ±0.7 ±0.6		[1] LIN	07A	BELL	Repl. by FUJIKAWA 10A
	11.4 ±0.9 ±0.6		[1] AUBERT	05Y	BABR	Repl. by AUBERT 08E
	11.4 ±1.7 ±0.8		[1] AUBERT	04M	BABR	Repl. by AUBERT 05Y
	$11.7 \pm 2.3\ ^{+1.2}_{-1.3}$		[1] CHAO	04	BELL	Repl. by LIN 07A
	$8.0\ ^{+3.3}_{-3.1} \pm 1.6$		[1] CASEY	02	BELL	Repl. by CHAO 04
	$16.0\ ^{+7.2}_{-5.9}\ ^{+2.5}_{-2.7}$		[1] ABE	01H	BELL	Repl. by CASEY 02
	$8.2\ ^{+3.1}_{-2.7} \pm 1.2$		[1] AUBERT	01E	BABR	Repl. by AUBERT 04M
	$14.6\ ^{+5.9}_{-5.1}\ ^{+2.4}_{-3.3}$		[1] CRONIN-HEN..	00	CLE2	Repl. by BORNHEIM 03
	<41	90	GODANG	98	CLE2	Repl. by CRONIN-HENNESSY 00
	<40	90	ASNER	96	CLE2	Rep. by GODANG 98

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042S41;LINKAGE=EP

$\Gamma(\pi^0\pi^0)/\Gamma_{total}$ — Γ_{352}/Γ

NODE=S042S37
NODE=S042S37

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	1.91±0.22 OUR AVERAGE					
	[(1.62 ± 0.31) × 10^{-6} OUR 2012 AVERAGE Scale factor = 1.3]					
YOUR DATA	1.83±0.21±0.13		[1] LEES	13D	BABR	$e^+e^- \to \Upsilon(4S)$
	$2.3\ ^{+0.4}_{-0.5}\ ^{+0.2}_{-0.3}$		[1] CHAO	05	BELL	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	1.47±0.25±0.12		[1] AUBERT	07BC	BABR	Repl. by LEES 13D
	1.17±0.32±0.10		[1] AUBERT	05L	BABR	Repl. by AUBERT 07BC
	< 3.6	90	[1] AUBERT	03L	BABR	$e^+e^- \to \Upsilon(4S)$
	2.1 ±0.6 ±0.3		[1] AUBERT	03S	BABR	Repl. by AUBERT 05L
	< 4.4	90	[1] BORNHEIM	03	CLE2	$e^+e^- \to \Upsilon(4S)$
	1.7 ±0.6 ±0.2		[1] LEE	03	BELL	Repl. by CHAO 05

< 5.7	90	[1] ASNER	02	CLE2	$e^+e^- \to \Upsilon(4S)$
< 6.4	90	[1] CASEY	02	BELL	$e^+e^- \to \Upsilon(4S)$
< 9.3	90	GODANG	98	CLE2	Repl. by ASNER 02
< 9.1	90	ASNER	96	CLE2	Repl. by GODANG 98
<60	90	[2] ACCIARRI	95H	L3	$e^+e^- \to Z$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042S37;LINKAGE=EP

[2] ACCIARRI 95H assumes $f_{B^0} = 39.5 \pm 4.0$ and $f_{B_s} = 12.0 \pm 3.0\%$. NODE=S042S37;LINKAGE=A

CP VIOLATION PARAMETERS

NODE=S042229

A_{CP} ($B^0 \to K^+\pi^-$)

NODE=S042ACP

NODE=S042ACP

VALUE	DOCUMENT ID		TECN	COMMENT
-0.087 ± 0.008 OUR AVERAGE [-0.097 ± 0.012 OUR 2012 AVERAGE]				NEW
$-0.069\pm0.014\pm0.007$	DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
YOUR DATA $-0.107\pm0.016^{+0.006}_{-0.004}$	LEES	13D	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.088\pm0.011\pm0.008$	AAIJ	12V	LHCB	pp at 7 TeV
$-0.086\pm0.023\pm0.009$	AALTONEN	11N	CDF	$p\overline{p}$ at 1.96 TeV
-0.04 ± 0.16	[1] CHEN	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.094\pm0.018\pm0.008$	LIN	08	BELL	Repl. by DUH 13
$-0.107\pm0.018^{+0.007}_{-0.004}$	AUBERT	07AF	BABR	Repl. by LEES 13D
$-0.013\pm0.078\pm0.012$	ABULENCIA,A	06D	CDF	Repl. by AALTONEN 11N
$-0.088\pm0.035\pm0.013$	[2] CHAO	05A	BELL	Repl. by CHAO 04B
$-0.133\pm0.030\pm0.009$	[3] AUBERT,B	04K	BABR	Repl. by AUBERT 07AF
$-0.101\pm0.025\pm0.005$	[4] CHAO	04B	BELL	Repl. by LIN 08
$-0.07 \pm0.08 \pm0.02$	[5] AUBERT	02D	BABR	Repl. by AUBERT 02Q
$-0.102\pm0.050\pm0.016$	[6] AUBERT	02Q	BABR	Repl. by AUBERT,B 04K
$-0.06 \pm0.09 ^{+0.01}_{-0.02}$	[7] CASEY	02	BELL	Repl. by CHAO 04B
$0.044^{+0.186}_{-0.167}{}^{+0.018}_{-0.021}$	[8] ABE	01K	BELL	Repl. by CASEY 02
$-0.19 \pm0.10 \pm0.03$	[9] AUBERT	01E	BABR	Repl. by AUBERT 02Q

[1] Corresponds to 90% confidence range $-0.30 < A_{CP} < 0.22$. NODE=S042ACP;LINKAGE=AA

[2] Corresponds to a 90% CL interval of $-0.15 < A_{CP} < -0.03$. NODE=S042ACP;LINKAGE=CO

[3] Based on a total signal yield of $N(K^-\pi^+) + N(K^+\pi^-) = 1606 \pm 51$ events. NODE=S042ACP;LINKAGE=AU

[4] CHAO 04B reports significance of 3.9 standard deviation for deviation of A_{CP} from zero. NODE=S042ACP;LINKAGE=CH

[5] Corresponds to 90% confidence range $-0.21 < A_{CP} < 0.07$. NODE=S042ACP;LINKAGE=AD

[6] Corresponds to 90% confidence range $-0.188 < A_{CP} < -0.016$. NODE=S042ACP;LINKAGE=BR

[7] Corresponds to 90% confidence range $-0.21 < A_{CP} < +0.09$. NODE=S042ACP;LINKAGE=CA

[8] Corresponds to 90% confidence range $-0.25 < A_{CP} < 0.37$. NODE=S042ACP;LINKAGE=AX

[9] Corresponds to 90% confidence range $-0.35 < A_{CP} < -0.03$. NODE=S042ACP;LINKAGE=L3

$C_{\pi\pi}$ ($B^0 \to \pi^+\pi^-$)

NODE=S042CPI

$C_{\pi\pi}$ is defined as $(1-|\lambda|^2)/(1+|\lambda|^2)$, where the quantity $\lambda = q/p\ \overline{A}_f/A_f$ is a phase convention independent observable quantity for the final state f. For details, see the review on "*CP* Violation" in the Reviews section. NODE=S042CPI

NODE=S042CPI

VALUE	DOCUMENT ID		TECN	COMMENT
-0.38 ± 0.15 OUR AVERAGE Error includes scale factor of 2.4. [-0.38 ± 0.17 OUR 2012 AVERAGE Scale factor = 2.6]				NEW
YOUR DATA $-0.25\pm0.08\pm0.02$	LEES	13D	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.55\pm0.08\pm0.05$	[1] ISHINO	07	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.21\pm0.09\pm0.02$	AUBERT	07AF	BABR	Repl. by LEES 13D
$-0.56\pm0.12\pm0.06$	[1] ABE	05D	BELL	Repl. by ISHINO 07
$-0.09\pm0.15\pm0.04$	AUBERT,BE	05	BABR	Repl. by AUBERT 07AF
$-0.58\pm0.15\pm0.07$	[1] ABE	04E	BELL	Repl. by ABE 05D
$-0.77\pm0.27\pm0.08$	[1] ABE	03G	BELL	Repl. by ABE 04E.
$-0.94^{+0.31}_{-0.25}\pm0.09$	[1] ABE	02M	BELL	Repl. by ABE 03G
$-0.25^{+0.45}_{-0.47}\pm0.14$	[2] AUBERT	02D	BABR	Repl. by AUBERT 02Q
$-0.30\pm0.25\pm0.04$	[3] AUBERT	02Q	BABR	Repl. by AUBERT,BE 05

[1] Paper reports $A_{\pi\pi}$ which equals to $-C_{\pi\pi}$. NODE=S042CPI;LINKAGE=MA
[2] Corresponds to 90% confidence range $-1.0 < C_{\pi\pi} < 0.47$. NODE=S042CPI;LINKAGE=AD
[3] Corresponds to 90% confidence range $-0.72 < C_{\pi\pi} < 0.12$. NODE=S042CPI;LINKAGE=BR

$S_{\pi\pi}$ ($B^0 \to \pi^+\pi^-$) NODE=S042SPI

$S_{\pi\pi} = 2\mathrm{Im}\lambda/(1+|\lambda|^2)$, see the note in the $C_{\pi\pi}$ datablock above. NODE=S042SPI

	VALUE	DOCUMENT ID		TECN	COMMENT	
	−0.65±0.07 OUR AVERAGE					NODE=S042SPI NEW
	[−0.61 ± 0.08 OUR 2012 AVERAGE]					
YOUR DATA	−0.68±0.10±0.03	LEES	13D	BABR	$e^+e^- \to \Upsilon(4S)$	
	−0.61±0.10±0.04	ISHINO	07	BELL	$e^+e^- \to \Upsilon(4S)$	
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	−0.60±0.11±0.03	AUBERT	07AF	BABR	Repl. by LEES 13D	
	−0.67±0.16±0.06	[1] ABE	05D	BELL	Repl. by ISHINO 07	
	−0.30±0.17±0.03	AUBERT,BE	05	BABR	Repl. by AUBERT 07AF	
	−1.00±0.21±0.07	[2] ABE	04E	BELL	Repl. by ABE 05D	
	$-1.23\pm0.41^{+0.08}_{-0.07}$	ABE	03G	BELL	Repl. by ABE 04E.	
	$-1.21^{+0.38}_{-0.27}{}^{+0.16}_{-0.13}$	ABE	02M	BELL	Repl. by ABE 03G	
	$0.03^{+0.52}_{-0.56}\pm0.11$	[3] AUBERT	02D	BABR	Repl. by AUBERT 02Q	
	0.02±0.34±0.05	[4] AUBERT	02Q	BABR	Repl. by AUBERT,BE 05	

[1] Rule out the *CP*-conserving case, $C_{\pi\pi} = S_{\pi\pi} = 0$, at the 5.4 sigma level. NODE=S042SPI;LINKAGE=AE
[2] Rule out the *CP*-conserving case, $C_{\pi\pi} = S_{\pi\pi} = 0$, at the 5.2 sigma level. NODE=S042SPI;LINKAGE=AB
[3] Corresponds to 90% confidence range $-0.89 < S_{\pi\pi} < 0.85$. NODE=S042SPI;LINKAGE=AD
[4] Corresponds to 90% confidence range $-0.54 < S_{\pi\pi} < 0.58$. NODE=S042SPI;LINKAGE=BR

$C_{\pi^0\pi^0}$($B^0 \to \pi^0\pi^0$) NODE=S042CX6

	VALUE	DOCUMENT ID		TECN	COMMENT	
						NODE=S042CX6
	−0.43±0.24 OUR AVERAGE					NEW
	[−0.48 ± 0.30 OUR 2012 AVERAGE]					
YOUR DATA	−0.43±0.26±0.05	LEES	13D	BABR	$e^+e^- \to \Upsilon(4S)$	
	$-0.44^{+0.52}_{-0.53}\pm0.17$	[1] CHAO	05	BELL	$e^+e^- \to \Upsilon(4S)$	
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	−0.49±0.35±0.05	AUBERT	07BC	BABR	Repl. by LEES 13D	
	−0.12±0.56±0.06	[2] AUBERT	05L	BABR	Repl. by AUBERT 07BC	

[1] BELLE Collab. quotes $A_{\pi^0\pi^0}$ which is equal to $-C_{\pi^0\pi^0}$. NODE=S042CX6;LINKAGE=CH
[2] Corresponds to a 90% CL interval of $-0.88 < A_{CP} < 0.64$. NODE=S042CX6;LINKAGE=AU

B^0 REFERENCES NODE=S042

	DUH	13	PR D87 031103	Y. T. Duh *et al.*	(Belle)	REFID=54957
YOUR PAPER	LEES	13D	PR D87 052009	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54958
	AAIJ	12V	PRL 108 201601	R. Aaij *et al.*	(LHCb Collab.)	REFID=54216
	AALTONEN	11N	PRL 106 181802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=16447
	FUJIKAWA	10A	PR D81 011101	M. Fujikawa *et al.*	(BELLE Collab.)	REFID=53200
	AUBERT	08E	PR D77 012003	B. Aubert *et al.*	(BABAR Collab.)	REFID=52146
	LIN	08	NAT 452 332	S.-W. Lin *et al.*	(BELLE Collab.)	REFID=52509
	AUBERT	07AF	PRL 99 021603	B. Aubert *et al.*	(BABAR Collab.)	REFID=51861
	AUBERT	07BC	PR D76 091102	B. Aubert *et al.*	(BABAR Collab.)	REFID=51989
	ISHINO	07	PRL 98 211801	H. Ishino *et al.*	(BELLE Collab.)	REFID=51753
	LIN	07A	PRL 99 121601	S.-W. Lin *et al.*	(BELLE Collab.)	REFID=51921
	ABULENCIA,A	06D	PRL 97 211802	A. Abulencia *et al.*	(CDF Collab.)	REFID=51490
	ABE	05D	PRL 95 101801	K. Abe *et al.*	(BELLE Collab.)	REFID=50561
	AUBERT	05L	PRL 94 181802	B. Aubert *et al.*	(BABAR Collab.)	REFID=50593
	AUBERT	05Y	PR D71 111102	B. Aubert *et al.*	(BABAR Collab.)	REFID=50663
	AUBERT,BE	05	PRL 95 151803	B. Aubert *et al.*	(BABAR Collab.)	REFID=50921
	CHAO	05	PRL 94 181803	Y. Chao *et al.*	(BELLE Collab.)	REFID=50594
	CHAO	05A	PR D71 031502	Y. Chao *et al.*	(BELLE Collab.)	REFID=50619
	ABE	04E	PRL 93 021601	K. Abe *et al.*	(BELLE Collab.)	REFID=50056
	AUBERT	04M	PRL 92 201802	B. Aubert *et al.*	(BABAR Collab.)	REFID=49928
	AUBERT,B	04K	PRL 93 131801	B. Aubert *et al.*	(BABAR Collab.)	REFID=50084
	CHAO	04	PR D69 111102	Y. Chao *et al.*	(BELLE Collab.)	REFID=50006
	CHAO	04B	PRL 93 191802	Y. Chao *et al.*	(BELLE Collab.)	REFID=50272
	ABE	03G	PR D68 012001	K. Abe *et al.*	(BELLE Collab.)	REFID=49506
	AUBERT	03L	PRL 91 021801	B. Aubert *et al.*	(BaBar Collab.)	REFID=49493
	AUBERT	03S	PRL 91 241801	B. Aubert *et al.*	(BaBar Collab.)	REFID=49646
	BORNHEIM	03	PR D68 052002	A. Bornheim *et al.*	(CLEO Collab.)	REFID=49546
	LEE	03	PRL 91 261801	S.H. Lee *et al.*	(BELLE Collab.)	REFID=49636
	ABE	02M	PRL 89 071801	K. Abe *et al.*	(BELLE Collab.)	REFID=48757
	ASNER	02	PR D65 031103	D.M. Asner *et al.*	(CLEO Collab.)	REFID=48515
	AUBERT	02D	PR D65 051502	B. Aubert *et al.*	(BaBar Collab.)	REFID=48635
	AUBERT	02Q	PRL 89 281802	B. Aubert *et al.*	(BaBar Collab.)	REFID=49243

CASEY	02	PR D66 092002	B.C.K. Casey *et al.*	(BELLE Collab.)	REFID=49071
ABE	01H	PRL 87 101801	K. Abe *et al.*	(BELLE Collab.)	REFID=48247
ABE	01K	PR D64 071101	K. Abe *et al.*	(BELLE Collab.)	REFID=48367
AUBERT	01E	PRL 87 151802	B. Aubert *et al.*	(BaBar Collab.)	REFID=48378
CHEN	00	PRL 85 525	S. Chen *et al.*	(CLEO Collab.)	REFID=47669
CRONIN-HEN...	00	PRL 85 515	D. Cronin-Hennessy *et al.*	(CLEO Collab.)	REFID=47659
GODANG	98	PRL 80 3456	R. Godang *et al.*	(CLEO Collab.)	REFID=45935
ASNER	96	PR D53 1039	D.M. Asner *et al.*	(CLEO Collab.)	REFID=44734
ACCIARRI	95H	PL B363 127	M. Acciarri *et al.*	(L3 Collab.)	REFID=44544

Reference = SATO 12; PRL 108 171801
Verifier code = BELLE

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Youngjoon Kwon

EMAIL: yjkwon63@yonsei.ac.kr

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

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FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS ($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

CP VIOLATION PARAMETERS

NODE=S042229

sin(2β)

NODE=S042BET

For a discussion of *CP* violation, see the review on "*CP* Violation" in the Reviews section. $\sin(2\beta)$ is a measure of the *CP*-violating amplitude in the $B^0_d \to J/\psi(1S)K^0_S$.

NODE=S042BET

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements.

NODE=S042BET

VALUE	DOCUMENT ID		TECN	COMMENT
0.682±0.019 OUR EVALUATION				NEW;→ UNCHECKED ←
[0.679 ± 0.020 OUR 2012 EVALUATION]				
0.675±0.020 OUR AVERAGE				NEW
[0.671 ± 0.022 OUR 2012 AVERAGE]				
0.667±0.023±0.012	[1] ADACHI	12A	BELL	$e^+e^- \to \Upsilon(4S)$
YOUR DATA 0.57 ±0.58 ±0.06	[2] SATO	12	BELL	$e^+e^- \to \Upsilon(5S)$
−0.69 ±0.52 ±0.08	[3] AUBERT	09AU	BABR	$e^+e^- \to \Upsilon(4S)$
0.687±0.028±0.012	[4] AUBERT	09K	BABR	$e^+e^- \to \Upsilon(4S)$
1.56 ±0.42 ±0.21	[5] AUBERT	04R	BABR	$e^+e^- \to \Upsilon(4S)$
$0.79\ ^{+0.41}_{-0.44}$	[6] AFFOLDER	00C	CDF	$p\overline{p}$ at 1.8 TeV
$0.84\ ^{+0.82}_{-1.04}$ ±0.16	[7] BARATE	00Q	ALEP	$e^+e^- \to Z$
$3.2\ ^{+1.8}_{-2.0}$ ±0.5	[8] ACKERSTAFF	98Z	OPAL	$e^+e^- \to Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.72 ±0.09 ±0.03	[9] SAHOO	08	BELL	Repl. by ADACHI 12A
0.714±0.032±0.018	[4] AUBERT	07AY	BABR	Repl. by AUBERT 09K
0.642±0.031±0.017	CHEN	07	BELL	Repl. by ADACHI 12A
0.728±0.056±0.023	[10] ABE	05B	BELL	Repl. by CHEN 07
0.722±0.040±0.023	[11] AUBERT	05F	BABR	Repl. by AUBERT 07AY
0.99 ±0.14 ±0.06	[12] ABE	02U	BELL	$e^+e^- \to \Upsilon(4S)$
0.719±0.074±0.035	[13] ABE	02Z	BELL	Repl. by ABE 05B
0.59 ±0.14 ±0.05	[14] AUBERT	02N	BABR	$e^+e^- \to \Upsilon(4S)$
0.741±0.067±0.034	[15] AUBERT	02P	BABR	Repl. by AUBERT 05F
$0.58\ ^{+0.32}_{-0.34}\ ^{+0.09}_{-0.10}$	ABASHIAN	01	BELL	Repl. by ABE 01G
0.99 ±0.14 ±0.06	[16] ABE	01G	BELL	Repl. by ABE 02Z
0.34 ±0.20 ±0.05	AUBERT	01	BABR	Repl. by AUBERT 01B
0.59 ±0.14 ±0.05	[16] AUBERT	01B	BABR	Repl. by AUBERT 02P
1.8 ±1.1 ±0.3	[17] ABE	98U	CDF	Repl. by AFFOLDER 00C

[1] Measurement based on $B^0 \to J/\psi K^0_S$, $B^0 \to \psi(2S)K^0_S$, $B^0 \to J/\psi K^0_L$, and $B^0 \to \chi_{c1}(1P)K^0_S$ decays. NODE=S042BET;LINKAGE=AD

[2] SATO 12 uses 121 fb^{-1} data collected on $\Upsilon(5S)$ resonance. Uses the "$B-\pi$ tagging" where $B\pi^+$ and $B\pi^-$ tagged $J/\psi K^0_S$ events are compared. NODE=S042BET;LINKAGE=ST

[3] Uses Dalitz plot analysis of $B^0 \to K^0\pi^+\pi^-$ decays and the first of two equivalent solutions. NODE=S042BET;LINKAGE=AT

[4] Measurement based on $B^0 \rightarrow c\overline{c}K^{(*)0}$ decays. NODE=S042BET;LINKAGE=UE
[5] Measurement in which the J/ψ decays to hadrons or to muons that do not satisfy the standard identification criteria. NODE=S042BET;LINKAGE=AB
[6] AFFOLDER 00C uses about 400 $B^0 \rightarrow J/\psi(1S)K^0_S$ events. The production flavor of B^0 was determined using three tagging algorithms: a same-side tag, a jet-charge tag, and a soft-lepton tag. NODE=S042BET;LINKAGE=N
[7] BARATE 00Q uses 23 candidates for $B^0 \rightarrow J/\psi(1S)K^0_S$ decays. A combination of jet-charge, vertex-charge, and same-side tagging techniques were used to determine the B^0 production flavor. NODE=S042BET;LINKAGE=BQ
[8] ACKERSTAFF 98Z uses 24 candidates for $B^0_d \rightarrow J/\psi(1S)K^0_S$ decay. A combination of jet-charge and vertex-charge techniques were used to tag the B^0_d production flavor. NODE=S042BET;LINKAGE=A
[9] Based on $B^0 \rightarrow \psi(2S)K^0_S$ decays. NODE=S042BET;LINKAGE=SA
[10] Measurement based on 152×10^6 $B\overline{B}$ pairs. NODE=S042BET;LINKAGE=AE
[11] Measurement based on 227×10^6 $B\overline{B}$ pairs. NODE=S042BET;LINKAGE=AR
[12] ABE 02U result is based on the same analysis and data sample reported in ABE 01G. NODE=S042BET;LINKAGE=AU
[13] ABE 02Z result is based on 85×10^6 $B\overline{B}$ pairs. NODE=S042BET;LINKAGE=KZ
[14] AUBERT 02N result based on the same analysis and data sample reported in AUBERT 01B. NODE=S042BET;LINKAGE=N2
[15] AUBERT 02P result is based on 88×10^6 $B\overline{B}$ pairs. NODE=S042BET;LINKAGE=P
[16] First observation of CP violation in B^0 meson system. NODE=S042BET;LINKAGE=BT
[17] ABE 98U uses 198 ± 17 $B^0_d \rightarrow J/\psi(1S)K^0$ events. The production flavor of B^0 was determined using the same side tagging technique. NODE=S042BET;LINKAGE=B

$S_{J/\psi(nS)K^0}$ ($B^0 \rightarrow J/\psi(nS)K^0$)

NODE=S042SJK

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements. NODE=S042SJK

NODE=S042SJK

	VALUE	DOCUMENT ID		TECN	COMMENT
	0.676±0.021 OUR EVALUATION				→ UNCHECKED ←
	0.680±0.021 OUR AVERAGE Error includes scale factor of 1.1. [0.67 ± 0.04 OUR 2012 AVERAGE Scale factor = 1.6]				NEW
	0.73 ±0.07 ±0.04	[1] AAIJ	13K	LHCB	pp at 7 TeV
	0.670±0.029±0.013	[2] ADACHI	12A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
	0.738±0.079±0.036	[3] ADACHI	12A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
	0.642±0.047±0.021	[4] ADACHI	12A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
YOUR DATA	0.57 ±0.58 ±0.06	[5] SATO	12	BELL	$e^+e^- \rightarrow \Upsilon(5S)$
	0.897±0.100±0.036	[3] AUBERT	09K	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
	0.666±0.031±0.013	AUBERT	09K	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
	$0.79 \; ^{+0.41}_{-0.44}$	[6] AFFOLDER	00C	CDF	$p\overline{p}$ at 1.8 TeV
	$0.84 \; ^{+0.82}_{-1.04} \pm 0.16$	[7] BARATE	00Q	ALEP	$e^+e^- \rightarrow Z$
	$3.2 \; ^{+1.8}_{-2.0} \pm 0.5$	[8] ACKERSTAFF	98Z	OPAL	$e^+e^- \rightarrow Z$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	0.650±0.029±0.018	[9] SAHOO	08	BELL	Repl. by ADACHI 12A
	0.72 ±0.09 ±0.03	[3] SAHOO	08	BELL	Repl. by ADACHI 12A
	0.642±0.031±0.017	CHEN	07	BELL	Repl. by ADACHI 12A

OCCUR=2
OCCUR=3
OCCUR=2
OCCUR=2

[1] AAIJ 13K uses 8200 flavor-tagged $B_d \rightarrow J/\psi K^0_S$ events from 1 fb^{-1} of integrated luminosity. Provides the correlation coefficient $\rho = 0.42$ between the statistical uncertainties of $S_{J/\psi(nS)K^0}$ ($B^0 \rightarrow J/\psi(nS)K^0$) and $C_{J/\psi(nS)K^0}$ ($B^0 \rightarrow J/\psi(nS)K^0$) measurements. NODE=S042SJK;LINKAGE=AA
[2] Uses $B^0 \rightarrow J/\psi K^0_S$ decays. NODE=S042SJK;LINKAGE=AD
[3] Based on $B^0 \rightarrow \psi(2S)K^0_S$ decays. NODE=S042SJK;LINKAGE=SA
[4] Uses $B^0 \rightarrow J/\psi K^0_L$ decays. NODE=S042SJK;LINKAGE=AH
[5] SATO 12 uses 121 fb^{-1} data collected at $\Upsilon(5S)$ resonance. Uses the "$B - \pi$ tagging" where $B\pi^+$ and $B\pi^-$ tagged $J/\psi K^0_S$ events are compared. NODE=S042SJK;LINKAGE=ST
[6] AFFOLDER 00C uses about 400 $B^0 \rightarrow J/\psi(1S)K^0_S$ events. The production flavor of B^0 was determined using three tagging algorithms: a same-side tag, a jet-charge tag, and a soft-lepton tag. NODE=S042SJK;LINKAGE=AF
[7] BARATE 00Q uses 23 candidates for $B^0 \rightarrow J/\psi(1S)K^0_S$ decays. A combination of jet-charge, vertex-charge, and same-side tagging techniques were used to determine the B^0 production flavor. NODE=S042SJK;LINKAGE=BA
[8] ACKERSTAFF 98Z uses 24 candidates for $B^0_d \rightarrow J/\psi(1S)K^0_S$ decay. A combination of jet-charge and vertex-charge techniques were used to tag the B^0_d production flavor. NODE=S042SJK;LINKAGE=AC

[9] Combined result of CHEN 07 and SAHOO 08. NODE=S042SJK;LINKAGE=SC

B^0 REFERENCES

NODE=S042

	AAIJ	13K	PL B721 24	R. Aaij *et al.*	(LHCb Collab.)	REFID=54974
	ADACHI	12A	PRL 108 171802	I. Adachi *et al.*	(BELLE Collab.)	REFID=54222
YOUR PAPER	SATO	12	PRL 108 171801	Y. Sato *et al.*	(BELLE Collab.)	REFID=54221
	AUBERT	09AU	PR D80 112001	B. Aubert *et al.*	(BABAR Collab.)	REFID=53180
	AUBERT	09K	PR D79 072009	B. Aubert *et al.*	(BABAR Collab.)	REFID=52704
	SAHOO	08	PR D77 091103	H. Sahoo *et al.*	(BELLE Collab.)	REFID=52346
	AUBERT	07AY	PRL 99 171803	B. Aubert *et al.*	(BABAR Collab.)	REFID=51985
	CHEN	07	PRL 98 031802	K.-F. Chen *et al.*	(BELLE Collab.)	REFID=51609
	ABE	05B	PR D71 072003	K. Abe *et al.*	(BELLE Collab.)	REFID=50517
	Also		PR D71 079903 (errat.)	K. Abe *et al.*	(BELLE Collab.)	REFID=50555
	AUBERT	05F	PRL 94 161803	B. Aubert *et al.*	(BABAR Collab.)	REFID=50545
	AUBERT	04R	PR D69 052001	B. Aubert *et al.*	(BABAR Collab.)	REFID=49956
	ABE	02U	PR D66 032007	K. Abe *et al.*	(BELLE Collab.)	REFID=48905
	ABE	02Z	PR D66 071102	K. Abe *et al.*	(BELLE Collab.)	REFID=49062
	AUBERT	02N	PR D66 032003	B. Aubert *et al.*	(BaBar Collab.)	REFID=48902
	AUBERT	02P	PRL 89 201802	B. Aubert *et al.*	(BaBar Collab.)	REFID=48995
	ABASHIAN	01	PRL 86 2509	A. Abashian *et al.*	(BELLE Collab.)	REFID=48105
	ABE	01G	PRL 87 091802	K. Abe *et al.*	(BELLE Collab.)	REFID=48246
	AUBERT	01	PRL 86 2515	B. Aubert *et al.*	(BaBar Collab.)	REFID=48106
	AUBERT	01B	PRL 87 091801	B. Aubert *et al.*	(BaBar Collab.)	REFID=48245
	AFFOLDER	00C	PR D61 072005	T. Affolder *et al.*	(CDF Collab.)	REFID=47438
	BARATE	00Q	PL B492 259	R. Barate *et al.*	(ALEPH Collab.)	REFID=47826
	ABE	98U	PRL 81 5513	F. Abe *et al.*	(CDF Collab.)	REFID=46693
	ACKERSTAFF	98Z	EPJ C5 379	K. Ackerstaff *et al.*	(OPAL Collab.)	REFID=46262

Reference = ADACHI 12A; PRL 108 171802
Verifier code = BELLE

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Youngjoon Kwon

EMAIL: yjkwon63@yonsei.ac.kr

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

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(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

CP VIOLATION PARAMETERS

NODE=S042229

$C_{c\overline{c}K^{(*)0}}$ ($B^0 \to c\overline{c}K^{(*)0}$)

NODE=S042CCC

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements.

NODE=S042CCC

NODE=S042CCC

VALUE (units 10^{-2})	DOCUMENT ID	TECN	COMMENT
0.5± 1.7 OUR EVALUATION			→ UNCHECKED ←
0.5± 1.6 OUR AVERAGE			NEW
[$(0.1 \pm 1.8) \times 10^{-2}$ OUR 2012 AVERAGE]			
YOUR DATA $-0.6 \pm 1.6 \pm 1.2$	[1] ADACHI 12A	BELL	$e^+e^- \to \Upsilon(4S)$
$-29\ ^{+53}_{-44} \pm 6$	[2] AUBERT 09AU	BABR	$e^+e^- \to \Upsilon(4S)$
$2.4 \pm 2.0 \pm 1.6$	[3] AUBERT 09K	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$-4 \pm 7 \pm 5$	[4] SAHOO 08	BELL	Repl. by ADACHI 12A
$4.9 \pm 2.3 \pm 1.8$	[3] AUBERT 07AY	BABR	Repl. by AUBERT 09K
$-1.8 \pm 2.1 \pm 1.4$	[5] CHEN 07	BELL	Repl. by ADACHI 12A
$-0.7 \pm 4.1 \pm 3.3$	[6] ABE 05B	BELL	Repl. by CHEN 07
$5.1 \pm 3.2 \pm 1.4$	[7] AUBERT 05F	BABR	Repl. by AUBERT 07AY
$5.1 \pm 5.1 \pm 2.6$	[8] ABE 02Z	BELL	Repl. by ABE 05B
$5.3 \pm 5.4 \pm 3.2$	[9] AUBERT 02P	BABR	Repl. by AUBERT 05F

[1] Measurement based on $B^0 \to J/\psi K^0_S$, $B^0 \to \psi(2S) K^0_S$, $B^0 \to J/\psi K^0_L$, and $B^0 \to \chi_{c1}(1P) K^0_S$ decays. NODE=S042CCC;LINKAGE=AD

[2] Uses Dalitz plot analysis of $B^0 \to K^0\pi^+\pi^-$ decays and the first of two equivalent solutions is used. NODE=S042CCC;LINKAGE=AU

[3] Measurement based on $B^0 \to c\overline{c}K^{(*)0}$ decays. NODE=S042CCC;LINKAGE=UE

[4] Reports value of A of $B^0 \to \psi(2S)K^0$ which is equal to $-C$. NODE=S042CCC;LINKAGE=SH

[5] Reports value of A of $B^0 \to J/\psi K^0$ which is equal to $-C$. NODE=S042CCC;LINKAGE=CH

[6] Measurement based on 152×10^6 $B\overline{B}$ pairs. NODE=S042CCC;LINKAGE=AE

[7] Measurement based on 227×10^6 $B\overline{B}$ pairs. NODE=S042CCC;LINKAGE=AR

[8] Measured with both $\eta_f = \pm 1$ samples. NODE=S042CCC;LINKAGE=A

[9] Measured with the high purity of $\eta_f = -1$ samples. NODE=S042CCC;LINKAGE=B

sin(2β)

NODE=S042BET

For a discussion of *CP* violation, see the review on "*CP* Violation" in the Reviews section. sin(2β) is a measure of the *CP*-violating amplitude in the $B^0_d \to J/\psi(1S)K^0_S$.

NODE=S042BET

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements.

VALUE	DOCUMENT ID	TECN	COMMENT
0.682±0.019 OUR EVALUATION			NEW;→ UNCHECKED ←
[0.679 ± 0.020 OUR 2012 EVALUATION]			
0.675±0.020 OUR AVERAGE			NEW

[0.671 ± 0.022 OUR 2012 AVERAGE]

YOUR DATA	0.667±0.023±0.012	[1] ADACHI	12A	BELL	$e^+e^- \to \Upsilon(4S)$	
	0.57 ±0.58 ±0.06	[2] SATO	12	BELL	$e^+e^- \to \Upsilon(5S)$	
	−0.69 ±0.52 ±0.08	[3] AUBERT	09AU	BABR	$e^+e^- \to \Upsilon(4S)$	
	0.687±0.028±0.012	[4] AUBERT	09K	BABR	$e^+e^- \to \Upsilon(4S)$	
	1.56 ±0.42 ±0.21	[5] AUBERT	04R	BABR	$e^+e^- \to \Upsilon(4S)$	
	0.79 $^{+0.41}_{-0.44}$	[6] AFFOLDER	00C	CDF	$p\overline{p}$ at 1.8 TeV	
	0.84 $^{+0.82}_{-1.04}$ ±0.16	[7] BARATE	00Q	ALEP	$e^+e^- \to Z$	
	3.2 $^{+1.8}_{-2.0}$ ±0.5	[8] ACKERSTAFF	98Z	OPAL	$e^+e^- \to Z$	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	0.72 ±0.09 ±0.03	[9] SAHOO	08	BELL	Repl. by ADACHI 12A	
	0.714±0.032±0.018	[4] AUBERT	07AY	BABR	Repl. by AUBERT 09K	
	0.642±0.031±0.017	CHEN	07	BELL	Repl. by ADACHI 12A	
	0.728±0.056±0.023	[10] ABE	05B	BELL	Repl. by CHEN 07	
	0.722±0.040±0.023	[11] AUBERT	05F	BABR	Repl. by AUBERT 07AY	
	0.99 ±0.14 ±0.06	[12] ABE	02U	BELL	$e^+e^- \to \Upsilon(4S)$	
	0.719±0.074±0.035	[13] ABE	02Z	BELL	Repl. by ABE 05B	
	0.59 ±0.14 ±0.05	[14] AUBERT	02N	BABR	$e^+e^- \to \Upsilon(4S)$	
	0.741±0.067±0.034	[15] AUBERT	02P	BABR	Repl. by AUBERT 05F	
	0.58 $^{+0.32}_{-0.34}$ $^{+0.09}_{-0.10}$	ABASHIAN	01	BELL	Repl. by ABE 01G	
	0.99 ±0.14 ±0.06	[16] ABE	01G	BELL	Repl. by ABE 02Z	
	0.34 ±0.20 ±0.05	AUBERT	01	BABR	Repl. by AUBERT 01B	
	0.59 ±0.14 ±0.05	[16] AUBERT	01B	BABR	Repl. by AUBERT 02P	
	1.8 ±1.1 ±0.3	[17] ABE	98U	CDF	Repl. by AFFOLDER 00C	

[1] Measurement based on $B^0 \to J/\psi K^0_S$, $B^0 \to \psi(2S) K^0_S$, $B^0 \to J/\psi K^0_L$, and $B^0 \to \chi_{c1}(1P) K^0_S$ decays. NODE=S042BET;LINKAGE=AD

[2] SATO 12 uses 121 fb^{-1} data collected on $\Upsilon(5S)$ resonance. Uses the "$B-\pi$ tagging" where $B\pi^+$ and $B\pi^-$ tagged $J/\psi K^0_S$ events are compared. NODE=S042BET;LINKAGE=ST

[3] Uses Dalitz plot analysis of $B^0 \to K^0\pi^+\pi^-$ decays and the first of two equivalent solutions. NODE=S042BET;LINKAGE=AT

[4] Measurement based on $B^0 \to c\overline{c}K^{(*)0}$ decays. NODE=S042BET;LINKAGE=UE

[5] Measurement in which the J/ψ decays to hadrons or to muons that do not satisfy the standard identification criteria. NODE=S042BET;LINKAGE=AB

[6] AFFOLDER 00C uses about 400 $B^0 \to J/\psi(1S) K^0_S$ events. The production flavor of B^0 was determined using three tagging algorithms: a same-side tag, a jet-charge tag, and a soft-lepton tag. NODE=S042BET;LINKAGE=N

[7] BARATE 00Q uses 23 candidates for $B^0 \to J/\psi(1S) K^0_S$ decays. A combination of jet-charge, vertex-charge, and same-side tagging techniques were used to determine the B^0 production flavor. NODE=S042BET;LINKAGE=BQ

[8] ACKERSTAFF 98Z uses 24 candidates for $B^0_d \to J/\psi(1S) K^0_S$ decay. A combination of jet-charge and vertex-charge techniques were used to tag the B^0_d production flavor. NODE=S042BET;LINKAGE=A

[9] Based on $B^0 \to \psi(2S) K^0_S$ decays. NODE=S042BET;LINKAGE=SA

[10] Measurement based on 152×10^6 $B\overline{B}$ pairs. NODE=S042BET;LINKAGE=AE

[11] Measurement based on 227×10^6 $B\overline{B}$ pairs. NODE=S042BET;LINKAGE=AR

[12] ABE 02U result is based on the same analysis and data sample reported in ABE 01G. NODE=S042BET;LINKAGE=AU

[13] ABE 02Z result is based on 85×10^6 $B\overline{B}$ pairs. NODE=S042BET;LINKAGE=KZ

[14] AUBERT 02N result based on the same analysis and data sample reported in AUBERT 01B. NODE=S042BET;LINKAGE=N2

[15] AUBERT 02P result is based on 88×10^6 $B\overline{B}$ pairs. NODE=S042BET;LINKAGE=P

[16] First observation of CP violation in B^0 meson system. NODE=S042BET;LINKAGE=BT

[17] ABE 98U uses 198 ± 17 $B^0_d \to J/\psi(1S) K^0$ events. The production flavor of B^0 was determined using the same side tagging technique. NODE=S042BET;LINKAGE=B

$C_{J/\psi(nS)K^0}$ ($B^0 \to J/\psi(nS)K^0$)

NODE=S042CJK

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements. NODE=S042CJK

VALUE (units 10^{-2})	DOCUMENT ID	TECN	COMMENT
0.5±2.0 OUR EVALUATION			
0.3±1.8 OUR AVERAGE			
[(0.0 ± 1.8) × 10^{-2} OUR 2012 AVERAGE]			
3 ±9 ±1	[1] AAIJ 13K	LHCB	pp at 7 TeV

NODE=S042CJK

→ UNCHECKED ←

NEW

YOUR DATA	$1.5 \pm 2.1 ^{+2.3}_{-4.5}$	[2,3] ADACHI	12A	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$	
YOUR DATA	$-10.4 \pm 5.5 ^{+2.7}_{-4.7}$	[3,4] ADACHI	12A	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$	OCCUR=2
YOUR DATA	$-1.9 \pm 2.6 ^{+4.1}_{-1.7}$	[3,5] ADACHI	12A	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$	OCCUR=3
	$8.9 \pm 7.6 \pm 2.0$	[4] AUBERT	09K	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$	
	$1.6 \pm 2.3 \pm 1.8$	AUBERT	09K	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$	OCCUR=2
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	$-4 \pm 7 \pm 5$	[3,4] SAHOO	08	BELL	Repl. by ADACHI 12A	
	$-1.8 \pm 2.1 \pm 1.4$	[3] CHEN	07	BELL	Repl. by ADACHI 12A	

[1] AAIJ 13K uses 8200 flavor-tagged $B_d \rightarrow J/\psi K^0_S$ events from 1 fb^{-1} of integrated luminosity. Provides the correlation coefficient $\rho = 0.42$ between the statistical uncertainties of $S_{J/\psi(\mathrm{nS})K^0}$ ($B^0 \rightarrow J/\psi(\mathrm{nS})K^0$) and $C_{J/\psi(\mathrm{nS})K^0}$ ($B^0 \rightarrow J/\psi(\mathrm{nS})K^0$) measurements. NODE=S042CJK;LINKAGE=AA

[2] Uses $B^0 \rightarrow J/\psi K^0_S$ decays. NODE=S042CJK;LINKAGE=AD

[3] The paper reports A, which is equal to $-C$. NODE=S042CJK;LINKAGE=CH

[4] Uses $B^0 \rightarrow \psi(2S) K^0_S$ decays. NODE=S042CJK;LINKAGE=SA

[5] Uses $B^0 \rightarrow J/\psi K^0_L$ decays. NODE=S042CJK;LINKAGE=AH

$S_{J/\psi(\mathrm{nS})K^0}$ ($B^0 \rightarrow J/\psi(\mathrm{nS})K^0$)

NODE=S042SJK

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements. NODE=S042SJK

VALUE	DOCUMENT ID		TECN	COMMENT	
					NODE=S042SJK
0.676±0.021 OUR EVALUATION					→ UNCHECKED ←
0.680±0.021 OUR AVERAGE Error includes scale factor of 1.1. [0.67 ± 0.04 OUR 2012 AVERAGE Scale factor = 1.6]					NEW
$0.73 \pm 0.07 \pm 0.04$	[1] AAIJ	13K	LHCB	pp at 7 TeV	
YOUR DATA $0.670 \pm 0.029 \pm 0.013$	[2] ADACHI	12A	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$	
YOUR DATA $0.738 \pm 0.079 \pm 0.036$	[3] ADACHI	12A	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$	OCCUR=2
YOUR DATA $0.642 \pm 0.047 \pm 0.021$	[4] ADACHI	12A	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$	OCCUR=3
$0.57 \pm 0.58 \pm 0.06$	[5] SATO	12	BELL	$e^+ e^- \rightarrow \Upsilon(5S)$	
$0.897 \pm 0.100 \pm 0.036$	[3] AUBERT	09K	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$	
$0.666 \pm 0.031 \pm 0.013$	AUBERT	09K	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$	OCCUR=2
$0.79 ^{+0.41}_{-0.44}$	[6] AFFOLDER	00C	CDF	$p\bar{p}$ at 1.8 TeV	
$0.84 ^{+0.82}_{-1.04} \pm 0.16$	[7] BARATE	00Q	ALEP	$e^+ e^- \rightarrow Z$	
$3.2 ^{+1.8}_{-2.0} \pm 0.5$	[8] ACKERSTAFF	98Z	OPAL	$e^+ e^- \rightarrow Z$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.650 \pm 0.029 \pm 0.018$	[9] SAHOO	08	BELL	Repl. by ADACHI 12A	
$0.72 \pm 0.09 \pm 0.03$	[3] SAHOO	08	BELL	Repl. by ADACHI 12A	OCCUR=2
$0.642 \pm 0.031 \pm 0.017$	CHEN	07	BELL	Repl. by ADACHI 12A	

[1] AAIJ 13K uses 8200 flavor-tagged $B_d \rightarrow J/\psi K^0_S$ events from 1 fb^{-1} of integrated luminosity. Provides the correlation coefficient $\rho = 0.42$ between the statistical uncertainties of $S_{J/\psi(\mathrm{nS})K^0}$ ($B^0 \rightarrow J/\psi(\mathrm{nS})K^0$) and $C_{J/\psi(\mathrm{nS})K^0}$ ($B^0 \rightarrow J/\psi(\mathrm{nS})K^0$) measurements. NODE=S042SJK;LINKAGE=AA

[2] Uses $B^0 \rightarrow J/\psi K^0_S$ decays. NODE=S042SJK;LINKAGE=AD

[3] Based on $B^0 \rightarrow \psi(2S) K^0_S$ decays. NODE=S042SJK;LINKAGE=SA

[4] Uses $B^0 \rightarrow J/\psi K^0_L$ decays. NODE=S042SJK;LINKAGE=AH

[5] SATO 12 uses 121 fb^{-1} data collected at $\Upsilon(5S)$ resonance. Uses the "$B - \pi$ tagging" where $B\pi^+$ and $B\pi^-$ tagged $J/\psi K^0_S$ events are compared. NODE=S042SJK;LINKAGE=ST

[6] AFFOLDER 00C uses about 400 $B^0 \rightarrow J/\psi(1S) K^0_S$ events. The production flavor of B^0 was determined using three tagging algorithms: a same-side tag, a jet-charge tag, and a soft-lepton tag. NODE=S042SJK;LINKAGE=AF

[7] BARATE 00Q uses 23 candidates for $B^0 \rightarrow J/\psi(1S) K^0_S$ decays. A combination of jet-charge, vertex-charge, and same-side tagging techniques were used to determine the B^0 production flavor. NODE=S042SJK;LINKAGE=BA

[8] ACKERSTAFF 98Z uses 24 candidates for $B^0_d \rightarrow J/\psi(1S) K^0_S$ decay. A combination of jet-charge and vertex-charge techniques were used to tag the B^0_d production flavor. NODE=S042SJK;LINKAGE=AC

[9] Combined result of CHEN 07 and SAHOO 08. NODE=S042SJK;LINKAGE=SC

$C_{\chi_{c1} K^0_S}$ ($B^0 \to \chi_{c1} K^0_S$)

NODE=S042CC1

VALUE	DOCUMENT ID		TECN	COMMENT	NODE=S042CC1
0.06 ±0.07 OUR AVERAGE					NEW
[0.13 ± 0.11 OUR 2012 AVERAGE]					
YOUR DATA $0.017 \pm 0.083^{+0.026}_{-0.046}$	ADACHI	12A	BELL	$e^+ e^- \to \Upsilon(4S)$	
$0.129 \pm 0.109 \pm 0.025$	AUBERT	09K	BABR	$e^+ e^- \to \Upsilon(4S)$	

$S_{\chi_{c1} K^0_S}$ ($B^0 \to \chi_{c1} K^0_S$)

NODE=S042SC1

VALUE	DOCUMENT ID		TECN	COMMENT	NODE=S042SC1
0.63 ±0.10 OUR AVERAGE					NEW
[0.61 ± 0.16 OUR 2012 AVERAGE]					
YOUR DATA $0.640 \pm 0.117 \pm 0.040$	ADACHI	12A	BELL	$e^+ e^- \to \Upsilon(4S)$	
$0.614 \pm 0.160 \pm 0.040$	AUBERT	09K	BABR	$e^+ e^- \to \Upsilon(4S)$	

B^0 REFERENCES

NODE=S042

	AAIJ 13K	PL B721 24	R. Aaij *et al.*	(LHCb Collab.)	REFID=54974
YOUR PAPER	ADACHI 12A	PRL 108 171802	I. Adachi *et al.*	(BELLE Collab.)	REFID=54222
	SATO 12	PRL 108 171801	Y. Sato *et al.*	(BELLE Collab.)	REFID=54221
	AUBERT 09AU	PR D80 112001	B. Aubert *et al.*	(BABAR Collab.)	REFID=53180
	AUBERT 09K	PR D79 072009	B. Aubert *et al.*	(BABAR Collab.)	REFID=52704
	SAHOO 08	PR D77 091103	H. Sahoo *et al.*	(BELLE Collab.)	REFID=52346
	AUBERT 07AY	PRL 99 171803	B. Aubert *et al.*	(BABAR Collab.)	REFID=51985
	CHEN 07	PRL 98 031802	K.-F. Chen *et al.*	(BELLE Collab.)	REFID=51609
	ABE 05B	PR D71 072003	K. Abe *et al.*	(BELLE Collab.)	REFID=50517
	Also	PR D71 079903 (errat.)	K. Abe *et al.*	(BELLE Collab.)	REFID=50555
	AUBERT 05F	PRL 94 161803	B. Aubert *et al.*	(BABAR Collab.)	REFID=50545
	AUBERT 04R	PR D69 052001	B. Aubert *et al.*	(BABAR Collab.)	REFID=49956
	ABE 02U	PR D66 032007	K. Abe *et al.*	(BELLE Collab.)	REFID=48905
	ABE 02Z	PR D66 071102	K. Abe *et al.*	(BELLE Collab.)	REFID=49062
	AUBERT 02N	PR D66 032003	B. Aubert *et al.*	(BaBar Collab.)	REFID=48902
	AUBERT 02P	PRL 89 201802	B. Aubert *et al.*	(BaBar Collab.)	REFID=48995
	ABASHIAN 01	PRL 86 2509	A. Abashian *et al.*	(BELLE Collab.)	REFID=48105
	ABE 01G	PRL 87 091802	K. Abe *et al.*	(BELLE Collab.)	REFID=48246
	AUBERT 01	PRL 86 2515	B. Aubert *et al.*	(BaBar Collab.)	REFID=48106
	AUBERT 01B	PRL 87 091801	B. Aubert *et al.*	(BaBar Collab.)	REFID=48245
	AFFOLDER 00C	PR D61 072005	T. Affolder *et al.*	(CDF Collab.)	REFID=47438
	BARATE 00Q	PL B492 259	R. Barate *et al.*	(ALEPH Collab.)	REFID=47826
	ABE 98U	PRL 81 5513	F. Abe *et al.*	(CDF Collab.)	REFID=46693
	ACKERSTAFF 98Z	EPJ C5 379	K. Ackerstaff *et al.*	(OPAL Collab.)	REFID=46262

Reference = CHANG 12; PR D85 091102
Verifier code = BELLE

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Youngjoon Kwon

EMAIL: yjkwon63@yonsei.ac.kr

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(J/\psi(1S)\eta)/\Gamma_{total}$ — Γ_{178}/Γ

NODE=S042S51
NODE=S042S51

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	12.3±1.9 OUR AVERAGE		[(9.5 ± 1.9) × 10^{-6} OUR 2012 AVERAGE]			
YOUR DATA	**$12.3^{+1.8}_{-1.7}\pm0.7$**		[1,2] CHANG	12	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	9.5±1.7±0.8		[2] CHANG	07A	BELL	Repl. by CHANG 12
	< 27	90	[2] AUBERT	03O	BABR	$e^+e^- \to \Upsilon(4S)$
	<1200	90	[3] ACCIARRI	97C	L3	

NEW

[1] Reconstructs η in $\gamma\gamma$ and $\pi^+\pi^-\pi^0$ decays.
[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[3] ACCIARRI 97C assumes B^0 production fraction (39.5 ± 4.0%) and B_s (12.0 ± 3.0%).

NODE=S042S51;LINKAGE=CH
NODE=S042S51;LINKAGE=EP
NODE=S042S51;LINKAGE=CQ

$\Gamma(J/\psi(1S)\eta'(958))/\Gamma_{total}$ — Γ_{188}/Γ

NODE=S042B54
NODE=S042B54

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	< 7.4 (CL = 90%)		[<6.3 × 10^{-5} (CL = 90%) OUR 2012 BEST LIMIT]			
YOUR DATA	**< 7.4**	90	[1,2] CHANG	12	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	<63	90	[2] AUBERT	03O	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Reconstructs $\eta'(985)$ in $\eta\pi^+\pi^-$ and $\rho(770)^0\gamma$ decays.
[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042B54;LINKAGE=CH
NODE=S042B54;LINKAGE=EP

B^0 REFERENCES

NODE=S042

YOUR PAPER

CHANG	12	PR D85 091102	M.-C. Chang *et al.*	(BELLE Collab.)	REFID=54403
CHANG	07A	PRL 98 131803	M.-C. Chang *et al.*	(BELLE Collab.)	REFID=51738
AUBERT	03O	PRL 91 071801	B. Aubert *et al.*	(BaBar Collab.)	REFID=49515
ACCIARRI	97C	PL B391 481	M. Acciarri *et al.*	(L3 Collab.)	REFID=45249

Reference = ROHRKEN 12; PR D85 091106
Verifier code = BELLE

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Youngjoon Kwon

EMAIL: yjkwon63@yonsei.ac.kr

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(D^- D^+)/\Gamma_{total}$ — Γ_{71}/Γ

NODE=S042S83
NODE=S042S83

	VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
	2.11±0.18 OUR AVERAGE					
	[(2.11 ± 0.31) × 10^{-4} OUR 2012 AVERAGE Scale factor = 1.2]					
YOUR DATA	2.12±0.16±0.18		[1] ROHRKEN	12	BELL	$e^+e^- \to \Upsilon(4S)$
	1.97±0.20±0.20		[1] FRATINA	07	BELL	$e^+e^- \to \Upsilon(4S)$
	2.8 ±0.4 ±0.5		[1] AUBERT,B	06A	BABR	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	1.91±0.51±0.30		[1] MAJUMDER	05	BELL	Repl. by FRATINA 07
	< 9.4	90	[1] LIPELES	00	CLE2	$e^+e^- \to \Upsilon(4S)$
	<59	90	BARATE	98Q	ALEP	$e^+e^- \to Z$
	<12	90	ASNER	97	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NEW
NODE=S042S83;LINKAGE=EP

$\Gamma(D^\pm D^{*\mp}$ (CP-averaged))$/\Gamma_{total}$ — Γ_{72}/Γ

NODE=S042C09
NODE=S042C09

	VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**6.14±0.29±0.50**	[1] ROHRKEN	12	BELL	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NEW
NODE=S042C09;LINKAGE=EP

CP VIOLATION PARAMETERS

NODE=S042229

$A_{CP}(B^0 \to D^*(2010)^+ D^-)$

NODE=S042AC4

A_{CP} is defined as

NODE=S042AC4

$$\frac{B(\overline{B}^0 \to \overline{f}) - B(B^0 \to f)}{B(\overline{B}^0 \to \overline{f}) + B(B^0 \to f)},$$

the CP-violation charge asymmetry of exclusive B^0 and $\overline{B}^0$ decay.

NODE=S042AC4

	VALUE	DOCUMENT ID		TECN	COMMENT
	0.037±0.034 OUR AVERAGE				
	[0.02 ± 0.04 OUR 2012 AVERAGE]				
YOUR DATA	0.06 ±0.05 ±0.02	ROHRKEN	12	BELL	$e^+e^- \to \Upsilon(4S)$
	0.008±0.048±0.013	AUBERT	09C	BABR	$e^+e^- \to \Upsilon(4S)$
	0.07 ±0.08 ±0.04	[1] AUSHEV	04	BELL	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	−0.12 ±0.06 ±0.02	AUBERT	07AI	BABR	Repl. by AUBERT 09C
	−0.03 ±0.10 ±0.02	AUBERT,B	06A	BABR	Repl. by AUBERT 07AI
	−0.03 ±0.11 ±0.05	AUBERT	03J	BABR	Repl. by AUBERT,B 06B

[1] Combines results from fully and partially reconstructed $B^0 \to D^{*\pm} D^\mp$ decays.

NEW
NODE=S042AC4;LINKAGE=AU

$C_{D^*(2010)^- D^+}$ ($B^0 \rightarrow D^*(2010)^- D^+$)

NODE=S042CPJ
NODE=S042CPJ
NEW

VALUE	DOCUMENT ID		TECN	COMMENT
−0.01±0.11 OUR AVERAGE				
[0.07 ± 0.14 OUR 2012 AVERAGE]				
YOUR DATA −0.13±0.16±0.05	[1] ROHRKEN	12	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
0.00±0.17±0.03	AUBERT	09C	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
0.23±0.25±0.06	[2] AUSHEV	04	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.23±0.15±0.04	AUBERT	07AI	BABR	Repl. by AUBERT 09C
0.17±0.24±0.04	AUBERT,B	05Z	BABR	Repl. by AUBERT 07AI
−0.22±0.37±0.10	AUBERT	03J	BABR	Repl. by AUBERT,B 05Z

[1] ROHRKEN 12 reports the measurements of C = −0.01 ± 0.11 ± 0.04 and ΔC = 0.12 ± 0.11 ± 0.03 such that $C_{D^*(2010)^- D^+}$ = C − ΔC . NODE=S042CPJ;LINKAGE=RO

[2] Combines results from fully and partially reconstructed $B^0 \rightarrow D^{*\pm} D^{\mp}$ decays. NODE=S042CPJ;LINKAGE=AU

$S_{D^*(2010)^- D^+}$ ($B^0 \rightarrow D^*(2010)^- D^+$)

NODE=S042SPJ
NODE=S042SPJ
NEW

VALUE	DOCUMENT ID		TECN	COMMENT
−0.72±0.15 OUR AVERAGE				
[−0.78 ± 0.21 OUR 2012 AVERAGE]				
YOUR DATA −0.65±0.22±0.07	[1] ROHRKEN	12	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
−0.73±0.23±0.050	AUBERT	09C	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
−0.96±0.43±0.12	[2] AUSHEV	04	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.44±0.22±0.06	AUBERT	07AI	BABR	Repl. by AUBERT 09C
−0.29±0.33±0.07	AUBERT,B	05Z	BABR	Repl. by AUBERT 07AI
−0.24±0.69±0.12	AUBERT	03J	BABR	Repl. by AUBERT,B 05Z

[1] ROHRKEN 12 reports the measurements of S = −0.78 ± 0.15 ± 0.05 and ΔS = −0.13 ± 0.15 ± 0.04 such that $S_{D^*(2010)^+ D^-}$ = S − ΔS. NODE=S042SPJ;LINKAGE=RO

[2] Combines results from fully and partially reconstructed $B^0 \rightarrow D^{*\pm} D^{\mp}$ decays. NODE=S042SPJ;LINKAGE=AU

$C_{D^*(2010)^+ D^-}$ ($B^0 \rightarrow D^*(2010)^+ D^-$)

NODE=S042CPK
NODE=S042CPK
NEW

VALUE	DOCUMENT ID		TECN	COMMENT
0.00±0.13 OUR AVERAGE Error includes scale factor of 1.3. See the ideogram below.				
[−0.09 ± 0.22 OUR 2012 AVERAGE Scale factor = 1.6]				
YOUR DATA 0.11±0.14±0.06	[1] ROHRKEN	12	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
0.08±0.17±0.04	AUBERT	09C	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
−0.37±0.22±0.06	[2] AUSHEV	04	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.18±0.15±0.04	AUBERT	07AI	BABR	Repl. by AUBERT 09C
0.09±0.25±0.06	AUBERT,B	05Z	BABR	Repl. by AUBERT 07AI
−0.47±0.40±0.12	AUBERT	03J	BABR	Repl. by AUBERT,B 05Z

[1] ROHRKEN 12 reports the measurements of C = −0.01 ± 0.11 ± 0.04 and ΔC = 0.12 ± 0.11 ± 0.03 such that $C_{D^*(2010)^+ D^-}$ = C + ΔC . NODE=S042CPK;LINKAGE=RO

[2] Combines results from fully and partially reconstructed $B^0 \rightarrow D^{*\pm} D^{\mp}$ decays. NODE=S042CPK;LINKAGE=AU

$S_{D^*(2010)^+ D^-}$ ($B^0 \rightarrow D^*(2010)^+ D^-$)

NODE=S042SPK
NODE=S042SPK
NEW

VALUE	DOCUMENT ID		TECN	COMMENT
−0.73±0.14 OUR AVERAGE				
[−0.61 ± 0.19 OUR 2012 AVERAGE]				
YOUR DATA −0.90±0.21±0.07	[1] ROHRKEN	12	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
−0.62±0.21±0.03	AUBERT	09C	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
−0.55±0.39±0.12	[2] AUSHEV	04	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.79±0.21±0.06	AUBERT	07AI	BABR	Repl. by AUBERT 09C
−0.54±0.35±0.07	AUBERT,B	05Z	BABR	Repl. by AUBERT 07AI
−0.82±0.75±0.14	AUBERT	03J	BABR	Repl. by AUBERT,B 05Z

[1] ROHRKEN 12 reports the measurements of S = −0.78 ± 0.15 ± 0.05 and ΔS = −0.13 ± 0.15 ± 0.04 such that $S_{D^*(2010)^+ D^-}$ = S + ΔS. NODE=S042SPK;LINKAGE=RO

[2] Combines results from fully and partially reconstructed $B^0 \rightarrow D^{*\pm} D^{\mp}$ decays. NODE=S042SPK;LINKAGE=AU

$C_{D^+D^-}$ ($B^0 \to D^+D^-$)

NODE=S042CPD

VALUE	DOCUMENT ID		TECN	COMMENT
-0.46 ± 0.21 OUR AVERAGE Error includes scale factor of 1.8. See the ideogram below.				
[-0.5 ± 0.4 OUR 2012 AVERAGE Scale factor = 2.5]				
YOUR DATA $-0.43\pm0.16\pm0.05$	ROHRKEN	12	BELL	$e^+e^- \to \Upsilon(4S)$
$-0.07\pm0.23\pm0.03$	AUBERT	09C	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.91\pm0.23\pm0.06$	[1] FRATINA	07	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.11\pm0.22\pm0.07$	AUBERT	07AI	BABR	Repl. by AUBERT 09C
$0.11\pm0.35\pm0.06$	AUBERT,B	05Z	BABR	Repl. by AUBERT 07AI

[1] The paper reports A, which is equal to $-C$.

NOD=S042CPD
NOD=S042CPD
NEW
NODE=S042CPD;LINKAGE=BL

$S_{D^+D^-}$ ($B^0 \to D^+D^-$)

NODE=S042SPD

VALUE	DOCUMENT ID		TECN	COMMENT
$-0.99^{+0.17}_{-0.14}$ OUR AVERAGE				
[-0.87 ± 0.26 OUR 2012 AVERAGE]				
YOUR DATA $-1.06^{+0.21}_{-0.14}\pm0.08$	ROHRKEN	12	BELL	$e^+e^- \to \Upsilon(4S)$
$-0.63\pm0.36\pm0.05$	AUBERT	09C	BABR	$e^+e^- \to \Upsilon(4S)$
$-1.13\pm0.37\pm0.09$	FRATINA	07	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.54\pm0.34\pm0.06$	AUBERT	07AI	BABR	Repl. by AUBERT 09C
$-0.29\pm0.63\pm0.06$	AUBERT,B	05Z	BABR	Repl. by AUBERT 07AI

NODE=S042SPD
NEW

B^0 REFERENCES

NODE=S042

YOUR PAPER	ROHRKEN	12	PR D85 091106	M. Rohrken *et al.*	(BELLE Collab.)	REFID=54404
	AUBERT	09C	PR D79 032002	B. Aubert *et al.*	(BABAR Collab.)	REFID=52643
	AUBERT	07AI	PRL 99 071801	B. Aubert *et al.*	(BABAR Collab.)	REFID=51864
	FRATINA	07	PRL 98 221802	S. Fratina *et al.*	(BELLE Collab.)	REFID=51811
	AUBERT,B	06A	PR D73 112004	B. Aubert *et al.*	(BABAR Collab.)	REFID=51283
	AUBERT,B	06B	PR D74 011101	B. Aubert *et al.*	(BABAR Collab.)	REFID=51288
	AUBERT,B	05Z	PRL 95 131802	B. Aubert *et al.*	(BABAR Collab.)	REFID=50920
	MAJUMDER	05	PRL 95 041803	G. Majumder *et al.*	(BELLE Collab.)	REFID=50689
	AUSHEV	04	PRL 93 201802	T. Aushev *et al.*	(BELLE Collab.)	REFID=50274
	AUBERT	03J	PRL 90 221801	B. Aubert *et al.*	(BaBar Collab.)	REFID=49438
	LIPELES	00	PR D62 032005	E. Lipeles *et al.*	(CLEO Collab.)	REFID=47690
	BARATE	98Q	EPJ C4 387	R. Barate *et al.*	(ALEPH Collab.)	REFID=46146
	ASNER	97	PRL 79 799	D. Asner *et al.*	(CLEO Collab.)	REFID=45441

Reference = AIHARA 12; PR D85 112014
Verifier code = BELLE

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Youngjoon Kwon

EMAIL: yjkwon63@yonsei.ac.kr

June 4, 2013

Dear Colleague,

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(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS ($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

CP VIOLATION

NODE=S041220

A_{CP} is defined as

NODE=S041220

$$\frac{B(B^- \to \overline{f}) - B(B^+ \to f)}{B(B^- \to \overline{f}) + B(B^+ \to f)},$$

the *CP*-violation charge asymmetry of exclusive B^- and B^+ decay.

$r_B(B^+ \to D^0 K^+)$

NODE=S041ARX

r_B and δ_B are the amplitude ratio and relative strong phase between the amplitudes of $A(B^+ \to D^0 K^+)$ and $A(B^+ \to \overline{D}^0 K^+)$,

NODE=S041ARX

NODE=S041ARX

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
0.096 ± 0.014 OUR AVERAGE Error includes scale factor of 1.2. [$0.113^{+0.024}_{-0.021}$ OUR 2012 AVERAGE]					
$0.092^{+0.013}_{-0.012}$		[1] LEES	13B	BABR	$e^+e^- \to \Upsilon(4S)$
0.07 ± 0.04		[2,3] AAIJ	12AQ	LHCB	pp at 7 TeV
$0.160^{+0.040}_{-0.038}{}^{+0.051}_{-0.015}$		[4] POLUEKTOV	10	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA $0.145 \pm 0.030 \pm 0.015$		[3,5] AIHARA	12	BELL	$e^+e^- \to \Upsilon(4S)$
<0.13	90	[6] LEES	11D	BABR	$e^+e^- \to \Upsilon(4S)$
$0.096 \pm 0.029 \pm 0.006$		[7] DEL-AMO-SA..	10F	BABR	Repl. by LEES 13B
$0.095^{+0.051}_{-0.041}$		[8] DEL-AMO-SA..	10H	BABR	Repl. by LEES 13B
$0.086 \pm 0.032 \pm 0.015$		[9] AUBERT	08AL	BABR	Repl. by DEL-AMO-SANCHEZ 10F
<0.19	90	HORII	08	BELL	$e^+e^- \to \Upsilon(4S)$
$0.159^{+0.054}_{-0.050} \pm 0.050$		[10] POLUEKTOV	06	BELL	Repl. by POLUEKTOV 10
$0.12 \pm 0.08 \pm 0.05$		[11] AUBERT,B	05Y	BABR	Repl. by AUBERT 08AL

NEW

[1] Reports combination of published measurements using GGSZ, GLW, and ADS methods. NODE=S041ARX;LINKAGE=LS

[2] Reports combined statistical and systematic uncertainties. NODE=S041ARX;LINKAGE=AA

[3] Uses binned Dalitz plot of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays from $B^+ \to \overline{D}^0 K^+$. Measurement of strong phases in $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ Dalitz plot from LIBBY 10 is used as input. NODE=S041ARX;LINKAGE=AH

[4] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays from $B^+ \to D^0 K^+$ modes. The corresponding two standard deviation interval is $0.084 < r_B < 0.239$. NODE=S041ARX;LINKAGE=PU

[5] We combined the systematics in quadrature. The authors report separately the contribution to the systematic uncertainty due to the uncertainty on the bin-averaged strong phase difference between D^0 and $\overline{D}^0$ amplitudes. NODE=S041ARX;LINKAGE=AI

[6] Uses decays of neutral D to $K^-\pi^+\pi^0$. NODE=S041ARX;LINKAGE=LE

[7] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$, $K^0_S K^+ K^-$ decays from $B^+ \to D^{(*)} K^{(*)+}$ modes. The corresponding two standard deviation interval is $0.037 < r_B < 0.155$. NODE=S041ARX;LINKAGE=DE

[8] Uses the Cabibbo suppressed decay of $B^+ \to \overline{D} K^+$ followed by $\overline{D} \to K^- \pi^+$. NODE=S041ARX;LINKAGE=DL

[9] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ and $\overline{D}^0 \to K^0_S K^+ K^-$ decays coming from $B^\pm \to D^{(*)} K^{(*)\pm}$ modes. NODE=S041ARX;LINKAGE=AB

[10] Uses a Dalitz plot analysis of the $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays; Combines the $D K^+$, $D^* K^+$ and $D K^{*+}$ modes. NODE=S041ARX;LINKAGE=PO

[11] Uses a Dalitz analysis of neutral D decays to $K^0_S \pi^+ \pi^-$ in the processes $B^\pm \to D^{(*)} K^\pm$, $D^* \to D\pi^0$, $D\gamma$. NODE=S041ARX;LINKAGE=AU

$\delta_B(B^+ \to D^0 K^+)$

NODE=S041DRX
NODE=S041DRX

VALUE (°)	DOCUMENT ID		TECN	COMMENT
115 ±13 OUR AVERAGE				NEW
[(125 ± 16)° OUR 2012 AVERAGE]				
$105 \; ^{+16}_{-17}$	[1] LEES	13B	BABR	$e^+e^- \to \Upsilon(4S)$
$137 \; ^{+35}_{-46}$	[2,3] AAIJ	12AQ	LHCB	pp at 7 TeV
$136.7 ^{+13.0}_{-15.8} \pm 23.2$	[4] POLUEKTOV	10	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
YOUR DATA $129.9 \pm 15.0 \pm 6.0$	[3,5] AIHARA	12	BELL	$e^+e^- \to \Upsilon(4S)$
$119 \; ^{+19}_{-20} \pm 4$	[6] DEL-AMO-SA..	10F	BABR	Repl. by LEES 13B
$109 \; ^{+27}_{-30} \pm 8$	[7] AUBERT	08AL	BABR	Repl. by DEL-AMO-SANCHEZ 10F
$145.7 ^{+19.0}_{-19.7} \pm 23.1$	[8] POLUEKTOV	06	BELL	Repl. by POLUEKTOV 10
$104 \pm 45 \; ^{+23}_{-32}$	[9] AUBERT,B	05Y	BABR	Repl. by AUBERT 08AL

[1] Reports combination of published measurements using GGSZ, GLW, and ADS methods. NODE=S041DRX;LINKAGE=LE
[2] Reports combined statistical and systematic uncertainties. NODE=S041DRX;LINKAGE=AA
[3] Uses binned Dalitz plot of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays from $B^+ \to \overline{D}^0 K^+$. Measurement of strong phases in $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ Dalitz plot from LIBBY 10 is used as input. NODE=S041DRX;LINKAGE=AH
[4] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays from $B^+ \to \overline{D}^0 K^+$ modes. The corresponding two standard deviation interval is $102.2° < \delta_B < 162.3°$. NODE=S041DRX;LINKAGE=PU
[5] We combined the systematics in quadrature. The authors report separately the contribution to the systematic uncertainty due to the uncertainty on the bin-averaged strong phase difference between D^0 and $\overline{D}^0$ amplitudes. NODE=S041DRX;LINKAGE=AI
[6] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$, $K^0_S K^+ K^-$ decays from $B^+ \to D^{(*)} K^{(*)+}$ modes. The corresponding two standard deviation interval is $75° < \delta_B < 157°$. NODE=S041DRX;LINKAGE=DE
[7] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ and $\overline{D}^0 \to K^0_S K^+ K^-$ decays coming from $B^\pm \to D^{(*)} K^{(*)\pm}$ modes. NODE=S041DRX;LINKAGE=AB
[8] Uses a Dalitz plot analysis of the $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays; Combines the $D K^+$, $D^* K^+$ and $D K^{*+}$ modes. NODE=S041DRX;LINKAGE=PO
[9] Uses a Dalitz analysis of neutral D decays to $K^0_S \pi^+ \pi^-$ in the processes $B^\pm \to D^{(*)} K^\pm$, $D^* \to D\pi^0$, $D\gamma$. NODE=S041DRX;LINKAGE=AU

$\gamma(B^+ \to D^{(*)0} K^{(*)+})$

NODE=S041GAM

For angle $\gamma(\phi_3)$ of the CKM unitarity triangle, see the review on "*CP* Violation" in the Reviews section. NODE=S041GAM
NODE=S041GAM

VALUE (°)	CL%	DOCUMENT ID		TECN	COMMENT
72 ±11 OUR AVERAGE					NEW
[(73 ± 10)° OUR 2012 AVERAGE]					
$69 \; ^{+17}_{-16}$		[1] LEES	13B	BABR	$e^+e^- \to \Upsilon(4S)$
$44 \; ^{+43}_{-38}$		[2,3] AAIJ	12AQ	LHCB	pp at 7 TeV
$78.4 ^{+10.8}_{-11.6} \pm 9.6$		[4] POLUEKTOV	10	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA $77.3 ^{+15.1}_{-14.9} \pm 5.9$		[3,5] AIHARA	12	BELL	$e^+e^- \to \Upsilon(4S)$
$68 \pm 14 \pm 5$		[6] DEL-AMO-SA..	10F	BABR	Repl. by LEES 13B
7 to 173	95	[7] DEL-AMO-SA..	10G	BABR	$e^+e^- \to \Upsilon(4S)$
$76 \; ^{+22}_{-23} \pm 7.1$		[8] AUBERT	08AL	BABR	Repl. by DEL-AMO-SANCHEZ 10F
$53 \; ^{+15}_{-18} \pm 10$		[9] POLUEKTOV	06	BELL	Repl. by POLUEKTOV 10
$70 \pm 31 \; ^{+18}_{-15}$		[10] AUBERT,B	05Y	BABR	Repl. by AUBERT 08AL
$77 \; ^{+17}_{-19} \pm 17$		[11] POLUEKTOV	04	BELL	Repl. by POLUEKTOV 06

[1] Reports combination of published measurements using GGSZ, GLW, and ADS methods. Reports also 2σ range of 41–102° and a 5.9σ significance for $\gamma(B^+ \rightarrow D^{(*)0} K^{(*)+}) \neq 0$ hypothesis. NODE=S041GAM;LINKAGE=LE

[2] Reports combined statistical and systematic uncertainties. NODE=S041GAM;LINKAGE=AA

[3] Uses binned Dalitz plot of $\overline{D}^0 \rightarrow K^0_S \pi^+ \pi^-$ decays from $B^+ \rightarrow \overline{D}^0 K^+$. Measurement of strong phases in $\overline{D}^0 \rightarrow K^0_S \pi^+ \pi^-$ Dalitz plot from LIBBY 10 is used as input. NODE=S041GAM;LINKAGE=AH

[4] Uses Dalitz plot analysis of $\overline{D}^0 \rightarrow K^0_S \pi^+ \pi^-$ decays from $B^+ \rightarrow D^{(*)} K^+$ modes. The corresponding two standard deviation interval for γ is $54.2^\circ < \gamma < 100.5^\circ$. CP conservation in the combined result is ruled out with a significance of 3.5 standard deviations. NODE=S041GAM;LINKAGE=PU

[5] We combined the systematics in quadrature. The authors report separately the contribution to the systematic uncertainty due to the uncertainty on the bin-averaged strong phase difference between D^0 and $\overline{D}^0$ amplitudes. NODE=S041GAM;LINKAGE=AI

[6] Uses Dalitz plot analysis of $\overline{D}^0 \rightarrow K^0_S \pi^+ \pi^-$, $K^0_S K^+ K^-$ decays from $B^+ \rightarrow D^{(*)} K^+$, $D K^{*+}$ modes. The corresponding two standard deviation interval for γ is $39^\circ < \gamma < 98^\circ$. CP conservation in the combined result is ruled out with a significance of 3.5 standard deviations. NODE=S041GAM;LINKAGE=DE

[7] Reports confidence intervals for the CKM angle γ from the measured values of the GLW parameters using $B^\pm \rightarrow D K^\pm$ decays with D mesons decaying to non-$CP(K\pi)$, CP-even ($K^+ K^-$, $\pi^+ \pi^-$), and CP-odd ($K^0_S \pi^0$, $K^0_S \omega$) states. NODE=S041GAM;LINKAGE=DA

[8] Uses Dalitz plot analysis of $\overline{D}^0 \rightarrow K^0_S \pi^+ \pi^-$ and $\overline{D}^0 \rightarrow K^0_S K^+ K^-$ decays coming from $B^\pm \rightarrow D^{(*)} K^{(*)\pm}$ modes. The corresponding two standard deviation interval is $29^\circ < \gamma < 122^\circ$. NODE=S041GAM;LINKAGE=AB

[9] Uses a Dalitz plot analysis of the $\overline{D}^0 \rightarrow K^0_S \pi^+ \pi^-$ decays; Combines the $D K^+$, $D^* K^+$ and $D K^{*+}$ modes. The corresponding two standard deviations interval for gamma is $8^\circ < \gamma < 111^\circ$. NODE=S041GAM;LINKAGE=PL

[10] Uses a Dalitz plot analysis of neutral $D \rightarrow K^0_S \pi^+ \pi^-$ decays coming from $B^\pm \rightarrow D K^\pm$ and $B^\pm \rightarrow D^{*0} K^\pm$ followed by $D^{*0} \rightarrow D\pi^0$, $D\gamma$. The corresponding two standard deviations interval for gamma is $12^\circ < \gamma < 137^\circ$. AUBERT,B 05Y also reports the amplitude ratios and the strong phases. NODE=S041GAM;LINKAGE=AU

[11] Uses a Dalitz plot analysis of the 3-body $D \rightarrow K^0_S \pi^+ \pi^-$ decays coming from $B^\pm \rightarrow D K^\pm$ and $B^\pm \rightarrow D^* K^\pm$ followed by $D^* \rightarrow D\pi^0$; here we use D to denote that the neutral D meson produced in the decay is an admixture of D^0 and $\overline{D}^0$. The corresponding two standard deviations interval for γ is $26^\circ < \gamma < 126^\circ$. POLUEKTOV 04 also reports the amplitude ratios and the strong phases. NODE=S041GAM;LINKAGE=PO

$B^\pm$ REFERENCES

NODE=S041

	LEES	13B	PR D87 052015	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54948
	AAIJ	12AQ	PL B718 43	R. Aaij *et al.*	(LHCb Collab.)	REFID=54594
YOUR PAPER	AIHARA	12	PR D85 112014	H. Aihara *et al.*	(BELLE Collab.)	REFID=54412
	LEES	11D	PR D84 012002	J.P. Lees *et al.*	(BABAR Collab.)	REFID=53751
	DEL-AMO-SA...	10F	PRL 105 121801	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53413
	DEL-AMO-SA...	10G	PR D82 072004	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53455
	DEL-AMO-SA...	10H	PR D82 072006	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53456
	LIBBY	10	PR D82 112006	J. Libby *et al.*	(CLEO Collab.)	REFID=53583
	POLUEKTOV	10	PR D81 112002	A. Poluektov *et al.*	(BELLE Collab.)	REFID=53340
	AUBERT	08AL	PR D78 034023	B. Aubert *et al.*	(BABAR Collab.)	REFID=52361
	HORII	08	PR D78 071901	Y. Horii *et al.*	(BELLE Collab.)	REFID=52533
	POLUEKTOV	06	PR D73 112009	A. Poluektov *et al.*	(BELLE Collab.)	REFID=51287
	AUBERT,B	05Y	PRL 95 121802	B. Aubert *et al.*	(BABAR Collab.)	REFID=50919
	POLUEKTOV	04	PR D70 072003	A. Poluektov *et al.*	(BELLE Collab.)	REFID=50223

Reference = NEGISHI 12; PR D86 011101
Verifier code = BELLE

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PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Youngjoon Kwon

EMAIL: yjkwon63@yonsei.ac.kr

June 4, 2013

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(D^0 K^+\pi^-)/\Gamma(\overline{D}^0 K^+\pi^-)$ — $\Gamma_{135}/\Gamma_{123}$

NODE=S042B97

VALUE	DOCUMENT ID		TECN	COMMENT
0.060±0.034 OUR AVERAGE				
[0.07 ± 0.04 OUR 2012 AVERAGE]				
YOUR DATA $0.045^{+0.056}_{-0.050}{}^{+0.028}_{-0.018}$	[1,2] NEGISHI	12	BELL	$e^+e^- \to \Upsilon(4S)$
0.068 ± 0.042	[3] AUBERT	09AE	BABR	$e^+e^- \to \Upsilon(4S)$

NODE=S042B97
NEW

[1] Assumes equal production of B^0 and B^+ from $\Upsilon(4S)$ decays. NODE=S042B97;LINKAGE=EP

[2] Uses $D^0 \to K^-\pi^+$ mode. Restricts $K^+\pi^-$ mass within ±50 MeV of the nominal K^{*0} mass. Corresponds to the upper limit, < 0.16 at 95% CL. NODE=S042B97;LINKAGE=NE

[3] Reports a signal at the level of 2.5 standard deviations after combining results from $D^0 \to K^+\pi^-$, $K^+\pi^-\pi^0$, and $K^+\pi^-\pi^+\pi^-$. NODE=S042B97;LINKAGE=AU

B^0 REFERENCES

NODE=S042

YOUR PAPER	NEGISHI	12	PR D86 011101	K. Negishi *et al.*	(BELLE Collab.)	REFID=54415
	AUBERT	09AE	PR D80 031102	B. Aubert *et al.*	(BABAR Collab.)	REFID=52944

Reference = KIM 12A; PR D86 031101
Verifier code = BELLE

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EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(\phi\pi^+)/\Gamma_{total}$ — **Γ_{388}/Γ**

NODE=S041B28
NODE=S041B28

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	< 0.24	90	[1] AUBERT,B	06C	BABR	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA	< 0.33	90	[1] KIM	12A	BELL	$e^+e^- \to \Upsilon(4S)$
	< 0.41	90	[1] AUBERT	04A	BABR	Repl. by AUBERT,B 06C
	< 1.4	90	[1] AUBERT	01D	BABR	$e^+e^- \to \Upsilon(4S)$
	<153	90	[2] ABE	00C	SLD	$e^+e^- \to Z$
	< 5	90	[1] BERGFELD	98	CLE2	

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041B28;LINKAGE=EP

[2] ABE 00C assumes B($Z \to b\overline{b}$)=(21.7 ± 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})$% and $f_{B_s}=(10.5^{+1.8}_{-2.2})$%.

NODE=S041B28;LINKAGE=KQ

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER	KIM	12A	PR D86 031101	J.H. Kim *et al.*	(BELLE Collab.)	REFID=54426
	AUBERT,B	06C	PR D74 011102	B. Aubert *et al.*	(BABAR Collab.)	REFID=51289
	AUBERT	04A	PR D69 011102	B. Aubert *et al.*	(BABAR Collab.)	REFID=49719
	AUBERT	01D	PRL 87 151801	B. Aubert *et al.*	(BaBar Collab.)	REFID=48377
	ABE	00C	PR D62 071101	K. Abe *et al.*	(SLD Collab.)	REFID=47762
	BERGFELD	98	PRL 81 272	T. Bergfeld *et al.*	(CLEO Collab.)	REFID=46091

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(\phi\pi^0)/\Gamma_{total}$ — **Γ_{367}/Γ**

NODE=S042S77
NODE=S042S77

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	<0.15 (CL = 90%)	[<0.28 × 10^{-6} (CL = 90%) OUR 2012 BEST LIMIT]				
YOUR DATA	**<0.15**	90	[1] KIM	12A	BELL	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	<0.28	90	[1] AUBERT,B	06C	BABR	$e^+e^- \to \Upsilon(4S)$
	<1.0	90	[1] AUBERT,B	04D	BABR	Repl. by AUBERT,B 06C
	<5	90	[1] BERGFELD	98	CLE2	

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042S77;LINKAGE=EP

B^0 REFERENCES

NODE=S042

YOUR PAPER	KIM	12A	PR D86 031101	J.H. Kim *et al.*	(BELLE Collab.)	REFID=54426
	AUBERT,B	06C	PR D74 011102	B. Aubert *et al.*	(BABAR Collab.)	REFID=51289
	AUBERT,B	04D	PR D70 032006	B. Aubert *et al.*	(BABAR Collab.)	REFID=50051
	BERGFELD	98	PRL 81 272	T. Bergfeld *et al.*	(CLEO Collab.)	REFID=46091

Reference = HSU 12; PR D86 032002
Verifier code = BELLE

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June 4, 2013

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PHONE: 1-(510)-486–5449
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BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(\text{invisible})/\Gamma_{\text{total}}$ — Γ_{480}/Γ

NODE=S042SN1
NODE=S042SN1

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
< 2.4 (CL = 90%)	[$<22 \times 10^{-5}$ (CL = 90%) OUR 2012 BEST LIMIT]				
< 2.4	90	[1] LEES	12T	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA <13	90	[2] HSU	12	BELL	$e^+e^- \to \Upsilon(4S)$
<22	90	[1] AUBERT,B	04J	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Uses the fully reconstructed $B^0 \to D^{(*)-}\ell^+\nu_\ell$ events as a tag. NODE=S042SN1;LINKAGE=AU

[2] Identified by fully reconstructing a hadronic decay of the accompanying B meson and requiring no other particles in the event. NODE=S042SN1;LINKAGE=HS

B^0 REFERENCES

NODE=S042

YOUR PAPER	HSU	12	PR D86 032002	C.-L. Hsu *et al.*	(BELLE Collab.)	REFID=54427
	LEES	12T	PR D86 051105	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54612
	AUBERT,B	04J	PRL 93 091802	B. Aubert *et al.*	(BABAR Collab.)	REFID=50074

Reference = KRONENBITTER 12; PR D86 071103
Verifier code = BELLE

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EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

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B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(D^*(2010)^+ D^*(2010)^-)/\Gamma_{total}$ — Γ_{147}/Γ

NODE=S042S52
NODE=S042S52

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
8.0 ±0.6 OUR AVERAGE					
[(8.2 ± 0.9) × 10^{-4} OUR 2012 AVERAGE]					
YOUR DATA 7.82±0.38±0.63		[1] KRONENBITT.12		BELL	$e^+e^- \to \Upsilon(4S)$
8.1 ±0.6 ±1.0		[1] AUBERT,B	06A	BABR	$e^+e^- \to \Upsilon(4S)$
$9.9\ ^{+4.2}_{-3.3}$ ±1.2		[1] LIPELES	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
8.1 ±0.8 ±1.1		[1] MIYAKE	05	BELL	Repl. by KRONENBITTER 12
8.3 ±1.6 ±1.2		[1,2] AUBERT	02M	BABR	Repl. by AUBERT,B 06B
$6.2\ ^{+4.0}_{-2.9}$ ±1.0		[3] ARTUSO	99	CLE2	Repl. by LIPELES 00
<61	90	[4] BARATE	98Q	ALEP	$e^+e^- \to Z$
<22	90	[5] ASNER	97	CLE2	Repl. by ARTUSO 99

NEW

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042S52;LINKAGE=EP

[2] AUBERT 02M also assumes the measured CP-odd fraction of the final states is 0.22 ± 0.18 ± 0.03. NODE=S042S52;LINKAGE=SM

[3] ARTUSO 99 uses B($\Upsilon(4S) \to B^0\overline{B}^0$)=(48 ± 4)%. NODE=S042S52;LINKAGE=L9

[4] BARATE 98Q (ALEPH) observes 2 events with an expected background of 0.10 ± 0.03 which corresponds to a branching ratio of $(2.3^{+1.9}_{-1.2} \pm 0.4) \times 10^{-3}$. NODE=S042S52;LINKAGE=AB

[5] ASNER 97 at CLEO observes 1 event with an expected background of 0.022 ± 0.011. This corresponds to a branching ratio of $(5.3^{+7.1}_{-3.7} \pm 1.0) \times 10^{-4}$. NODE=S042S52;LINKAGE=A

POLARIZATION IN B^0 DECAY

NODE=S042223

In decays involving two vector mesons, one can distinguish among the states in which meson polarizations are both longitudinal (L) or both are transverse and parallel ($\|$) or perpendicular ($\perp$) to each other with the parameters Γ_L/Γ, $\Gamma_\perp/\Gamma$, and the relative phases $\phi_\|$ and $\phi_\perp$. See the definitions in the note on "Polarization in B Decays" review in the B^0 Particle Listings.

NODE=S042223

Γ_L/Γ in $B^0 \to D^{*+} D^{*-}$

NODE=S042P7
NODE=S042P7

VALUE	DOCUMENT ID		TECN	COMMENT
0.624±0.031 OUR AVERAGE	[0.57 ± 0.08 OUR 2012 AVERAGE]			
YOUR DATA **0.624±0.029±0.011**	KRONENBITT.12		BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.57 ±0.08 ±0.02	MIYAKE	05	BELL	Repl. by KRONENBITTER 12

NEW

$\Gamma_\perp/\Gamma$ in $B^0 \to D^{*+} D^{*-}$

NODE=S042DD
NODE=S042DD

VALUE	DOCUMENT ID		TECN	COMMENT
0.147±0.019 OUR AVERAGE				
[0.150 ± 0.025 OUR 2012 AVERAGE]				
YOUR DATA 0.138±0.024±0.006	KRONENBITT.	12	BELL	$e^+e^- \to \Upsilon(4S)$
0.158±0.028±0.006	AUBERT	09C	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.125±0.043±0.023	VERVINK	09	BELL	Repl. by KRONENBITTER 12
0.143±0.034±0.008	AUBERT	07BO	BABR	Repl. by AUBERT 09C
0.125±0.044±0.007	AUBERT,BE	05A	BABR	Repl. by AUBERT 07BO
0.19 ±0.08 ±0.01	MIYAKE	05	BELL	Repl. by VERVINK 09
0.063±0.055±0.009	AUBERT	03Q	BABR	Repl. by AUBERT,BE 05A

NEW

CP VIOLATION PARAMETERS

NODE=S042229

$C_{D^{*+}D^{*-}}$ ($B^0 \to D^{*+} D^{*-}$)

NODE=S042LD1
NODE=S042LD1

VALUE	DOCUMENT ID		TECN	COMMENT
0.01±0.09 OUR AVERAGE Error includes scale factor of 1.6. See the ideogram below.				
[−0.01 ± 0.09 OUR 2012 AVERAGE Scale factor = 1.2]				
YOUR DATA −0.15±0.08±0.04	[1,2] KRONENBITT.	12	BELL	$e^+e^- \to \Upsilon(4S)$
+0.15±0.09±0.04	[3] LEES	12AF	BABR	$e^+e^- \to \Upsilon(4S)$
0.05±0.09±0.02	AUBERT	09C	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.15±0.13±0.04	[2] VERVINK	09	BELL	Repl. by KRONENBITTER 12
−0.02±0.11±0.02	[1] AUBERT	07BO	BABR	Repl. by AUBERT 09C
0.26±0.26±0.06	[2] MIYAKE	05	BELL	Repl. by VERVINK 09
0.28±0.23±0.02	[4] AUBERT	03Q	BABR	Repl. by AUBERT 07BO

NEW

[1] Assumes both *CP*-even and *CP*-odd states having the *CP* asymmetry. NODE=S042LD1;LINKAGE=AU

[2] Belle Collab. quotes $A_{D^{*+}D^{*-}}$ which is equal to $-C_{D^{*+}D^{*-}}$. NODE=S042LD1;LINKAGE=MI

[3] Measured partially reconstructed candidates when one D^0 meson is not excplicitely reconstructed. Analysis does not separate *CP*-even and *CP*-odd component. NODE=S042LD1;LINKAGE=LE

[4] AUBERT 03Q reports $|\lambda|$=0.75 ± 0.19 ± 0.02 and Im(λ)=0.05 ± 0.29 ± 0.10. We convert them to *S* and *C* parameters taking into account correlations. NODE=S042LD1;LINKAGE=AR

$S_{D^{*+}D^{*-}}$ ($B^0 \to D^{*+} D^{*-}$)

NODE=S042LD2
NODE=S042LD2

VALUE	DOCUMENT ID		TECN	COMMENT
−0.59±0.14 OUR AVERAGE Error includes scale factor of 1.8. See the ideogram below.				
[−0.76 ± 0.14 OUR 2012 AVERAGE]				
YOUR DATA −0.79±0.13±0.03	[1] KRONENBITT.	12	BELL	$e^+e^- \to \Upsilon(4S)$
−0.34±0.12±0.05	[2] LEES	12AF	BABR	$e^+e^- \to \Upsilon(4S)$
−0.70±0.16±0.03	[1] AUBERT	09C	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.96\pm0.25^{+0.13}_{-0.16}$	VERVINK	09	BELL	Repl. by KRONENBITTER 12
−0.66±0.19±0.04	[1] AUBERT	07BO	BABR	Repl. by AUBERT 09C
−0.75±0.56±0.12	MIYAKE	05	BELL	Repl. by VERVINK 09
0.06±0.37±0.13	[3] AUBERT	03Q	BABR	Repl. by AUBERT 07BO

NEW

[1] Assumes both *CP*-even and *CP*-odd states having the *CP* asymmetry. NODE=S042LD2;LINKAGE=AU

[2] Measured partially reconstructed candidates when one D^0 meson is not excplicitely reconstructed. Analysis does not separate *CP*-even and *CP*-odd component. NODE=S042LD2;LINKAGE=LE

[3] AUBERT 03Q reports $|\lambda|$=0.75 ± 0.19 ± 0.02 and Im(λ)=0.05 ± 0.29 ± 0.10. We convert them to *S* and *C* parameters taking into account correlations. NODE=S042LD2;LINKAGE=AR

C_+ ($B^0 \to D^{*+} D^{*-}$)

NODE=S042CD+

See the note in the $C_{\pi\pi}$ datablock, but for *CP* even final state.

NODE=S042CD+
NODE=S042CD+

VALUE	DOCUMENT ID		TECN	COMMENT
0.00±0.10 OUR AVERAGE Error includes scale factor of 1.6. See the ideogram below.				
[0.00 ± 0.12 OUR 2012 AVERAGE]				
YOUR DATA −0.18±0.10±0.05	[1] KRONENBITT.	12	BELL	$e^+e^- \to \Upsilon(4S)$
+0.15±0.09±0.04	[2] LEES	12AF	BABR	$e^+e^- \to \Upsilon(4S)$
0.00±0.12±0.02	AUBERT	09C	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.05±0.14±0.02	AUBERT	07BO	BABR	Repl. by AUBERT 09C
0.06±0.17±0.03	[3] AUBERT,BE	05A	BABR	Repl. by AUBERT 07BO

NEW

[1] Belle Collab. quotes $A_{D^{*+}D^{*-}}$ which is equal to $-C_{D^{*+}D^{*-}}$. NODE=S042CD+;LINKAGE=KR

[2] Measured partially reconstructed candidates when one D^0 meson is not excplicitely reconstructed. Extracted under assumption of equal C_+ and C_-. NODE=S042CD+;LINKAGE=LE

[3] AUBERT,BE 05A reports a *CP*-odd fraction $R_\perp = 0.125 \pm 0.044 \pm 0.007$. NODE=S042CD+;LINKAGE=AU

S_+ ($B^0 \to D^{*+} D^{*-}$)

NODE=S042SD+

See the note in the $S_{\pi\pi}$ datablock, but for *CP* even final state. NODE=S042SD+

VALUE	DOCUMENT ID		TECN	COMMENT	NODE=S042SD+
−0.73±0.09 OUR AVERAGE					NEW
[−0.76 ± 0.16 OUR 2012 AVERAGE]					
YOUR DATA −0.81±0.13±0.03	KRONENBITT	12	BELL	$e^+e^- \to \Upsilon(4S)$	
−0.49±0.18±0.08	[1] LEES	12AF	BABR	$e^+e^- \to \Upsilon(4S)$	
−0.76±0.16±0.04	AUBERT	09C	BABR	$e^+e^- \to \Upsilon(4S)$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
−0.72±0.19±0.05	AUBERT	07BO	BABR	Repl. by AUBERT 09C	
−0.75±0.25±0.03	[2] AUBERT,BE	05A	BABR	Repl. by AUBERT 07BO	

[1] Measured partially reconstructed candidates when one D^0 meson is not excplicitely reconstructed. Analysis does not separate *CP*-even and *CP*-odd component. Value is obtained from $S = -0.34 \pm 0.12 \pm 0.05$ using $S = S_+ (1 - 2 R_\perp)$ with $R_\perp = 0.158 \pm 0.029$. NODE=S042SD+;LINKAGE=LE

[2] AUBERT,BE 05A reports a *CP*-odd fraction $R_\perp = 0.125 \pm 0.044 \pm 0.007$. NODE=S042SD+;LINKAGE=AU

C_- ($B^0 \to D^{*+} D^{*-}$)

NODE=S042CD-

See the note in the $C_{\pi\pi}$ datablock, but for *CP* odd final state. NODE=S042CD-

VALUE	DOCUMENT ID		TECN	COMMENT	NODE=S042CD-
0.19±0.31 OUR AVERAGE					NEW
[0.4 ± 0.5 OUR 2012 AVERAGE]					
YOUR DATA 0.05±0.39±0.08	[1] KRONENBITT	12	BELL	$e^+e^- \to \Upsilon(4S)$	
0.41±0.49±0.08	AUBERT	09C	BABR	$e^+e^- \to \Upsilon(4S)$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.23±0.67±0.10	AUBERT	07BO	BABR	Repl. by AUBERT 09C	
−0.20±0.96±0.11	[2] AUBERT,BE	05A	BABR	Repl. by AUBERT 07BO	

[1] Belle Collab. quotes $A_{D^{*+}D^{*-}}$ which is equal to $-C_{D^{*+}D^{*-}}$. NODE=S042CD-;LINKAGE=KR

[2] AUBERT,BE 05A reports a *CP*-odd fraction $R_\perp = 0.125 \pm 0.044 \pm 0.007$. NODE=S042CD-;LINKAGE=AU

S_- ($B^0 \to D^{*+} D^{*-}$)

NODE=S042SD-

See the note in the $S_{\pi\pi}$ datablock, but for *CP* odd final state. NODE=S042SD-

VALUE	DOCUMENT ID		TECN	COMMENT	NODE=S042SD-
0.1 ±1.6 OUR AVERAGE Error includes scale factor of 3.5. [−1.8 ± 0.7 OUR 2012 AVERAGE]					NEW
YOUR DATA 1.52±0.62±0.12	KRONENBITT	12	BELL	$e^+e^- \to \Upsilon(4S)$	
−1.80±0.70±0.16	AUBERT	09C	BABR	$e^+e^- \to \Upsilon(4S)$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
−1.83±1.04±0.23	AUBERT	07BO	BABR	Repl. by AUBERT 09C	
−1.75±1.78±0.22	[1] AUBERT,BE	05A	BABR	Repl. by AUBERT 07BO	

[1] AUBERT,BE 05A reports a *CP*-odd fraction $R_\perp = 0.125 \pm 0.044 \pm 0.007$. NODE=S042SD-;LINKAGE=AU

B^0 REFERENCES

NODE=S042

YOUR PAPER	KRONENBITT	12	PR D86 071103	B. Kronenbitter *et al.*	(BELLE Collab.)	REFID=54630
	LEES	12AF	PR D86 112006	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54801
	AUBERT	09C	PR D79 032002	B. Aubert *et al.*	(BABAR Collab.)	REFID=52643
	VERVINK	09	PR D80 111104	K. Vervink *et al.*	(BELLE Collab.)	REFID=53178
	AUBERT	07BO	PR D76 111102	B. Aubert *et al.*	(BABAR Collab.)	REFID=52097
	AUBERT,B	06A	PR D73 112004	B. Aubert *et al.*	(BABAR Collab.)	REFID=51283
	AUBERT,B	06B	PR D74 011101	B. Aubert *et al.*	(BABAR Collab.)	REFID=51288
	AUBERT,BE	05A	PRL 95 151804	B. Aubert *et al.*	(BABAR Collab.)	REFID=50922
	MIYAKE	05	PL B618 34	H. Miyake *et al.*	(BELLE Collab.)	REFID=50654
	AUBERT	03Q	PRL 91 131801	B. Aubert *et al.*	(BaBar Collab.)	REFID=49542
	AUBERT	02M	PRL 89 061801	B. Aubert *et al.*	(BaBar Collab.)	REFID=48755
	LIPELES	00	PR D62 032005	E. Lipeles *et al.*	(CLEO Collab.)	REFID=47690
	ARTUSO	99	PRL 82 3020	M. Artuso *et al.*	(CLEO Collab.)	REFID=46984
	BARATE	98Q	EPJ C4 387	R. Barate *et al.*	(ALEPH Collab.)	REFID=46146
	ASNER	97	PRL 79 799	D. Asner *et al.*	(CLEO Collab.)	REFID=45441

Reference = STYPULA 12; PR D86 072007
Verifier code = BELLE

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Youngjoon Kwon

EMAIL: yjkwon63@yonsei.ac.kr

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(D_s^{(*)-} K^+ \ell^+ \nu_\ell)/\Gamma_{total}$ — **Γ_{16}/Γ**

NODE=S041C78
NODE=S041C78

	VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
	6.1 ±0.9 OUR AVERAGE				
YOUR DATA	$6.13^{+1.04}_{-1.03} \pm 0.67$	[1] STYPULA	12	BELL	$e^+e^- \to \Upsilon(4S)$
	$6.13^{+1.04}_{-1.03} \pm 0.67$	[1] DEL-AMO-SA...	11L	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041C78;LINKAGE=EP

$\Gamma(D_s^- K^+ \ell^+ \nu_\ell)/\Gamma_{total}$ — **Γ_{17}/Γ**

NODE=S041T92
NODE=S041T92

	VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$\mathbf{3.0 \pm 0.9^{+1.1}_{-0.8}}$	[1] STYPULA	12	BELL	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041T92;LINKAGE=EP

$\Gamma(D_s^{*-} K^+ \ell^+ \nu_\ell)/\Gamma_{total}$ — **Γ_{18}/Γ**

NODE=S041T70
NODE=S041T70

	VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
	2.9±1.9 OUR AVERAGE [$(6.1 \pm 1.2) \times 10^{-4}$ OUR 2012 AVERAGE]				
YOUR DATA	$\mathbf{2.9 \pm 1.6^{+1.1}_{-1.0}}$	[1,2] STYPULA	12	BELL	$e^+e^- \to \Upsilon(4S)$

NEW

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041T70;LINKAGE=EP

[2] STYPULA 12 provides also an upper limit of 0.56×10^{-3} at 90% CL for the same data. Also measures branching fraction of the combined modes of $D_s^- K^+ \ell^+ \nu_\ell$ and $D_s^{*-} K^+ \ell^+ \nu_\ell$ as $B(B^+ \to D_s^{(*)-} K^+ \ell^+ \nu_\ell) = (5.9 \pm 1.2 \pm 1.5) \times 10^{-4}$.

NODE=S041T70;LINKAGE=ST

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER STYPULA 12 PR D86 072007 J. Stypula *et al.* (BELLE Colalb.) REFID=54633
DEL-AMO-SA... 11L PRL 107 041804 P. del Amo Sanchez *et al.* (BABAR Collab.) REFID=16499

Reference = DALSENO 12; PR D86 092012
Verifier code = BELLE

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Youngjoon Kwon

EMAIL: yjkwon63@yonsei.ac.kr

June 4, 2013

Dear Colleague,

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(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
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USA

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BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(a_1(1260)^\mp\pi^\pm)/\Gamma_{total}$ — Γ_{386}/Γ

NODE=S042R27

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
26 ±5 OUR AVERAGE Error includes scale factor of 1.9. [(33 ± 5) × 10^{-6} OUR 2012 AVERAGE]					
YOUR DATA 22.2±2.0±2.8		[1,2] DALSENO	12	BELL	$e^+e^- \to \Upsilon(4S)$
33.2±3.8±3.0		[2,3] AUBERT	06V	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 630	90	[2] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$
< 490	90	[4] BORTOLETTO	89	CLEO	$e^+e^- \to \Upsilon(4S)$
<1000	90	[4] BEBEK	87	CLEO	$e^+e^- \to \Upsilon(4S)$

NEW

NODE=S042R27

[1] DALSENO 12 reports B($B^0 \to a_1^\pm\pi^\mp$) B($a_1^\pm \to \pi^\pm\pi^+\pi^-$) = (11.1 ± 1.0 ± 1.4) × 10^{-6} which we rescaled assuming $a_1(1260)$ decays only to 3π and B($a_1^\pm \to \pi^\pm\pi^+\pi^-$) = 0.5.

NODE=S042R27;LINKAGE=DA

[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042R27;LINKAGE=EP

[3] Assumes $a_1(1260)$ decays only to 3π and B($a_1^\pm \to \pi^\pm\pi^\mp\pi^\pm$) = 0.5.

NODE=S042R27;LINKAGE=UA

[4] Paper assumes the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

NODE=S042R27;LINKAGE=A1

$\Gamma(a_2(1320)^\mp\pi^\pm)/\Gamma_{total}$ — Γ_{387}/Γ

NODE=S042R28

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<6.3 × 10^{-6} (CL = 90%) [<3.0 × 10^{-4} (CL = 90%) OUR 2012 BEST LIMIT]					
YOUR DATA **<6.3 × 10^{-6}**	90	[1] DALSENO	12	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<3.0 × 10^{-4}	90	[2] BORTOLETTO	89	CLEO	$e^+e^- \to \Upsilon(4S)$
<1.4 × 10^{-3}	90	[2] BEBEK	87	CLEO	$e^+e^- \to \Upsilon(4S)$

NODE=S042R28

[1] DALSENO 12 reports B($B^0 \to a_2^\pm\pi^\mp$) B($a_2^\pm \to \pi^\pm\pi^+\pi^-$) < 2.2 × 10^{-6} which we rescaled using B($a_2^\pm \to \pi^\pm\pi^+\pi^-$) = 1/2 B($a_2^\pm \to 3\pi$) = 0.35 ± 0.013.

NODE=S042R28;LINKAGE=DA

[2] Paper assumes the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

NODE=S042R28;LINKAGE=A1

CP VIOLATION PARAMETERS

NODE=S042229

$A_{CP}(B^0 \to a_1(1260)^\pm\pi^\mp)$

NODE=S042AAP

VALUE	DOCUMENT ID		TECN	COMMENT
−0.07±0.06 OUR AVERAGE [−0.07 ± 0.07 OUR 2012 AVERAGE]				
YOUR DATA −0.06±0.05±0.07	DALSENO	12	BELL	$e^+e^- \to \Upsilon(4S)$
−0.07±0.07±0.02	AUBERT	07O	BABR	$e^+e^- \to \Upsilon(4S)$

NODE=S042AAP

NEW

$C_{a_1\pi}$ ($B^0 \to a_1(1260)^+\pi^-$)

NODE=S042CAP

VALUE	DOCUMENT ID		TECN	COMMENT
-0.05 ± 0.11 OUR AVERAGE [-0.10 ± 0.17 OUR 2012 AVERAGE]				
YOUR DATA $-0.01\pm0.11\pm0.09$	DALSENO	12	BELL	$e^+e^- \to \Upsilon(4S)$
$-0.10\pm0.15\pm0.09$	AUBERT	07O	BABR	$e^+e^- \to \Upsilon(4S)$

NODE=S042CAP
NEW

$S_{a_1\pi}$ ($B^0 \to a_1(1260)^+\pi^-$)

NODE=S042SAP

VALUE	DOCUMENT ID		TECN	COMMENT
-0.2 ± 0.4 OUR AVERAGE Error includes scale factor of 3.2. [0.37 ± 0.22 OUR 2012 AVERAGE]				
YOUR DATA $-0.51\pm0.14\pm0.08$	DALSENO	12	BELL	$e^+e^- \to \Upsilon(4S)$
$0.37\pm0.21\pm0.07$	AUBERT	07O	BABR	$e^+e^- \to \Upsilon(4S)$

NODE=S042SAP
NEW

$\Delta C_{a_1\pi}$ ($B^0 \to a_1(1260)^+\pi^-$)

NODE=S042CDA

$\Delta C_{a_1\pi}$ describes the asymmetry between the rates $\Gamma(B^0 \to a_1^+\pi^-) + \Gamma(\overline{B}^0 \to a_1^-\pi^+)$ and $\Gamma(B^0 \to a_1^-\pi^+) + \Gamma(\overline{B}^0 \to a_1^+\pi^-)$.

NODE=S042CDA

VALUE	DOCUMENT ID		TECN	COMMENT
0.43 ± 0.14 OUR AVERAGE Error includes scale factor of 1.3. [0.26 ± 0.17 OUR 2012 AVERAGE]				
YOUR DATA $0.54\pm0.11\pm0.07$	DALSENO	12	BELL	$e^+e^- \to \Upsilon(4S)$
$0.26\pm0.15\pm0.07$	AUBERT	07O	BABR	$e^+e^- \to \Upsilon(4S)$

NODE=S042CDA
NEW

$\Delta S_{a_1\pi}$ ($B^0 \to a_1(1260)^+\pi^-$)

NODE=S042SDA

$\Delta S_{a_1\pi}$ is related to the strong phase difference between the amplitudes contributing to $B^0 \to a_1\pi$ decays.

NODE=S042SDA

VALUE	DOCUMENT ID		TECN	COMMENT
-0.11 ± 0.12 OUR AVERAGE [-0.14 ± 0.22 OUR 2012 AVERAGE]				
YOUR DATA $-0.09\pm0.14\pm0.06$	DALSENO	12	BELL	$e^+e^- \to \Upsilon(4S)$
$-0.14\pm0.21\pm0.06$	AUBERT	07O	BABR	$e^+e^- \to \Upsilon(4S)$

NODE=S042SDA
NEW

B^0 REFERENCES

NODE=S042

YOUR PAPER	DALSENO 12	PR D86 092012	J. Dalseno *et al.*	(BELLE Collab.)	REFID=54709
	AUBERT 07O	PRL 98 181803	B. Aubert *et al.*	(BABAR Collab.)	REFID=51679
	AUBERT 06V	PRL 97 051802	B. Aubert *et al.*	(BABAR Collab.)	REFID=51249
	ALBRECHT 90B	PL B241 278	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=41216
	BORTOLETTO 89	PRL 62 2436	D. Bortoletto *et al.*	(CLEO Collab.)	REFID=40787
	BEBEK 87	PR D36 1289	C. Bebek *et al.*	(CLEO Collab.)	REFID=40270

Reference = DUH 13; PR D87 031103
Verifier code = BELLE

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Youngjoon Kwon

EMAIL: yjkwon63@yonsei.ac.kr

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
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Berkeley, CA 94720-8153
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PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
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BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(K^0\pi^+)/\Gamma_{total}$ — Γ_{249}/Γ

NODE=S041R5
NODE=S041R5

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
23.8 ± 0.7 OUR AVERAGE					
[(23.1 ± 1.0) × 10^{-6} OUR 2012 AVERAGE]					
YOUR DATA 23.97 ± 0.53 ± 0.71		[1] DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
23.9 ± 1.1 ± 1.0		[1] AUBERT,BE	06C	BABR	$e^+e^- \to \Upsilon(4S)$
$18.8\ ^{+3.7}_{-3.3}\ ^{+2.1}_{-1.8}$		[1] BORNHEIM	03	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$22.8\ ^{+0.8}_{-0.7}$ ± 1.3		[1] LIN	07	BELL	Repl. by DUH 13
26.0 ± 1.3 ± 1.0		[1] AUBERT,BE	05E	BABR	Repl. by AUBERT,BE 06C
22.3 ± 1.7 ± 1.1		[1] AUBERT	04M	BABR	Repl. by AUBERT,BE 05E
22.0 ± 1.9 ± 1.1		[1] CHAO	04	BELL	Repl. by LIN 07
$19.4\ ^{+3.1}_{-3.0}$ ± 1.6		[1] CASEY	02	BELL	Repl. by CHAO 04
$13.7\ ^{+5.7}_{-4.8}\ ^{+1.9}_{-1.8}$		[1] ABE	01H	BELL	Repl. by CASEY 02
$18.2\ ^{+3.3}_{-3.0}$ ± 2.0		[1] AUBERT	01E	BABR	Repl. by AUBERT 04M
$18.2\ ^{+4.6}_{-4.0}$ ± 1.6		[1] CRONIN-HEN...	00	CLE2	Repl. by BORNHEIM 03
$23\ ^{+11}_{-10}$ ± 3.6		GODANG	98	CLE2	Repl. by CRONIN-HENNESSY 00
< 48	90	ASNER	96	CLE2	Repl. by GODANG 98
<190	90	ALBRECHT	91B	ARG	$e^+e^- \to \Upsilon(4S)$
<100	90	[2] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$
<680	90	AVERY	87	CLEO	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

[2] AVERY 89B reports $< 9 \times 10^{-5}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

NODE=S041R5;LINKAGE=EP
NODE=S041R5;LINKAGE=A1

$\Gamma(K^+\pi^0)/\Gamma_{total}$ — Γ_{250}/Γ

NODE=S041R97
NODE=S041R97

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
12.9 ±0.5 OUR AVERAGE					
[(12.9 ± 0.6) × 10^{-6} OUR 2012 AVERAGE]					
YOUR DATA 12.62 ± 0.31 ± 0.56		[1] DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
13.6 ± 0.6 ± 0.7		[1] AUBERT	07BC	BABR	$e^+e^- \to \Upsilon(4S)$
$12.9\ ^{+2.4}_{-2.2}\ ^{+1.2}_{-1.1}$		[1] BORNHEIM	03	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
12.4 ± 0.5 ± 0.6		[1] LIN	07A	BELL	Repl. by DUH 13
12.0 ± 0.7 ± 0.6		[1] AUBERT	05L	BABR	Repl. by AUBERT 07BC
$12.0 \pm 1.3\ ^{+1.3}_{-0.9}$		[1] CHAO	04	BELL	Repl. by LIN 07A
$12.8\ ^{+1.2}_{-1.1}$ ± 1.0		[1] AUBERT	03L	BABR	Repl. by AUBERT 05L
$13.0\ ^{+2.5}_{-2.4}$ ± 1.3		[1] CASEY	02	BELL	Repl. by CHAO 04

NEW

$16.3\ ^{+3.5}_{-3.3}\ ^{+1.6}_{-1.8}$		[1] ABE	01H	BELL	Repl. by CASEY 02	
$10.8\ ^{+2.1}_{-1.9}\ \pm1.0$		[1] AUBERT	01E	BABR	Repl. by AUBERT 03L	
$11.6\ ^{+3.0}_{-2.7}\ ^{+1.4}_{-1.3}$		[1] CRONIN-HEN..	00	CLE2	Repl. by BORNHEIM 03	
<16	90	GODANG	98	CLE2	Repl. by CRONIN-HENNESSY 00	
<14	90	ASNER	96	CLE2	Repl. by GODANG 98	

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S041R97;LINKAGE=EP

$\Gamma(K^+\overline{K}^0)/\Gamma_{total}$ — Γ_{309}/Γ

NODE=S041B16
NODE=S041B16

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
1.19±0.18 OUR AVERAGE					NEW
[(1.36 ± 0.27) × 10^{-6} OUR 2012 AVERAGE]					
YOUR DATA $1.11\pm0.19\pm0.05$		[1] DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
$1.61\pm0.44\pm0.09$		[1] AUBERT,BE	06C	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.22^{+0.32}_{-0.28}{}^{+0.13}_{-0.16}$		[1] LIN	07	BELL	Repl. by DUH 13
$1.0\ \pm0.4\ \pm0.1$		[1] ABE	05G	BELL	Repl. by LIN 07
$1.5\ \pm0.5\ \pm0.1$		[1] AUBERT,BE	05E	BABR	Repl. by AUBERT,BE 06C
<2.5	90	[1] AUBERT	04M	BABR	Repl. by AUBERT,BE 05E
<3.3	90	[1] CHAO	04	BELL	$e^+e^- \to \Upsilon(4S)$
<3.3	90	[1] BORNHEIM	03	CLE2	$e^+e^- \to \Upsilon(4S)$
<2.0	90	[1] CASEY	02	BELL	Repl. by CHAO 04
<5.0	90	[1] ABE	01H	BELL	$e^+e^- \to \Upsilon(4S)$
<2.4	90	[1] AUBERT	01E	BABR	$e^+e^- \to \Upsilon(4S)$
<5.1	90	[1] CRONIN-HEN..	00	CLE2	$e^+e^- \to \Upsilon(4S)$
<21	90	GODANG	98	CLE2	Repl. by CRONIN-HENNESSY 00

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S041B16;LINKAGE=EP

$\Gamma(\pi^+\pi^0)/\Gamma_{total}$ — Γ_{366}/Γ

NODE=S041R16
NODE=S041R16

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
5.5 ±0.4 OUR AVERAGE Error includes scale factor of 1.2. [(5.7 ± 0.5) × 10^{-6} OUR 2012 AVERAGE Scale factor = 1.4]					NEW
YOUR DATA $5.86\pm0.26\pm0.38$		[1] DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
$5.02\pm0.46\pm0.29$		[1] AUBERT	07BC	BABR	$e^+e^- \to \Upsilon(4S)$
$4.6\ ^{+1.8}_{-1.6}\ ^{+0.6}_{-0.7}$		[1] BORNHEIM	03	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$6.5\ \pm0.4\ \pm0.4$		[1] LIN	07A	BELL	Repl. by DUH 13
$5.8\ \pm0.6\ \pm0.4$		[1] AUBERT	05L	BABR	Repl. by AUBERT 07BC
$5.0\ \pm1.2\ \pm0.5$		[1] CHAO	04	BELL	Repl. by LIN 07A
$5.5\ ^{+1.0}_{-1.9}\ \pm0.6$		[1] AUBERT	03L	BABR	Repl. by AUBERT 05L
$7.4\ ^{+2.3}_{-2.2}\ \pm0.9$		[1] CASEY	02	BELL	Repl. by CHAO 04
<13.4	90	[1] ABE	01H	BELL	$e^+e^- \to \Upsilon(4S)$
<9.6	90	[1] AUBERT	01E	BABR	$e^+e^- \to \Upsilon(4S)$
<12.7	90	[1] CRONIN-HEN..	00	CLE2	$e^+e^- \to \Upsilon(4S)$
<20	90	GODANG	98	CLE2	Repl. by CRONIN-HENNESSY 00
<17	90	ASNER	96	CLE2	Repl. by GODANG 98
<240	90	[1] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$
<2300	90	[2] BEBEK	87	CLEO	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S041R16;LINKAGE=EP
[2] BEBEK 87 assume the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. NODE=S041R16;LINKAGE=A

CP VIOLATION

NODE=S041220

A_{CP} is defined as NODE=S041220

$$\frac{B(B^- \to \overline{f}) - B(B^+ \to f)}{B(B^- \to \overline{f}) + B(B^+ \to f)},$$

the *CP*-violation charge asymmetry of exclusive B^- and B^+ decay.

$A_{CP}(B^+ \to K^0_S \pi^+)$

NODE=S041AX4

VALUE	DOCUMENT ID		TECN	COMMENT
-0.014 ± 0.019 OUR AVERAGE				
[0.009 ± 0.029 OUR 2012 AVERAGE Scale factor = 1.2]				
YOUR DATA $-0.011 \pm 0.021 \pm 0.006$	DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
$-0.029 \pm 0.039 \pm 0.010$	[1] AUBERT,BE	06C	BABR	$e^+e^- \to \Upsilon(4S)$
0.18 ± 0.24	[2] CHEN	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.03 \pm 0.03 \pm 0.01$	LIN	07	BELL	Repl. by DUH 13
$-0.09 \pm 0.05 \pm 0.01$	[3] AUBERT,BE	05E	BABR	Repl. by AUBERT,BE 06C
$0.05 \pm 0.05 \pm 0.01$	[4] CHAO	05A	BELL	Repl. by LIN 07
$-0.05 \pm 0.08 \pm 0.01$	[5] AUBERT	04M	BABR	Repl. by AUBERT,BE 05E
$0.07 \; {}^{+0.09}_{-0.08} \; {}^{+0.01}_{-0.03}$	[6] UNNO	03	BELL	Repl. by CHAO 05A
$0.46 \pm 0.15 \pm 0.02$	[7] CASEY	02	BELL	Repl. by UNNO 03
$0.098 {}^{+0.430}_{-0.343} {}^{+0.020}_{-0.063}$	[8] ABE	01K	BELL	Repl. by CASEY 02
$-0.21 \pm 0.18 \pm 0.03$	[9] AUBERT	01E	BABR	Repl. by AUBERT 04M

[1] Corresponds to 90% confidence range $-0.092 < A_{CP} < 0.036$. NODE=S041AX4;LINKAGE=AE
[2] Corresponds to 90% confidence range $-0.22 < A_{CP} < 0.56$. NODE=S041AX4;LINKAGE=A
[3] Corresponds to 90% confidence range $-0.16 < A_{CP} < -0.02$. NODE=S041AX4;LINKAGE=AB
[4] Corresponds to 90% confidence range $-0.04 < A_{CP} < 0.13$. NODE=S041AX4;LINKAGE=CO
[5] Corresponds to 90% confidence range $-0.18 < A_{CP} < 0.08$. NODE=S041AX4;LINKAGE=AU
[6] Corresponds to 90% confidence range $-0.10 < A_{CP} < +0.22$. NODE=S041AX4;LINKAGE=UN
[7] Corresponds to 90% confidence range $+0.19 < A_{CP} < +0.72$. NODE=S041AX4;LINKAGE=CA
[8] Corresponds to 90% confidence range $-0.53 < A_{CP} < 0.82$. NODE=S041AX4;LINKAGE=AX
[9] Corresponds to 90% confidence range $-0.51 < A_{CP} < 0.09$. NODE=S041AX4;LINKAGE=L3

$A_{CP}(B^+ \to K^+ \pi^0)$

NODE=S041AX3

VALUE	DOCUMENT ID		TECN	COMMENT
0.037 ± 0.021 OUR AVERAGE				
[0.051 ± 0.025 OUR 2012 AVERAGE]				
YOUR DATA $0.043 \pm 0.024 \pm 0.002$	DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
$0.030 \pm 0.039 \pm 0.010$	AUBERT	07BC	BABR	$e^+e^- \to \Upsilon(4S)$
-0.29 ± 0.23	[1] CHEN	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.07 \pm 0.03 \pm 0.01$	LIN	08	BELL	Repl. by DUH 13
$0.06 \pm 0.06 \pm 0.01$	[2] AUBERT	05L	BABR	Repl. by AUBERT 07BC
$0.06 \pm 0.06 \pm 0.02$	[2] CHAO	05A	BELL	Repl. by CHAO 04B
$0.04 \pm 0.05 \pm 0.02$	[3] CHAO	04B	BELL	Repl. by LIN 08
$-0.09 \pm 0.09 \pm 0.01$	[4] AUBERT	03L	BABR	Repl. by AUBERT 05L
$-0.02 \pm 0.19 \pm 0.02$	[5] CASEY	02	BELL	Repl. by CHAO 04B
$-0.059 {}^{+0.222}_{-0.196} {}^{+0.055}_{-0.017}$	[6] ABE	01K	BELL	Repl. by CASEY 02
$0.00 \pm 0.18 \pm 0.04$	[7] AUBERT	01E	BABR	Repl. by AUBERT 03L

[1] Corresponds to 90% confidence range $-0.67 < A_{CP} < 0.09$. NODE=S041AX3;LINKAGE=A
[2] Corresponds to a 90% CL interval of $-0.06 < A_{CP} < 0.18$. NODE=S041AX3;LINKAGE=CO
[3] Corresponds to 90% CL interval of $-0.05 < A_{CP} < 0.13$. NODE=S041AX3;LINKAGE=CH
[4] Corresponds to 90% confidence range $-0.24 < A_{CP} < 0.06$. NODE=S041AX3;LINKAGE=3L
[5] Corresponds to 90% confidence range $-0.35 < A_{CP} < +0.30$. NODE=S041AX3;LINKAGE=CA
[6] Corresponds to 90% confidence range $-0.40 < A_{CP} < 0.36$. NODE=S041AX3;LINKAGE=AX
[7] Corresponds to 90% confidence range $-0.30 < A_{CP} < +0.30$. NODE=S041AX3;LINKAGE=L3

$A_{CP}(B^+ \to K^0 K^+)$

NODE=S041CQ8

VALUE	DOCUMENT ID		TECN	COMMENT
0.04 ± 0.14 OUR AVERAGE				
[0.12 ± 0.18 OUR 2012 AVERAGE]				
YOUR DATA $0.014 \pm 0.168 \pm 0.002$	DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
$0.10 \pm 0.26 \pm 0.03$	[1] AUBERT,BE	06C	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.13 \; {}^{+0.23}_{-0.24} \pm 0.02$	LIN	07	BELL	Repl. by DUH 13
$0.15 \pm 0.33 \pm 0.03$	[2] AUBERT,BE	05E	BABR	Repl. by AUBERT,BE 06C

[1] Corresponds to 90% confidence range $-0.31 < A_{CP} < 0.54$. NODE=S041CQ8;LINKAGE=AE
[2] Corresponds to 90% confidence range $-0.43 < A_{CP} < 0.68$. NODE=S041CQ8;LINKAGE=AU

$A_{CP}(B^+ \to \pi^+\pi^0)$

NODE=S041AX0

VALUE	DOCUMENT ID		TECN	COMMENT
0.03 ±0.04 OUR AVERAGE				
[0.06 ± 0.05 OUR 2012 AVERAGE]				
YOUR DATA 0.025±0.043±0.007	DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
0.03 ±0.08 ±0.01	AUBERT	07BC	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.07 ±0.06 ±0.01	LIN	08	BELL	Repl. by DUH 13
−0.01 ±0.10 ±0.02	[1] AUBERT	05L	BABR	Repl. by AUBERT 07BC
0.00 ±0.10 ±0.02	[2] CHAO	05A	BELL	Repl. by CHAO 04B
−0.02 ±0.10 ±0.01	[3] CHAO	04B	BELL	Repl. by LIN 08
$-0.03\ ^{+0.18}_{-0.17}\ \pm 0.02$	[4] AUBERT	03L	BABR	Repl. by AUBERT 05L
$0.30\ \pm 0.30\ ^{+0.06}_{-0.04}$	[5] CASEY	02	BELL	Repl. by CHAO 04B

[1] Corresponds to a 90% CL interval of $-0.19 < A_{CP} < 0.21$. NODE=S041AX0;LINKAGE=AU

[2] Corresponds to a 90% CL interval of $-0.17 < A_{CP} < 0.16$. NODE=S041AX0;LINKAGE=CO

[3] This corresponds to 90% CL interval of $-0.18 < A_{CP} < 0.14$. NODE=S041AX0;LINKAGE=CH

[4] Corresponds to 90% confidence range $-0.32 < A_{CP} < 0.27$. NODE=S041AX0;LINKAGE=3L

[5] Corresponds to 90% confidence range $-0.23 < A_{CP} < +0.86$. NODE=S041AX0;LINKAGE=CA

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER DUH	13	PR D87 031103	Y. T. Duh *et al.*	(Belle)	REFID=54957
LIN	08	NAT 452 332	S.-W. Lin *et al.*	(BELLE Collab.)	REFID=52509
AUBERT	07BC	PR D76 091102	B. Aubert *et al.*	(BABAR Collab.)	REFID=51989
LIN	07	PRL 98 181804	S.-W. Lin *et al.*	(BELLE Collab.)	REFID=51752
LIN	07A	PRL 99 121601	S.-W. Lin *et al.*	(BELLE Collab.)	REFID=51921
AUBERT,BE	06C	PRL 97 171805	B. Aubert *et al.*	(BABAR Collab.)	REFID=51436
ABE	05G	PRL 95 231802	K. Abe *et al.*	(BELLE Collab.)	REFID=50936
AUBERT	05L	PRL 94 181802	B. Aubert *et al.*	(BABAR Collab.)	REFID=50593
AUBERT,BE	05E	PRL 95 221801	B. Aubert *et al.*	(BABAR Collab.)	REFID=50948
CHAO	05A	PR D71 031502	Y. Chao *et al.*	(BELLE Collab.)	REFID=50619
AUBERT	04M	PRL 92 201802	B. Aubert *et al.*	(BABAR Collab.)	REFID=49928
CHAO	04	PR D69 111102	Y. Chao *et al.*	(BELLE Collab.)	REFID=50006
CHAO	04B	PRL 93 191802	Y. Chao *et al.*	(BELLE Collab.)	REFID=50272
AUBERT	03L	PRL 91 021801	B. Aubert *et al.*	(BaBar Collab.)	REFID=49493
BORNHEIM	03	PR D68 052002	A. Bornheim *et al.*	(CLEO Collab.)	REFID=49546
UNNO	03	PR D68 011103	Y. Unno *et al.*	(BELLE Collab.)	REFID=49505
CASEY	02	PR D66 092002	B.C.K. Casey *et al.*	(BELLE Collab.)	REFID=49071
ABE	01H	PRL 87 101801	K. Abe *et al.*	(BELLE Collab.)	REFID=48247
ABE	01K	PR D64 071101	K. Abe *et al.*	(BELLE Collab.)	REFID=48367
AUBERT	01E	PRL 87 151802	B. Aubert *et al.*	(BaBar Collab.)	REFID=48378
CHEN	00	PRL 85 525	S. Chen *et al.*	(CLEO Collab.)	REFID=47669
CRONIN-HEN...	00	PRL 85 515	D. Cronin-Hennessy *et al.*	(CLEO Collab.)	REFID=47659
GODANG	98	PRL 80 3456	R. Godang *et al.*	(CLEO Collab.)	REFID=45935
ASNER	96	PR D53 1039	D.M. Asner *et al.*	(CLEO Collab.)	REFID=44734
ALBRECHT	91B	PL B254 288	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=41451
ALBRECHT	90B	PL B241 278	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=41216
AVERY	89B	PL B223 470	P. Avery *et al.*	(CLEO Collab.)	REFID=40820
AVERY	87	PL B183 429	P. Avery *et al.*	(CLEO Collab.)	REFID=40387
BEBEK	87	PR D36 1289	C. Bebek *et al.*	(CLEO Collab.)	REFID=40270

NODE=S042

B^0

$$I(J^P) = \tfrac{1}{2}(0^-)$$

Quantum numbers not measured. Values shown are quark-model predictions. NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section. NODE=S042220

$\Gamma(K^+\pi^-)/\Gamma_{total}$ — Γ_{222}/Γ

NODE=S042R10
NODE=S042R10

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
19.6 ± 0.5 OUR AVERAGE					
[(19.4 ± 0.6) × 10^{-6} OUR 2012 AVERAGE]					
YOUR DATA 20.00 ± 0.34 ± 0.60		[1] DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
19.1 ± 0.6 ± 0.6		[1] AUBERT	07B	BABR	$e^+e^- \to \Upsilon(4S)$
$18.0 \; ^{+2.3}_{-2.1} \; ^{+1.2}_{-0.9}$		[1] BORNHEIM	03	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
19.9 ± 0.4 ± 0.8		[1] LIN	07A	BELL	Repl. by DUH 13
18.5 ± 1.0 ± 0.7		[1] CHAO	04	BELL	Repl. by LIN 07A
17.9 ± 0.9 ± 0.7		[1] AUBERT	02Q	BABR	Repl. by AUBERT 07B
22.5 ± 1.9 ± 1.8		[1] CASEY	02	BELL	Repl. by CHAO 04
$19.3 \; ^{+3.4}_{-3.2} \; ^{+1.5}_{-0.6}$		[1] ABE	01H	BELL	Repl. by CASEY 02
16.7 ± 1.6 ± 1.3		[1] AUBERT	01E	BABR	Repl. by AUBERT 02Q
< 66	90	[2] ABE	00C	SLD	$e^+e^- \to Z$
$17.2 \; ^{+2.5}_{-2.4} \; \pm 1.2$		[1] CRONIN-HEN..	00	CLE2	Repl. by BORNHEIM 03
$15 \; ^{+5.}_{-4} \; \pm 1.4$		GODANG	98	CLE2	Repl. by CRONIN-HENNESSY 00
$24 \; ^{+17}_{-11} \; \pm 2$		[3] ADAM	96D	DLPH	$e^+e^- \to Z$
< 17	90	ASNER	96	CLE2	Sup. by ADAM 96D
< 30	90	[4] BUSKULIC	96V	ALEP	$e^+e^- \to Z$
< 90	90	[5] ABREU	95N	DLPH	Sup. by ADAM 96D
< 81	90	[6] AKERS	94L	OPAL	$e^+e^- \to Z$
< 26	90	[7] BATTLE	93	CLE2	$e^+e^- \to \Upsilon(4S)$
<180	90	ALBRECHT	91B	ARG	$e^+e^- \to \Upsilon(4S)$
< 90	90	[8] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$
<320	90	AVERY	87	CLEO	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042R10;LINKAGE=EP

[2] ABE 00C assumes B($Z \to b\overline{b}$)=(21.7 ± 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})$% and $f_{B_s}=(10.5^{+1.8}_{-2.2})$%. NODE=S042R10;LINKAGE=KQ

[3] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$. Contributions from B^0 and B_s decays cannot be separated. Limits are given for the weighted average of the decay rates for the two neutral B mesons. NODE=S042R10;LINKAGE=DQ

[4] BUSKULIC 96V assumes PDG 96 production fractions for B^0, B^+, B_s, b baryons. NODE=S042R10;LINKAGE=BV

[5] Assumes a B^0, B^- production fraction of 0.39 and a B_s production fraction of 0.12. Contributions from B^0 and B^0_s decays cannot be separated. Limits are given for the weighted average of the decay rates for the two neutral B mesons. NODE=S042R10;LINKAGE=SR

[6] Assumes B($Z \to b\overline{b}$) = 0.217 and B^0_d (B^0_s) fraction 39.5% (12%). NODE=S042R10;LINKAGE=C

[7] BATTLE 93 assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$. NODE=S042R10;LINKAGE=B

[8] Assumes the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. NODE=S042R10;LINKAGE=A1

$\Gamma(K^0\pi^0)/\Gamma_{total}$ — Γ_{223}/Γ

NODE=S042S41
NODE=S042S41

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
9.9 ±0.5 OUR AVERAGE					
[(9.5 ± 0.8) × 10^{-6} OUR 2012 AVERAGE Scale factor = 1.3]					
YOUR DATA 9.68 ± 0.46 ± 0.50		[1] DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
10.1 ± 0.6 ± 0.4		[1] LEES	13D	BABR	$e^+e^- \to \Upsilon(4S)$
$12.8 \; ^{+4.0}_{-3.3} \; ^{+1.7}_{-1.4}$		[1] BORNHEIM	03	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
8.7 ± 0.5 ± 0.6		[1] FUJIKAWA	10A	BELL	Repl. by DUH 13
10.3 ± 0.7 ± 0.6		[1] AUBERT	08E	BABR	Repl. by LEES 13D
9.2 ± 0.7 ± 0.6		[1] LIN	07A	BELL	Repl. by FUJIKAWA 10A
11.4 ± 0.9 ± 0.6		[1] AUBERT	05Y	BABR	Repl. by AUBERT 08E
11.4 ± 1.7 ± 0.8		[1] AUBERT	04M	BABR	Repl. by AUBERT 05Y
$11.7 \pm 2.3 \; ^{+1.2}_{-1.3}$		[1] CHAO	04	BELL	Repl. by LIN 07A
$8.0 \; ^{+3.3}_{-3.1} \; \pm 1.6$		[1] CASEY	02	BELL	Repl. by CHAO 04
$16.0 \; ^{+7.2}_{-5.9} \; ^{+2.5}_{-2.7}$		[1] ABE	01H	BELL	Repl. by CASEY 02
$8.2 \; ^{+3.1}_{-2.7} \; \pm 1.2$		[1] AUBERT	01E	BABR	Repl. by AUBERT 04M

$14.6\ ^{+5.9}_{-5.1}\ ^{+2.4}_{-3.3}$		[1] CRONIN-HEN..00	CLE2	Repl. by BORNHEIM 03	
<41	90	GODANG 98	CLE2	Repl. by CRONIN-HENNESSY 00	
<40	90	ASNER 96	CLE2	Rep. by GODANG 98	

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042S41;LINKAGE=EP

$\Gamma(K^+K^-)/\Gamma_{total}$ — Γ_{285}/Γ

NODE=S042S1
NODE=S042S1

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	0.13±0.05 OUR AVERAGE					
YOUR DATA	$0.10\pm0.08\pm0.04$		[1,2] DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
	$0.12^{+0.08}_{-0.07}\pm0.01$		[3] AAIJ	12AR	LHCB	pp at 7 TeV
	$0.23\pm0.10\pm0.10$		[4] AALTONEN	12L	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	< 0.7	90	[5] AALTONEN	09C	CDF	Repl. by AALTONEN 12L
	< 0.5	90	[2] AUBERT	07B	BABR	$e^+e^- \to \Upsilon(4S)$
	< 0.41	90	[2] LIN	07	BELL	Repl. by DUH 13
	< 1.8	90	[6] ABULENCIA,A	06D	CDF	Repl. by AALTONEN 09C
	< 0.37	90	ABE	05G	BELL	Repl. by LIN 07
	< 0.7	90	CHAO	04	BELL	$e^+e^- \to \Upsilon(4S)$
	< 0.8	90	[2] BORNHEIM	03	CLE2	$e^+e^- \to \Upsilon(4S)$
	< 0.6	90	[2] AUBERT	02Q	BABR	$e^+e^- \to \Upsilon(4S)$
	< 0.9	90	[2] CASEY	02	BELL	$e^+e^- \to \Upsilon(4S)$
	< 2.7	90	[2] ABE	01H	BELL	$e^+e^- \to \Upsilon(4S)$
	< 2.5	90	[2] AUBERT	01E	BABR	$e^+e^- \to \Upsilon(4S)$
	< 66	90	[7] ABE	00C	SLD	$e^+e^- \to Z$
	< 1.9	90	[2] CRONIN-HEN..00		CLE2	$e^+e^- \to \Upsilon(4S)$
	< 4.3	90	GODANG 98		CLE2	Repl. by CRONIN-HENNESSY 00
	< 46		[8] ADAM	96D	DLPH	$e^+e^- \to Z$
	< 4	90	ASNER 96		CLE2	Repl. by GODANG 98
	< 18	90	[9] BUSKULIC	96V	ALEP	$e^+e^- \to Z$
	<120	90	[10] ABREU	95N	DLPH	Sup. by ADAM 96D
	< 7	90	[2] BATTLE	93	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] DUH 13 reports also for the same data $B(B^0 \to K^+K^-) < 0.20\times10^{-6}$ at 90% CL.

NODE=S042S1;LINKAGE=B

[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042S1;LINKAGE=EP

[3] AAIJ 12AR reports $[\Gamma(B^0 \to K^+K^-)/\Gamma_{total}]$ / $[B(B^0_s \to K^+K^-)]$ / $[\Gamma(\overline{b} \to B^0_s)/\Gamma(\overline{b} \to B^0)] = 0.018^{+0.008}_{-0.007} \pm 0.009$ which we multiply by our best values $B(B^0_s \to K^+K^-) = (2.52 \pm 0.17)\times10^{-5}$, $\Gamma(\overline{b} \to B^0_s)/\Gamma(\overline{b} \to B^0) = 0.259 \pm 0.016$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=S042S1;LINKAGE=AI

[4] Reported a central value of $(0.23 \pm 0.10 \pm 0.10)\times10^{-6}$ using $B(B^0 \to K^+\pi^-) = (19.4 \pm 0.6)\times10^{-6}$.

NODE=S042S1;LINKAGE=AL

[5] Obtains this result from $B(K^+K^-)/B(K^+\pi^-) = 0.020 \pm 0.008 \pm 0.006$, assuming $B(B^0 \to K^+\pi^-) = (19.4 \pm 0.6)\times10^{-6}$.

NODE=S042S1;LINKAGE=AA

[6] ABULENCIA,A 06D obtains this from $\Gamma(K^+K^-)/\Gamma(K^+\pi^-) < 0.10$ at 90% CL, assuming $B(B^0 \to K^+\pi^-) = (18.9 \pm 0.7)\times10^{-6}$.

NODE=S042S1;LINKAGE=AB

[7] ABE 00C assumes $B(Z \to b\overline{b})=(21.7 \pm 0.1)\%$ and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})\%$ and $f_{B_s}=(10.5^{+1.8}_{-2.2})\%$.

NODE=S042S1;LINKAGE=KQ

[8] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$. Contributions from B^0 and B_s decays cannot be separated. Limits are given for the weighted average of the decay rates for the two neutral B mesons.

NODE=S042S1;LINKAGE=DQ

[9] BUSKULIC 96V assumes PDG 96 production fractions for B^0, B^+, B_s, b baryons.

NODE=S042S1;LINKAGE=BV

[10] Assumes a B^0, B^- production fraction of 0.39 and a B_s production fraction of 0.12. Contributions from B^0 and B^0_s decays cannot be separated. Limits are given for the weighted average of the decay rates for the two neutral B mesons.

NODE=S042S1;LINKAGE=SR

$\Gamma(K^0\overline{K}^0)/\Gamma_{total}$ — Γ_{286}/Γ

NODE=S042S60
NODE=S042S60

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	1.21±0.16 OUR AVERAGE					
	$[(0.96^{+0.20}_{-0.18})\times10^{-6}$ OUR 2012 AVERAGE]					
YOUR DATA	$1.26\pm0.19\pm0.05$		[1] DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
	$1.08\pm0.28\pm0.11$		[1] AUBERT,BE	06C	BABR	$e^+e^- \to \Upsilon(4S)$

NEW

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.87^{+0.25}_{-0.20}\pm0.09$		[1] LIN	07	BELL	Repl. by DUH 13
$0.8\ \pm0.3\ \pm0.9$		[1] ABE	05G	BELL	Repl. by LIN 07
$1.19^{+0.40}_{-0.35}\pm0.13$		[1] AUBERT,BE	05E	BABR	Repl. by AUBERT,BE 06C
$<$ 1.8	90	[1] AUBERT	04M	BABR	$e^+e^- \to \Upsilon(4S)$
$<$ 1.5	90	[1] CHAO	04	BELL	Repl. by ABE 05G
$<$ 3.3	90	[1] BORNHEIM	03	CLE2	$e^+e^- \to \Upsilon(4S)$
$<$ 4.1	90	[1] CASEY	02	BELL	$e^+e^- \to \Upsilon(4S)$
$<$17	90	GODANG	98	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042S60;LINKAGE=EP

$\Gamma(\pi^+\pi^-)/\Gamma_{total}$ — Γ_{351}/Γ

NODE=S042R5
NODE=S042R5

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
5.13±0.24 OUR AVERAGE					NEW
[(5.18 ± 0.24) × 10^{-6} OUR 2012 AVERAGE]					
YOUR DATA $5.04\pm0.21\pm0.18$		[1] DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
$5.5\ \pm0.4\ \pm0.3$		[1] AUBERT	07B	BABR	$e^+e^- \to \Upsilon(4S)$
$4.5\ ^{+1.4}_{-1.2}\ ^{+0.5}_{-0.4}$		[1] BORNHEIM	03	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$5.1\ \pm0.2\ \pm0.2$		[1] LIN	07A	BELL	Repl. by DUH 13
$4.4\ \pm0.6\ \pm0.3$		[1] CHAO	04	BELL	Repl. by LIN 07A
$4.7\ \pm0.6\ \pm0.2$		[1] AUBERT	02Q	BABR	Repl. by AUBERT 07B
$5.4\ \pm1.2\ \pm0.5$		[1] CASEY	02	BELL	Repl. by CHAO 04
$5.6\ ^{+2.3}_{-2.0}\ ^{+0.4}_{-0.5}$		[1] ABE	01H	BELL	Repl. by CASEY 02
$4.1\ \pm1.0\ \pm0.7$		[1] AUBERT	01E	BABR	Repl. by AUBERT 02Q
$<$ 67	90	[2] ABE	00C	SLD	$e^+e^- \to Z$
$4.3\ ^{+1.6}_{-1.4}\ \pm0.5$		[1] CRONIN-HEN..	00	CLE2	Repl. by BORNHEIM 03
$<$ 15	90	GODANG	98	CLE2	Repl. by CRONIN-HENNESSY 00
$<$ 45	90	[3] ADAM	96D	DLPH	$e^+e^- \to Z$
$<$ 20	90	ASNER	96	CLE2	Repl. by GODANG 98
$<$ 41	90	[4] BUSKULIC	96V	ALEP	$e^+e^- \to Z$
$<$ 55	90	[5] ABREU	95N	DLPH	Sup. by ADAM 96D
$<$ 47	90	[6] AKERS	94L	OPAL	$e^+e^- \to Z$
$<$ 29	90	[1] BATTLE	93	CLE2	$e^+e^- \to \Upsilon(4S)$
$<$130	90	[1] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$
$<$ 77	90	[7] BORTOLETTO	89	CLEO	$e^+e^- \to \Upsilon(4S)$
$<$260	90	[7] BEBEK	87	CLEO	$e^+e^- \to \Upsilon(4S)$
$<$500	90	GILES	84	CLEO	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042R5;LINKAGE=EP

[2] ABE 00C assumes B($Z \to b\bar{b}$)=(21.7 ± 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})$% and $f_{B_s}=(10.5^{+1.8}_{-2.2})$%. NODE=S042R5;LINKAGE=KQ

[3] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$. NODE=S042R5;LINKAGE=DQ

[4] BUSKULIC 96V assumes PDG 96 production fractions for B^0, B^+, B_s, b baryons. NODE=S042R5;LINKAGE=BV

[5] Assumes a B^0, B^- production fraction of 0.39 and a B_s production fraction of 0.12. NODE=S042R5;LINKAGE=SR

[6] Assumes B($Z \to b\bar{b}$) = 0.217 and B^0_d (B^0_s) fraction 39.5% (12%). NODE=S042R5;LINKAGE=C

[7] Paper assumes the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%. NODE=S042R5;LINKAGE=A

CP VIOLATION PARAMETERS

NODE=S042229

A_{CP} ($B^0 \to K^+\pi^-$)

NODE=S042ACP
NODE=S042ACP

VALUE	DOCUMENT ID		TECN	COMMENT
−0.087±0.008 OUR AVERAGE				NEW
[−0.097 ± 0.012 OUR 2012 AVERAGE]				
YOUR DATA $-0.069\pm0.014\pm0.007$	DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
$-0.107\pm0.016^{+0.006}_{-0.004}$	LEES	13D	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.088\pm0.011\pm0.008$	AAIJ	12V	LHCB	pp at 7 TeV
$-0.086\pm0.023\pm0.009$	AALTONEN	11N	CDF	$p\bar{p}$ at 1.96 TeV
$-0.04\ \pm0.16$	[1] CHEN	00	CLE2	$e^+e^- \to \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$-0.094 \pm 0.018 \pm 0.008$	LIN	08	BELL	Repl. by DUH 13
$-0.107 \pm 0.018 {}^{+0.007}_{-0.004}$	AUBERT	07AF	BABR	Repl. by LEES 13D
$-0.013 \pm 0.078 \pm 0.012$	ABULENCIA,A	06D	CDF	Repl. by AALTONEN 11N
$-0.088 \pm 0.035 \pm 0.013$	[2] CHAO	05A	BELL	Repl. by CHAO 04B
$-0.133 \pm 0.030 \pm 0.009$	[3] AUBERT,B	04K	BABR	Repl. by AUBERT 07AF
$-0.101 \pm 0.025 \pm 0.005$	[4] CHAO	04B	BELL	Repl. by LIN 08
$-0.07 \pm 0.08 \pm 0.02$	[5] AUBERT	02D	BABR	Repl. by AUBERT 02Q
$-0.102 \pm 0.050 \pm 0.016$	[6] AUBERT	02Q	BABR	Repl. by AUBERT,B 04K
$-0.06 \pm 0.09 {}^{+0.01}_{-0.02}$	[7] CASEY	02	BELL	Repl. by CHAO 04B
$0.044 {}^{+0.186}_{-0.167} {}^{+0.018}_{-0.021}$	[8] ABE	01K	BELL	Repl. by CASEY 02
$-0.19 \pm 0.10 \pm 0.03$	[9] AUBERT	01E	BABR	Repl. by AUBERT 02Q

[1] Corresponds to 90% confidence range $-0.30 < A_{CP} < 0.22$. NODE=S042ACP;LINKAGE=AA
[2] Corresponds to a 90% CL interval of $-0.15 < A_{CP} < -0.03$. NODE=S042ACP;LINKAGE=CO
[3] Based on a total signal yield of $N(K^-\pi^+) + N(K^+\pi^-) = 1606 \pm 51$ events. NODE=S042ACP;LINKAGE=AU
[4] CHAO 04B reports significance of 3.9 standard deviation for deviation of A_{CP} from zero. NODE=S042ACP;LINKAGE=CH
[5] Corresponds to 90% confidence range $-0.21 < A_{CP} < 0.07$. NODE=S042ACP;LINKAGE=AD
[6] Corresponds to 90% confidence range $-0.188 < A_{CP} < -0.016$. NODE=S042ACP;LINKAGE=BR
[7] Corresponds to 90% confidence range $-0.21 < A_{CP} < +0.09$. NODE=S042ACP;LINKAGE=CA
[8] Corresponds to 90% confidence range $-0.25 < A_{CP} < 0.37$. NODE=S042ACP;LINKAGE=AX
[9] Corresponds to 90% confidence range $-0.35 < A_{CP} < -0.03$. NODE=S042ACP;LINKAGE=L3

B^0 REFERENCES

NODE=S042

YOUR PAPER	DUH	13	PR D87 031103	Y. T. Duh *et al.*	(Belle)	REFID=54957
	LEES	13D	PR D87 052009	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54958
	AAIJ	12AR	JHEP 1210 037	R. Aaij *et al.*	(LHCb Collab.)	REFID=54595
	AAIJ	12V	PRL 108 201601	R. Aaij *et al.*	(LHCb Collab.)	REFID=54216
	AALTONEN	12L	PRL 108 211803	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54241
	AALTONEN	11N	PRL 106 181802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=16447
	FUJIKAWA	10A	PR D81 011101	M. Fujikawa *et al.*	(BELLE Collab.)	REFID=53200
	AALTONEN	09C	PRL 103 031801	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52698
	AUBERT	08E	PR D77 012003	B. Aubert *et al.*	(BABAR Collab.)	REFID=52146
	LIN	08	NAT 452 332	S.-W. Lin *et al.*	(BELLE Collab.)	REFID=52509
	AUBERT	07AF	PRL 99 021603	B. Aubert *et al.*	(BABAR Collab.)	REFID=51861
	AUBERT	07B	PR D75 012008	B. Aubert *et al.*	(BABAR Collab.)	REFID=51610
	LIN	07	PRL 98 181804	S.-W. Lin *et al.*	(BELLE Collab.)	REFID=51752
	LIN	07A	PRL 99 121601	S.-W. Lin *et al.*	(BELLE Collab.)	REFID=51921
	ABULENCIA,A	06D	PRL 97 211802	A. Abulencia *et al.*	(CDF Collab.)	REFID=51490
	AUBERT,BE	06C	PRL 97 171805	B. Aubert *et al.*	(BABAR Collab.)	REFID=51436
	ABE	05G	PRL 95 231802	K. Abe *et al.*	(BELLE Collab.)	REFID=50936
	AUBERT	05Y	PR D71 111102	B. Aubert *et al.*	(BABAR Collab.)	REFID=50663
	AUBERT,BE	05E	PRL 95 221801	B. Aubert *et al.*	(BABAR Collab.)	REFID=50948
	CHAO	05A	PR D71 031502	Y. Chao *et al.*	(BELLE Collab.)	REFID=50619
	AUBERT	04M	PRL 92 201802	B. Aubert *et al.*	(BABAR Collab.)	REFID=49928
	AUBERT,B	04K	PRL 93 131801	B. Aubert *et al.*	(BABAR Collab.)	REFID=50084
	CHAO	04	PR D69 111102	Y. Chao *et al.*	(BELLE Collab.)	REFID=50006
	CHAO	04B	PRL 93 191802	Y. Chao *et al.*	(BELLE Collab.)	REFID=50272
	BORNHEIM	03	PR D68 052002	A. Bornheim *et al.*	(CLEO Collab.)	REFID=49546
	AUBERT	02D	PR D65 051502	B. Aubert *et al.*	(BaBar Collab.)	REFID=48635
	AUBERT	02Q	PRL 89 281802	B. Aubert *et al.*	(BaBar Collab.)	REFID=49243
	CASEY	02	PR D66 092002	B.C.K. Casey *et al.*	(BELLE Collab.)	REFID=49071
	ABE	01H	PRL 87 101801	K. Abe *et al.*	(BELLE Collab.)	REFID=48247
	ABE	01K	PR D64 071101	K. Abe *et al.*	(BELLE Collab.)	REFID=48367
	AUBERT	01E	PRL 87 151802	B. Aubert *et al.*	(BaBar Collab.)	REFID=48378
	ABE	00C	PR D62 071101	K. Abe *et al.*	(SLD Collab.)	REFID=47762
	CHEN	00	PRL 85 525	S. Chen *et al.*	(CLEO Collab.)	REFID=47669
	CRONIN-HEN...	00	PRL 85 515	D. Cronin-Hennessy *et al.*	(CLEO Collab.)	REFID=47659
	GODANG	98	PRL 80 3456	R. Godang *et al.*	(CLEO Collab.)	REFID=45935
	ADAM	96D	ZPHY C72 207	W. Adam *et al.*	(DELPHI Collab.)	REFID=45276
	ASNER	96	PR D53 1039	D.M. Asner *et al.*	(CLEO Collab.)	REFID=44734
	BUSKULIC	96V	PL B384 471	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=44909
	PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495
	ABREU	95N	PL B357 255	P. Abreu *et al.*	(DELPHI Collab.)	REFID=44417
	AKERS	94L	PL B337 393	R. Akers *et al.*	(OPAL Collab.)	REFID=44018
	BATTLE	93	PRL 71 3922	M. Battle *et al.*	(CLEO Collab.)	REFID=43640
	ALBRECHT	91B	PL B254 288	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=41451
	ALBRECHT	90B	PL B241 278	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=41216
	AVERY	89B	PL B223 470	P. Avery *et al.*	(CLEO Collab.)	REFID=40820
	BORTOLETTO	89	PRL 62 2436	D. Bortoletto *et al.*	(CLEO Collab.)	REFID=40787
	AVERY	87	PL B183 429	P. Avery *et al.*	(CLEO Collab.)	REFID=40387
	BEBEK	87	PR D36 1289	C. Bebek *et al.*	(CLEO Collab.)	REFID=40270
	GILES	84	PR D30 2279	R. Giles *et al.*	(CLEO Collab.)	REFID=11570

Reference = HARA 13; PRL 110 131801
Verifier code = BELLE

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PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Youngjoon Kwon

EMAIL: yjkwon63@yonsei.ac.kr

June 4, 2013

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1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(\tau^+\nu_\tau)/\Gamma_{total}$ — Γ_{29}/Γ

NODE=S041S57

See the note on "Decay Constants of Charged Pseudoscalar Mesons" in the D^+_s Listings.

NODE=S041S57

NODE=S041S57

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
1.05 ± 0.25 OUR AVERAGE		Error includes scale factor of 1.1. $[(1.65 \pm 0.34) \times 10^{-4}$ OUR 2012 AVERAGE]			
YOUR DATA $0.72^{+0.27}_{-0.25} \pm 0.11$		[1] HARA	13	BELL	$e^+e^- \to \Upsilon(4S)$
$1.7 \pm 0.8 \pm 0.2$		[2,3] AUBERT	10E	BABR	$e^+e^- \to \Upsilon(4S)$
$1.54^{+0.38}_{-0.37}{}^{+0.29}_{-0.31}$		[2,4] HARA	10	BELL	$e^+e^- \to \Upsilon(4S)$
$1.8 \; ^{+0.9}_{-0.8} \pm 0.45$		[2,5] AUBERT	08D	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.9 \pm 0.6 \pm 0.1$		[2,3] AUBERT	07AL	BABR	Repl. by AUBERT 10E
< 2.6	90	[2] AUBERT	06K	BABR	$e^+e^- \to \Upsilon(4S)$
$1.79^{+0.56}_{-0.49}{}^{+0.46}_{-0.51}$		[2,5] IKADO	06	BELL	Repl. by HARA 13
< 4.2	90	[2] AUBERT,B	05B	BABR	Repl. by AUBERT 06K
< 8.3	90	[6] BARATE	01E	ALEP	$e^+e^- \to Z$
< 8.4	90	[2] BROWDER	01	CLE2	$e^+e^- \to \Upsilon(4S)$
< 5.7	90	[7] ACCIARRI	97F	L3	$e^+e^- \to Z$
<104	90	[8] ALBRECHT	95D	ARG	$e^+e^- \to \Upsilon(4S)$
< 22	90	ARTUSO	95	CLE2	$e^+e^- \to \Upsilon(4S)$
< 18	90	[9] BUSKULIC	95	ALEP	$e^+e^- \to Z$

NEW

[1] The authors combine their result with that from HARA 10 obtaining B($B^- \to \tau^-\overline{\nu}_\tau$)=$(0.96 \pm 0.26) \times 10^{-4}$ and deriving $f_B\,|V_{ub}|$=$(7.4 \pm 0.8 \pm 0.5) \times 10^{-4}$ GeV.

NODE=S041S57;LINKAGE=D

[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041S57;LINKAGE=EP

[3] Requires one reconstructed semileptonic B decay $B^- \to D^0\ell^-\overline{\nu}_\ell X$ in the recoil.

NODE=S041S57;LINKAGE=UB

[4] Requires one reconstructed semileptonic B decay $B^- \to D^{(*)0}\ell^-\overline{\nu}_\ell X$ in the recoil.

NODE=S041S57;LINKAGE=HA

[5] The analysis is based on a sample of events with one fully reconstructed tag B in a hadronic decay mode $B^- \to D^{(*)0}X^-$.

NODE=S041S57;LINKAGE=BT

[6] The energy-flow and b-tagging algorithms were used.

NODE=S041S57;LINKAGE=QK

[7] ACCIARRI 97F uses missing-energy technique and $f(b \to B^-) = (38.2 \pm 2.5)\%$.

NODE=S041S57;LINKAGE=C

[8] ALBRECHT 95D uses full reconstruction of one B decay as tag.

NODE=S041S57;LINKAGE=A

[9] BUSKULIC 95 uses same missing-energy technique as in $\overline{b} \to \tau^+\nu_\tau$X, but analysis is restricted to endpoint region of missing-energy distribution.

NODE=S041S57;LINKAGE=B

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER

HARA	13	PRL 110 131801	K. Hara *et al.*	(BELLE Collab.)	REFID=54961
AUBERT	10E	PR D81 051101	B. Aubert *et al.*	(BABAR Collab.)	REFID=53218
HARA	10	PR D82 071101	K. Hara *et al.*	(BELLE Collab.)	REFID=53464
AUBERT	08D	PR D77 011107	B. Aubert *et al.*	(BABAR Collab.)	REFID=52145
AUBERT	07AL	PR D76 052002	B. Aubert *et al.*	(BABAR Collab.)	REFID=51937
AUBERT	06K	PR D73 057101	B. Aubert *et al.*	(BABAR Collab.)	REFID=51092
IKADO	06	PRL 97 251802	K. Ikado *et al.*	(BELLE Collab.)	REFID=51572
AUBERT,B	05B	PRL 95 041804	B. Aubert *et al.*	(BABAR Collab.)	REFID=50688

BARATE	01E	EPJ C19 213	R. Barate *et al.*	(ALEPH Collab.)	REFID=48135
BROWDER	01	PRL 86 2950	T.E. Browder *et al.*	(CLEO Collab.)	REFID=48107
ACCIARRI	97F	PL B396 327	M. Acciarri *et al.*	(L3 Collab.)	REFID=45317
ALBRECHT	95D	PL B353 554	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=44352
ARTUSO	95	PRL 75 785	M. Artuso *et al.*	(CLEO Collab.)	REFID=44347
BUSKULIC	95	PL B343 444	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=44119

Reference = AALTONEN 08M; PRL 100 182002
Verifier code = CDF

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Konstantinos Vellidis

EMAIL: vellidis@fnal.gov

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PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM, CHARMED MESONS ($B = C = \pm 1$)

NODE=MXXX049

$B_c^+ = c\bar{b}$, $B_c^- = \bar{c}b$, similarly for B_c^*'s

NODE=MXXX049

$B_c^\pm$

NODE=S091

$I(J^P) = 0(0^-)$
I, J, P need confirmation.

Quantum numbers shown are quark-model predictions.

NODE=S091

B_c^+ BRANCHING RATIOS

NODE=S091225

$\Gamma(J/\psi(1S)\pi^+)/\Gamma_{total} \times B(\bar{b} \to B_c)$ — $\Gamma_2/\Gamma \times B$

NODE=S091R2
NODE=S091R2

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
	seen		AALTONEN	13	CDF	$p\bar{p}$ at 1.96 TeV
	seen		[11] AAIJ	12AV	LHCB	pp at 7 TeV
YOUR DATA	seen		AALTONEN	08M	CDF	$p\bar{p}$ at 1.96 TeV
	seen		ABAZOV	08T	D0	$p\bar{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	$<2.4 \times 10^{-4}$	90	[12] ACKERSTAFF	98O	OPAL	$e^+e^- \to Z$
	$<3.4 \times 10^{-4}$	90	[13] ABREU	97E	DLPH	$e^+e^- \to Z$
	$<8.2 \times 10^{-5}$	90	[14] BARATE	97H	ALEP	$e^+e^- \to Z$
	$<2.0 \times 10^{-5}$	95	[15] ABE	96R	CDF	$p\bar{p}$ 1.8 TeV

[11] AAIJ 12AV reports a measurement of $B(B_c^+ \to J/\psi\pi^+)/B(B^+ \to J/\psi K^+)\ f_c/f_u = (0.68 \pm 0.10 \pm 0.03 \pm 0.05)\%$ at $p_T(B) > 4$ GeV and $2.5 < \eta(B) < 4.5$. NODE=S091R2;LINKAGE=AA

[12] ACKERSTAFF 98O reports $B(Z \to B_c X)/B(Z \to q\bar{q}) \times B(B_c \to J/\psi(1S)\pi^+) < 1.06 \times 10^{-4}$ at 90%CL. We rescale to our PDG 98 values of $B(Z \to b\bar{b})$. NODE=S091R2;LINKAGE=D

[13] ABREU 97E value listed is for an assumed $\tau_{B_c} = 0.4$ ps and improves to 2.7×10^{-4} for $\tau_{B_c} = 1.4$ ps. NODE=S091R2;LINKAGE=A

[14] BARATE 97H reports $B(Z \to B_c X)/B(Z \to q\bar{q}) \cdot B(B_c \to J/\psi(1S)\pi) < 3.6 \times 10^{-5}$ at 90%CL. We rescale to our PDG 96 values of $B(Z \to b\bar{b})$. NODE=S091R2;LINKAGE=B

[15] ABE 96R reports $B(b \to B_c X)/B(b \to B^+ X) \cdot B(B_c^+ \to J/\psi(1S)\pi^+)/B(B^+ \to J/\psi(1S)K^+) < 0.053$ at 95%CL for $\tau_{B_c} = 0.8$ ps. It changes from 0.15 to 0.04 for 0.17 ps$< \tau_{B_c} <$ 1.6 ps. We rescale to our PDG 96 values of $B(b \to B^+) = 0.378 \pm 0.022$ and $B(B^+ \to J/\psi(1S)K^+) = 0.00101 \pm 0.00014$. NODE=S091R2;LINKAGE=C

$B_c^\pm$ REFERENCES

NODE=S091

AALTONEN	13	PR D87 011101	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54798
AAIJ	12AV	PRL 109 232001	R. Aaij *et al.*	(LHCb Colalb.)	REFID=54764
YOUR PAPER AALTONEN	08M	PRL 100 182002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52252
ABAZOV	08T	PRL 101 012001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52398
ACKERSTAFF	98O	PL B420 157	K. Ackerstaff *et al.*	(OPAL Collab.)	REFID=46029
PDG	98	EPJ C3 1	C. Caso *et al.*		REFID=45838
ABREU	97E	PL B398 207	P. Abreu *et al.*	(DELPHI Collab.)	REFID=45322
BARATE	97H	PL B402 213	R. Barate *et al.*	(ALEPH Collab.)	REFID=45480
ABE	96R	PRL 77 5176	F. Abe *et al.*	(CDF Collab.)	REFID=45159
PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495

Reference = AALTONEN 12D; PR D85 072002
Verifier code = CDF

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USA

PHONE: 1-(510)-486–5449
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BOTTOM, STRANGE MESONS ($B = \pm 1$, $S = \mp 1$)

$B_s^0 = s\overline{b}$, $\overline{B}_s^0 = \overline{s}\,b$, similarly for B_s^*'s

NODE=MXXX046

NODE=MXXX046

B_s^0

$I(J^P) = 0(0^-)$

NODE=S086

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

B_s^0 MEAN LIFE ($B_S \to J/\psi\phi$)

NODE=S086TJP

NODE=S086TJP

	VALUE (10^{-12} s)	DOCUMENT ID		TECN	COMMENT
	1.429±0.088 OUR EVALUATION				
	1.517±0.026 OUR AVERAGE				
	$[(1.42^{+0.08}_{-0.07}) \times 10^{-12}$ s OUR 2012 AVERAGE]				
YOUR DATA	$1.529 \pm 0.025 \pm 0.012$	[1] AALTONEN	12D	CDF	$p\overline{p}$ at 1.96 TeV
	$1.444^{+0.098}_{-0.090} \pm 0.020$	[2] ABAZOV	05B	D0	$p\overline{p}$ at 1.96 TeV
	$1.40\ ^{+0.15}_{-0.13} \pm 0.02$	[1] ACOSTA	05	CDF	$p\overline{p}$ at 1.96 TeV
	$1.34\ ^{+0.23}_{-0.19} \pm 0.05$	[1] ABE	98B	CDF	$p\overline{p}$ at 1.8 TeV
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	$1.39\ ^{+0.13}_{-0.16}\ ^{+0.01}_{-0.02}$	[1] ABAZOV	05W	D0	$p\overline{p}$ at 1.96 TeV
	$1.34\ ^{+0.23}_{-0.19} \pm 0.05$	[3] ABE	96N	CDF	Repl. by ABE 98B

NODE=S086TJP

NODE=S086TJP

→ UNCHECKED ←

NEW

[1] Measured using the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.

[2] Measured using fully reconstructed $B_s \to J/\psi\phi$ decays.

[3] ABE 96N uses 58 ± 12 exclusive $B_s \to J/\psi\phi$ events.

NODE=S086TJP;LINKAGE=AC

NODE=S086TJP;LINKAGE=CD

NODE=S086TJP;LINKAGE=AB

B_s^0 REFERENCES

NODE=S086

YOUR PAPER	AALTONEN	12D	PR D85 072002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54070
	ABAZOV	05B	PRL 94 042001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50492
	ABAZOV	05W	PRL 95 171801	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50929
	ACOSTA	05	PRL 94 101803	D. Acosta *et al.*	(CDF Collab.)	REFID=50519
	ABE	98B	PR D57 5382	F. Abe *et al.*	(CDF Collab.)	REFID=45880
	ABE	96N	PRL 77 1945	F. Abe *et al.*	(CDF Collab.)	REFID=44811

Reference = AALTONEN 12G; PL B714 24
Verifier code = CDF

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EMAIL: wmyao@lbl.gov

QUARKS

NODE=QXXX005

NODE=Q007

t

$I(J^P) = 0(\frac{1}{2}^+)$

NODE=Q007

Charge $= \frac{2}{3}\ e$ Top $= +1$

t-QUARK MASS

NODE=Q007210

NODE=Q007210

We first list the direct measurements of the top quark mass which employ the event kinematics and then list the measurements which extract a top quark mass from the measured $t\bar{t}$ cross-section using theory calculations. A discussion of the definition of the top quark mass in these measurements can be found in the review "The Top Quark."

OUR EVALUATION of $173.07 \pm 0.52 \pm 0.72$ GeV is an average of published top mass measurements from Tevatron Runs. The LHC experiments are working on a combined average that should appear in the 2014 PDG edition once the correlated uncertainties between experiments are understood. The Tevatron average was provided by the Tevatron Electroweak Working Group (TEVEWWG). It takes correlated uncertainties into account and has a χ^2 of 8.4 for 11 degrees of freedom.

For earlier search limits see PDG 96, Physical Review **D54** 1 (1996). We no longer include a compilation of indirect top mass determinations from Standard Model Electroweak fits in the Listings (our last compilation can be found in the Listings of the 2007 partial update). For a discussion of current results see the reviews "The Top Quark" and "Electroweak Model and Constraints on New Physics."

t-Quark Mass (Direct Measurements)

NODE=Q007TP

NODE=Q007TP

The following measurements extract a t-quark mass from the kinematics of $t\bar{t}$ events. They are sensitive to the top quark mass used in the MC generator that is usually interpreted as the pole mass, but the theoretical uncertainty in this interpretation is hard to quantify. See the review "The Top Quark" and references therein for more information.

NODE=Q007TP

	VALUE (GeV)	DOCUMENT ID		TECN	COMMENT	
	173.07± 0.52± 0.72 OUR EVALUATION	See comments in the header above.				NEW;→ UNCHECKED ←
	[173.5 ± 0.6 ± 0.8 GeV OUR 2012 EVALUATION]					
	174.5 ± 0.6 ± 2.3	[1] AAD	12I	ATLS	$\ell+\not{E}_T+\geq 4$ jets (≥ 1 b), MT	
	172.85± 0.71± 0.85	[2] AALTONEN	12AI	CDF	$\ell+\not{E}_T+\geq 4$j (0,1,2b) template	
	172.7 ± 9.3 ± 3.7	[3] AALTONEN	12AL	CDF	$\tau_h + \not{E}_T$ +4j ($\geq 1b$)	
YOUR DATA	172.5 ± 1.4 ± 1.5	[4] AALTONEN	12G	CDF	6–8 jets with ≥ 1 b	
	173.9 ± 1.9 ± 1.6	[5] ABAZOV	12AB	D0	$\ell\ell+\not{E}_T+\geq 2$j ($\nu$WT+MWT)	OCCUR=2
	172.5 ± 0.4 ± 1.5	[6] CHATRCHYAN	12BA	CMS	$\ell\ell+\not{E}_T+\geq 2$j ($\geq 1b$), AMWT	
	173.49± 0.43± 0.98	[7] CHATRCHYAN	12BP	CMS	$\ell+\not{E}_T+\geq 4$j ($\geq 2b$)	
	172.3 ± 2.4 ± 1.0	[8] AALTONEN	11AK	CDF	$\not{E}_T + \geq 4$ jets (≥ 1 b-tag)	
	172.1 ± 1.1 ± 0.9	[9] AALTONEN	11E	CDF	ℓ + jets and dilepton	
	174.94± 0.83± 1.24	[10] ABAZOV	11P	D0	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag)	
	173.0 ± 1.2	[11] AALTONEN	10AE	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag), ME method	
	170.7 ± 6.3 ± 2.6	[12] AALTONEN	10D	CDF	$\ell + \not{E}_T$ + 4 jets (b-tag)	
	180.1 ± 3.6 ± 3.9	[13,14] ABAZOV	04G	D0	lepton + jets	
	176.1 ± 5.1 ± 5.3	[15] AFFOLDER	01	CDF	lepton + jets	
	167.4 ±10.3 ± 4.8	[16,17] ABE	99B	CDF	dilepton	OCCUR=2
	168.4 ±12.3 ± 3.6	[14] ABBOTT	98D	D0	dilepton	
	186 ±10 ± 5.7	[16,18] ABE	97R	CDF	6 or more jets	
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	173.18± 0.56± 0.75	[19] AALTONEN	12AP	TEVA	CDF, D0 combination	
	173.7 ± 2.8 ± 1.5	[20] ABAZOV	12AB	D0	$\ell\ell + \not{E}_T + \geq 2$ j (νWT)	
	172.4 ± 1.4 ± 1.3	[21] AALTONEN	11AC	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag)	
	176.9 ± 8.0 ± 2.7	[22] AALTONEN	11T	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag), $p_T(\ell)$ shape	
	174.0 ± 1.8 ± 2.4	[23] ABAZOV	11R	D0	dilepton + $\not{E}_T + \geq 2$ jets	
	175.5 ± 4.6 ± 4.6	[24] CHATRCHYAN	11F	CMS	dilepton + $\not{E}_T$ + jets	
	169.3 ± 2.7 ± 3.2	[25] AALTONEN	10C	CDF	dilepton + b-tag (MT2+NWA)	
	174.8 ± 2.4 $^{+1.2}_{-1.0}$	[26] AALTONEN	10E	CDF	≥ 6 jets, vtx b-tag	

$180.5 \pm 12.0 \pm 3.6$	[27] AALTONEN	09AK	CDF	$\ell + \not{E}_T$ + jets (soft μ b-tag)	
$172.7 \pm 1.8 \pm 1.2$	[28] AALTONEN	09J	CDF	$\ell + \not{E}_T$ + 4 jets (b-tag)	
$171.1 \pm 3.7 \pm 2.1$	[29] AALTONEN	09K	CDF	6 jets, vtx b-tag	
$171.9 \pm 1.7 \pm 1.1$	[30] AALTONEN	09L	CDF	ℓ + jets, $\ell\ell$ + jets	
$171.2 \pm 2.7 \pm 2.9$	[31] AALTONEN	09O	CDF	dilepton	
$165.5 {}^{+3.4}_{-3.3} \pm 3.1$	[32] AALTONEN	09X	CDF	$\ell\ell + \not{E}_T$ ($\nu\phi$ weighting)	
$174.7 \pm 4.4 \pm 2.0$	[33] ABAZOV	09AH	D0	dilepton + b-tag (νWT+MWT)	
$170.7 {}^{+4.2}_{-3.9} \pm 3.5$	[34,35] AALTONEN	08C	CDF	dilepton, $\sigma_{t\bar{t}}$ constrained	
$171.5 \pm 1.8 \pm 1.1$	[36] ABAZOV	08AH	D0	$\ell + \not{E}_T$ + 4 jets	
$177.1 \pm 4.9 \pm 4.7$	[37,38] AALTONEN	07	CDF	6 jets with ≥ 1 b vtx	
$172.3 {}^{+10.8}_{-9.6} \pm 10.8$	[39] AALTONEN	07B	CDF	≥ 4 jets (b-tag)	
$174.0 \pm 2.2 \pm 4.8$	[40] AALTONEN	07D	CDF	≥ 6 jets, vtx b-tag	
$170.8 \pm 2.2 \pm 1.4$	[41,42] AALTONEN	07I	CDF	lepton + jets (b-tag)	
$173.7 \pm 4.4 {}^{+2.1}_{-2.0}$	[38,43] ABAZOV	07F	D0	lepton + jets	
$176.2 \pm 9.2 \pm 3.9$	[44] ABAZOV	07W	D0	dilepton (MWT)	
$179.5 \pm 7.4 \pm 5.6$	[44] ABAZOV	07W	D0	dilepton (νWT)	OCCUR=2
$164.5 \pm 3.9 \pm 3.9$	[42,45] ABULENCIA	07D	CDF	dilepton	
$180.7 {}^{+15.5}_{-13.4} \pm 8.6$	[46] ABULENCIA	07J	CDF	lepton + jets	
$170.3 {}^{+4.1}_{-4.5} {}^{+1.2}_{-1.8}$	[42,47] ABAZOV	06U	D0	lepton + jets (b-tag)	
$173.2 {}^{+2.6}_{-2.4} \pm 3.2$	[48,49] ABULENCIA	06D	CDF	lepton + jets	
$173.5 {}^{+3.7}_{-3.6} \pm 1.3$	[35,48] ABULENCIA	06D	CDF	lepton + jets	OCCUR=2
$165.2 \pm 6.1 \pm 3.4$	[42,50] ABULENCIA	06G	CDF	dilepton	
$170.1 \pm 6.0 \pm 4.1$	[35,51] ABULENCIA	06V	CDF	dilepton	
$178.5 \pm 13.7 \pm 7.7$	[52,53] ABAZOV	05	D0	6 or more jets	
176.1 ± 6.6	[54] AFFOLDER	01	CDF	dilepton, lepton+jets, all-jets	OCCUR=2
$172.1 \pm 5.2 \pm 4.9$	[55] ABBOTT	99G	D0	di-lepton, lepton+jets	
176.0 ± 6.5	[17,56] ABE	99B	CDF	dilepton, lepton+jets, all-jets	
$173.3 \pm 5.6 \pm 5.5$	[14,57] ABBOTT	98F	D0	lepton + jets	
$175.9 \pm 4.8 \pm 5.3$	[16,58] ABE	98E	CDF	lepton + jets	
$161 \pm 17 \pm 10$	[16] ABE	98F	CDF	dilepton	
$172.1 \pm 5.2 \pm 4.9$	[59] BHAT	98B	RVUE	dilepton and lepton+jets	
173.8 ± 5.0	[60] BHAT	98B	RVUE	dilepton, lepton+jets, all-jets	OCCUR=2
$173.3 \pm 5.6 \pm 6.2$	[14] ABACHI	97E	D0	lepton + jets	
$199 {}^{+19}_{-21} \pm 22$	ABACHI	95	D0	lepton + jets	
$176 \pm 8 \pm 10$	ABE	95F	CDF	lepton + b-jet	
$174 \pm 10 {}^{+13}_{-12}$	ABE	94E	CDF	lepton + b-jet	

[1] Based on 1.04 fb^{-1} of data at LHC7. Uses 2d-template analysis (MT) with m_t and jet energy scale factor (JSF) from m_W mass fit. NODE=Q007TP;LINKAGE=GD

[2] Based on 8.7 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. The JES is calibrated by using the dijet mass from the W boson decay. NODE=Q007TP;LINKAGE=CL

[3] Use the ME method based on 2.2 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. NODE=Q007TP;LINKAGE=CD

[4] Based on 5.8 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. The quoted systematic error is the sum of JES($\pm$1.0) and systematic($\pm$1.0) uncertainties. The measurement is performed with a liklihood fit technique which simultaneously determines m_t and JES. NODE=Q007TP;LINKAGE=OA

[5] Combination with the result in 1 fb^{-1} of preceding data reported in ABAZOV 09AH as well as the MWT result of ABAZOV 11R with a statistical correlation of 60%. NODE=Q007TP;LINKAGE=VB

[6] Based on 5.0 fb^{-1} of data at LHC7. Uses an analytical matrix weighting technique (AMWT) and full kinematic analysis (KIN). NODE=Q007TP;LINKAGE=CA

[7] Based on 5.0 fb^{-1} of data at LHC7. The first error is statistical and JES combined, and the second is systematic. Ideogram method is used to obtain 2D liklihood for the kinematical fit with two parameters mtop and JES. NODE=Q007TP;LINKAGE=RC

[8] Based on 5.7 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. Events with an identified charged lepton or small $\not{E}_T$ are rejected from the event sample, so that the measurement is statistically independent from those in the ℓ + jets and all hadronic channels while being sensitive to those events with a τ lepton in the final state. Supersedes AALTONEN 07B. NODE=Q007TP;LINKAGE=TL

[9] Based on 5.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. Employs a multi-dimensional template likelihood technique where the lepton plus jets (one or two b-tags) channel gives $172.2 \pm 1.2 \pm 0.9$ GeV while the dilepton channel yields $170.3 \pm 2.0 \pm 3.1$ GeV. The results are combined. OUR EVALUATION includes the measurement in the dilepton channel only. NODE=Q007TP;LINKAGE=NT

[10] Based on 3.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. ABAZOV 11P reports $174.94 \pm 0.83 \pm 0.78 \pm 0.96$ GeV, where the first uncertainty is from statistics, the second from JES, and the last from other systematic uncertainties. We combine the JES and systematic uncertainties. A matrix-element method is used where the JES uncertainty is constrained NODE=Q007TP;LINKAGE=ZA

by the W mass. ABAZOV 11P describes a measurement based on 2.6 fb^{-1} that is combined with ABAZOV 08AH, which employs an independent 1 fb^{-1} of data.

[11] Based on 5.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The likelihood calculated using a matrix element method gives m_t = 173.0 ± 0.7(stat)±0.6(JES)±0.9(syst) GeV, for a total uncertainty of 1.2 GeV. NODE=Q007TP;LINKAGE=NA

[12] Based on 1.9 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The result is from the measurement using the transverse decay lenght of b-hadrons and that using the transverse momentum of the W decay muons, which are both insensitive to the JES (jet energy scale) uncertainty. OUR EVALUATION uses only the measurement exploiting the decay length significance which yields $166.9^{+9.5}_{-8.5}$(stat)±2.9 (syst) GeV. The measurement that uses the lepton transverse momentum is excluded from the average because of a statistical correlation with other samples. NODE=Q007TP;LINKAGE=AE

[13] Obtained by re-analysis of the lepton + jets candidate events that led to ABBOTT 98F. It is based upon the maximum likelihood method which makes use of the leading order matrix elements. NODE=Q007TP;LINKAGE=AO

[14] Based on 125 ± 7 pb^{-1} of data at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=WW

[15] Based on ∼ 106 pb^{-1} of data at $\sqrt{s}$= 1.8 TeV. NODE=Q007TP;LINKAGE=F1

[16] Based on 109 ± 7 pb^{-1} of data at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=XX

[17] See AFFOLDER 01 for details of systematic error re-evaluation. NODE=Q007TP;LINKAGE=XZ

[18] Based on the first observation of all hadronic decays of $t\overline{t}$ pairs. Single b-quark tagging with jet-shape variable constraints was used to select signal enriched multi-jet events. The updated systematic error is listed. See AFFOLDER 01, appendix C. NODE=Q007TP;LINKAGE=AR

[19] Combination based on up to 5.8 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. NODE=Q007TP;LINKAGE=EA

[20] Based on 4.3 fb^{-1} of data in p-pbar collisions at 1.96 TeV. The measurement reduces the JES uncertainty by using the single lepton channel study of ABAZOV 11P. NODE=Q007TP;LINKAGE=VA

[21] Based on 3.2 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and JES combined, and the latter is from the other systematic uncertainties. The result is obtained using an unbinned maximum likelihood method where the top quark mass and the JES are measured simultaneously, with Δ_{JES} = 0.3 ± 0.3(stat). NODE=Q007TP;LINKAGE=NL

[22] Uses a likelihood fit of the lepton p_T distribution based on 2.7 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=NN

[23] Based on a matrix-element method which employs 5.4 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. Superseded by ABAZOV 12AB. NODE=Q007TP;LINKAGE=OZ

[24] Based on 36 pb^{-1} of pp collisions at $\sqrt{s}$ = 7 TeV. A Kinematic Method using b-tagging and an analytical Matrix Weighting Technique give consistent results and are combined. Superseded by CHATRCHYAN 12BA. NODE=Q007TP;LINKAGE=CH

[25] Based on 3.4 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The result is obtained by combining the MT2 variable method and the NWA (Neutrino Weighting Algorithm). The MT2 method alone gives $m_t = 168.0^{+4.8}_{-4.0}$(stat)±2.9(syst) GeV with smaller systematic error due to small JES uncertainty. NODE=Q007TP;LINKAGE=TA

[26] Based on 2.9 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and JES uncertainty, and the latter is from the other systematics. Neural-network-based kinematical selection of 6 highest E_T jets with a vtx b-tag is used to distinguish signal from background. Superseded by AALTONEN 12G. NODE=Q007TP;LINKAGE=LN

[27] Based on 2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The top mass is obtained from the measurement of the invariant mass of the lepton (e or μ) from W decays and the soft μ in b-jet. The result is insensitive to jet energy scaling. NODE=Q007TP;LINKAGE=NO

[28] Based on 1.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and jet energy scale uncertainty, and the latter is from the other systematics. Matrix element method with effective propagators. NODE=Q007TP;LINKAGE=LO

[29] Based on 943 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistical and jet-energy-scale uncertainties, and the latter is from other systematics. AALTONEN 09K selected 6 jet events with one or more vertex b-tags and used the tree-level matrix element to construct template models of signal and background. NODE=Q007TP;LINKAGE=OT

[30] Based on 1.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistical and jet-energy-scale (JES) uncertainties, and the second is from other systematics. Events with lepton + jets and those with dilepton + jets were simultaneously fit to constrain m_t and JES. Lepton + jets data only give m_t = 171.8 ± 2.2 GeV, and dilepton data only give $m_t = 171.2^{+5.3}_{-5.1}$ GeV. NODE=Q007TP;LINKAGE=EN

[31] Based on 2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Matrix Element method. Optimal selection criteria for candidate events with two high p_T leptons, high $\not{E}_T$, and two or more jets with and without b-tag are obtained by neural network with neuroevolution technique to minimize the statistical error of m_t. NODE=Q007TP;LINKAGE=TE

[32] Based on 2.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Mass m_t is estimated from the likelihood for the eight-fold kinematical solutions in the plane of the azimuthal angles of the two neutrino momenta. NODE=Q007TP;LINKAGE=ON

[33] Based on 1 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Events with two identified leptons, and those with one lepton plus one isolated track and a b-tag were used to constrain m_t. The result is a combination of the νWT (ν Weighting Technique) result of 176.2 ± 4.8 ± 2.1 GeV and the MWT (Matrix-element Weighting Technique) result of 173.2 ± 4.9 ± 2.0 GeV. NODE=Q007TP;LINKAGE=ZV

[34] Reports measurement of $170.7^{+4.2}_{-3.9} \pm 2.6 \pm 2.4$ GeV based on 1.2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The last error is due to the theoretical uncertainty on $\sigma_{t\bar{t}}$. Without the cross-section constraint a top mass of $169.7^{+5.2}_{-4.9} \pm 3.1$ GeV is obtained. NODE=Q007TP;LINKAGE=AN

[35] Template method. NODE=Q007TP;LINKAGE=BC

[36] Result is based on 1 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and jet energy scale uncertainty, and the latter is from the other systematics. NODE=Q007TP;LINKAGE=BV

[37] Based on 310 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=TN

[38] Ideogram method. NODE=Q007TP;LINKAGE=TO

[39] Based on 311 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Events with 4 or more jets with $E_T >$ 15 GeV, significant missing E_T, and secondary vertex b-tag are used in the fit. About 44% of the signal acceptance is from $\tau\nu$ + 4 jets. Events with identified e or μ are vetoed to provide a statistically independent measurement. NODE=Q007TP;LINKAGE=LT

[40] Based on 1.02 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Superseded by AALTONEN 12G. NODE=Q007TP;LINKAGE=NE

[41] Based on 955 pb^{-1} of data $\sqrt{s}$ = 1.96 TeV. m_t and JES (Jet Energy Scale) are fitted simultaneously, and the first error contains the JES contribution of 1.5 GeV. NODE=Q007TP;LINKAGE=LA

[42] Matrix element method. NODE=Q007TP;LINKAGE=UB

[43] Based on 425 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is a combination of statistics and JES (Jet Energy Scale) uncertainty, which has been measured simultaneously to give JES = 0.989 ± 0.029(stat). NODE=Q007TP;LINKAGE=OV

[44] Based on 370 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Combined result of MWT (Matrix-element Weighting Technique) and νWT (ν Weighting Technique) analyses is 178.1 ± 6.7 ± 4.8 GeV. NODE=Q007TP;LINKAGE=ZO

[45] Based on 1.0 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. ABULENCIA 07D improves the matrix element description by including the effects of initial-state radiation. NODE=Q007TP;LINKAGE=LE

[46] Based on 695 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The transverse decay length of the b hadron is used to determine m_t, and the result is free from the JES (jet energy scale) uncertainty. NODE=Q007TP;LINKAGE=UL

[47] Based on ∼ 400 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error includes statistical and systematic jet energy scale uncertainties, the second error is from the other systematics. The result is obtained with the b-tagging information. The result without b-tagging is $169.2^{+5.0}_{-7.4}{}^{+1.5}_{-1.4}$ GeV. Superseded by ABAZOV 08AH. NODE=Q007TP;LINKAGE=BZ

[48] Based on 318 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=BA

[49] Dynamical likelihood method. NODE=Q007TP;LINKAGE=BB

[50] Based on 340 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=UA

[51] Based on 360 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=AL

[52] Based on 110.2 ± 5.8 pb^{-1} at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=AA

[53] Based on the all hadronic decays of $t\bar{t}$ pairs. Single b-quark tagging via the decay chain $b \rightarrow c \rightarrow \mu$ was used to select signal enriched multijet events. The result was obtained by the maximum likelihood method after bias correction. NODE=Q007TP;LINKAGE=AZ

[54] Obtained by combining the measurements in the lepton + jets [AFFOLDER 01], all-jets [ABE 97R, ABE 99B], and dilepton [ABE 99B] decay topologies. NODE=Q007TP;LINKAGE=F2

[55] Obtained by combining the D0 result m_t (GeV) = 168.4 ± 12.3 ± 3.6 from 6 di-lepton events (see also ABBOTT 98D) and m_t (GeV) = 173.3 ± 5.6 ± 5.5 from lepton+jet events (ABBOTT 98F). NODE=Q007TP;LINKAGE=DG

[56] Obtained by combining the CDF results of m_t (GeV)=167.4 ± 10.3 ± 4.8 from 8 dilepton events, m_t (GeV)=175.9 ± 4.8 ± 5.3 from lepton+jet events (ABE 98E), and m_t (GeV)=186.0 ± 10.0 ± 5.7 from all-jet events (ABE 97R). The systematic errors in the latter two measurements are changed in this paper. NODE=Q007TP;LINKAGE=BG

[57] See ABAZOV 04G. NODE=Q007TP;LINKAGE=AT

[58] The updated systematic error is listed. See AFFOLDER 01, appendix C. NODE=Q007TP;LINKAGE=XY

[59] Obtained by combining the DØ results of m_t(GeV)=168.4 ± 12.3 ± 3.6 from 6 dilepton events and m_t(GeV)=173.3 ± 5.6 ± 5.5 from 77 lepton+jet events. NODE=Q007TP;LINKAGE=BE

[60] Obtained by combining the DØ results from dilepton and lepton+jet events, and the CDF results (ABE 99B) from dilepton, lepton+jet events, and all-jet events. NODE=Q007TP;LINKAGE=BF

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AALTONEN	07B	PR D75 111103	T. Aaltonen *et al.*	(CDF Collab.)	REFID=51802
AALTONEN	07D	PR D76 072009	T. Aaltonen *et al.*	(CDF Collab.)	REFID=51996
AALTONEN	07I	PRL 99 182002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52044
ABAZOV	07F	PR D75 092001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=51792
ABAZOV	07W	PL B655 7	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52026
ABULENCIA	07D	PR D75 031105	A. Abulencia *et al.*	(CDF Collab.)	REFID=51683
ABULENCIA	07J	PR D75 071102	A. Abulencia *et al.*	(CDF Collab.)	REFID=51783
ABAZOV	06U	PR D74 092005	V.M. Abazov *et al.*	(D0 Collab.)	REFID=51503
ABULENCIA	06D	PRL 96 022004	A. Abulencia *et al.*	(CDF Collab.)	REFID=51102
Also		PR D73 032003	A. Abulencia *et al.*	(CDF Collab.)	REFID=51103
Also		PR D73 092002	A. Abulencia *et al.*	(CDF Collab.)	REFID=51306
ABULENCIA	06G	PRL 96 152002	A. Abulencia *et al.*	(CDF Collab.)	REFID=51104
Also		PR D74 032009	A. Abulencia *et al.*	(CDF Collab.)	REFID=51329
ABULENCIA	06V	PR D73 112006	A. Abulencia *et al.*	(CDF Collab.)	REFID=51285
ABAZOV	05	PL B606 25	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50386
ABAZOV	04G	NAT 429 638	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50556
AFFOLDER	01	PR D63 032003	T. Affolder *et al.*	(CDF Collab.)	REFID=48049
ABBOTT	99G	PR D60 052001	B. Abbott *et al.*	(D0 Collab.)	REFID=47135
ABE	99B	PRL 82 271	F. Abe *et al.*	(CDF Collab.)	REFID=46548
Also		PRL 82 2808 (erratum)	F. Abe *et al.*	(CDF Collab.)	REFID=46822
ABBOTT	98D	PRL 80 2063	B. Abbott *et al.*	(D0 Collab.)	REFID=45940
ABBOTT	98F	PR D58 052001	B. Abbott *et al.*	(D0 Collab.)	REFID=45967
ABE	98E	PRL 80 2767	F. Abe *et al.*	(CDF Collab.)	REFID=45941
ABE	98F	PRL 80 2779	F. Abe *et al.*	(CDF Collab.)	REFID=45942
BHAT	98B	IJMP A13 5113	P.C. Bhat, H.B. Prosper, S.S. Snyder		REFID=46531
ABACHI	97E	PRL 79 1197	S. Abachi *et al.*	(D0 Collab.)	REFID=45590
ABE	97R	PRL 79 1992	F. Abe *et al.*	(CDF Collab.)	REFID=45594
PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495
ABACHI	95	PRL 74 2632	S. Abachi *et al.*	(D0 Collab.)	REFID=44167
ABE	95F	PRL 74 2626	F. Abe *et al.*	(CDF Collab.)	REFID=44170
ABE	94E	PR D50 2966	F. Abe *et al.*	(CDF Collab.)	REFID=43810
Also		PRL 73 225	F. Abe *et al.*	(CDF Collab.)	REFID=43823

Reference = AALTONEN 12I; PRL 108 081807
Verifier code = CDF

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Konstantinos Vellidis

EMAIL: vellidis@fnal.gov

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS ($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

$B^\pm/B^0$ ADMIXTURE

NODE=S049

POLARIZATION IN B DECAY

NODE=S049224

In decays involving two vector mesons, one can distinguish among the states in which meson polarizations are both longitudinal (L) or both are transverse and parallel ($\|$) or perpendicular ($\perp$) to each other with the parameters Γ_L/Γ, $\Gamma_\perp/\Gamma$, and the relative phases $\phi_\|$ and $\phi_\perp$. See the definitions in the note on "Polarization in B Decays" review in the B^0 Particle Listings.

NODE=S049224

$F_L(B \to K^* \ell^+ \ell^-)$ ($q^2 < 2.0$ GeV^2/c^2)

NODE=S049FL3

VALUE	DOCUMENT ID		TECN	COMMENT
$0.159^{+0.110}_{-0.023}$ OUR AVERAGE Error includes scale factor of 1.2. [0.35 ± 0.17 OUR 2012 AVERAGE]				
$0.00\ ^{+0.13}_{-0.00} \pm 0.02$	AAIJ	12U	LHCB	pp at 7 TeV
YOUR DATA $0.30 \pm 0.16 \pm 0.02$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.29\ ^{+0.21}_{-0.18} \pm 0.02$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.53\ ^{+0.32}_{-0.34} \pm 0.07$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

NODE=S049FL3 NEW

$F_L(B \to K^* \ell^+ \ell^-)$ ($2.0 < q^2 < 4.3$ GeV^2/c^2)

NODE=S049FL4

VALUE	DOCUMENT ID		TECN	COMMENT
0.68 ± 0.12 OUR AVERAGE [0.60 ± 0.20 OUR 2012 AVERAGE]				
$0.77 \pm 0.15 \pm 0.03$	AAIJ	12U	LHCB	pp at 7 TeV
YOUR DATA $0.37^{+0.25}_{-0.24} \pm 0.10$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.71 \pm 0.24 \pm 0.05$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.40^{+0.32}_{-0.33} \pm 0.08$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

NODE=S049FL4 NEW

$F_L(B \to K^* \ell^+ \ell^-)$ ($4.3 < q^2 < 8.6$ GeV^2/c^2)

NODE=S049FL5

VALUE	DOCUMENT ID		TECN	COMMENT
0.61 ± 0.06 OUR AVERAGE [$0.74^{+0.15}_{-0.17}$ OUR 2012 AVERAGE]				
$0.60^{+0.06}_{-0.07} \pm 0.01$	AAIJ	12U	LHCB	pp at 7 TeV
YOUR DATA $0.68^{+0.15}_{-0.17} \pm 0.09$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.64^{+0.23}_{-0.24} \pm 0.07$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.82^{+0.19}_{-0.23} \pm 0.07$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

NODE=S049FL5 NEW

$F_L(B \to K^* \ell^+ \ell^-)$ ($10.09 < q^2 < 12.86$ GeV^2/c^2)

NODE=S049FL6

VALUE	DOCUMENT ID		TECN	COMMENT
0.38 ± 0.08 OUR AVERAGE [0.23 ± 0.12 OUR 2012 AVERAGE]				
$0.41 \pm 0.11 \pm 0.03$	AAIJ	12U	LHCB	pp at 7 TeV
YOUR DATA $0.47 \pm 0.14 \pm 0.03$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.17^{+0.17}_{-0.15} \pm 0.03$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				

NODE=S049FL6 NEW

$0.31^{+0.19}_{-0.18}\pm0.02$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

$F_L(B \to K^* \ell^+ \ell^-)$ ($14.18 < q^2 < 16.0$ GeV^2/c^2)

NODE=S049FL7
NODE=S049FL7

VALUE	DOCUMENT ID	TECN	COMMENT
0.30 ± 0.10 OUR AVERAGE Error includes scale factor of 1.2. [0.34 ± 0.31 OUR 2012 AVERAGE Scale factor = 2.1]			
$0.37\pm0.09\pm0.05$	AAIJ	12U	LHCB pp at 7 TeV
YOUR DATA $0.29^{+0.14}_{-0.13}\pm0.05$	AALTONEN	12I	CDF $p\overline{p}$ at 1.96 TeV
$-0.15^{+0.27}_{-0.23}\pm0.07$	WEI	09A	BELL $e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.55^{+0.17}_{-0.18}\pm0.02$	AALTONEN	11L	CDF Repl. by AALTONEN 12I

NEW

$F_L(B \to K^* \ell^+ \ell^-)$ ($q^2 > 16.0$ GeV^2/c^4)

NODE=S049FL8
NODE=S049FL8

VALUE	DOCUMENT ID	TECN	COMMENT
$0.22^{+0.08}_{-0.07}$ OUR AVERAGE [$0.11^{+0.12}_{-0.10}$ OUR 2012 AVERAGE]			
$0.26^{+0.10}_{-0.08}\pm0.03$	AAIJ	12U	LHCB pp at 7 TeV
YOUR DATA $0.20^{+0.19}_{-0.17}\pm0.05$	AALTONEN	12I	CDF $p\overline{p}$ at 1.96 TeV
$0.12^{+0.15}_{-0.13}\pm0.02$	WEI	09A	BELL $e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.09^{+0.18}_{-0.14}\pm0.03$	AALTONEN	11L	CDF Repl. by AALTONEN 12I

NEW

$F_L(B \to K^* \ell^+ \ell^-)$ ($1.0 < q^2 < 6.0$ GeV^2/c^4)

NODE=S049FL9
NODE=S049FL9

VALUE	DOCUMENT ID	TECN	COMMENT
0.59 ± 0.09 OUR AVERAGE [0.60 ± 0.18 OUR 2012 AVERAGE]			
$0.55\pm0.10\pm0.03$	AAIJ	12U	LHCB pp at 7 TeV
YOUR DATA $0.69^{+0.19}_{-0.21}\pm0.08$	AALTONEN	12I	CDF $p\overline{p}$ at 1.96 TeV
$0.67\pm0.23\pm0.05$	WEI	09A	BELL $e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.50^{+0.27}_{-0.30}\pm0.03$	AALTONEN	11L	CDF Repl. by AALTONEN 12I

NEW

$F_L(B \to K^* \ell^+ \ell^-)$ ($0.0 < q^2 < 4.3$ GeV^2/c^2)

NODE=S049FLA
NODE=S049FLA

VALUE	DOCUMENT ID	TECN	COMMENT
0.33 ± 0.14 OUR AVERAGE [0.47 ± 0.24 OUR 2012 AVERAGE]			
YOUR DATA **$0.33^{+0.14}_{-0.13}\pm0.03$**	AALTONEN	12I	CDF $p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.47^{+0.23}_{-0.24}\pm0.03$	AALTONEN	11L	CDF Repl. by AALTONEN 12I

NEW

LEPTON FORWARD-BACKWARD ASYMMETRY IN $B \to K^{(*)} \ell^+ \ell^-$ DECAY

NODE=S049220

The forward-backward angular asymmetry of the lepton pair in $B \to K^{(*)} \ell^+ \ell^-$ decay is defined as

NODE=S049220

$$A_{FB}(s) = \frac{N(cos\theta>0)-N(cos\theta<0)}{N(cos\theta>0)+N(cos\theta<0)},$$

where $s=q^2/m_B^2$, and θ is the angle of the lepton with respect to the flight direction of the B meson, measured in the dilepton rest frame. In addition, the fraction of longitudinal polarization F_L of the K^* and F_S, the relative contribution from scalar and pseudoscalar penguin amplitudes in $B \to K \ell^+ \ell^-$, can be measured from the angular distribution of its decay products.

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($q^2 < 2.0$ GeV^2/c^4)

NODE=S049FB5
NODE=S049FB5

VALUE	DOCUMENT ID	TECN	COMMENT
-0.07 ± 0.20 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below. [$0.45^{+0.26}_{-0.30}$ OUR 2012 AVERAGE]			
$-0.15 \pm 0.20 \pm 0.06$	AAIJ 12U	LHCB	pp at 7 TeV
YOUR DATA $-0.35^{+0.26}_{-0.23} \pm 0.10$	AALTONEN 12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.47^{+0.26}_{-0.32} \pm 0.03$	WEI 09A	BELL	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.13^{+1.65}_{-0.75} \pm 0.25$	AALTONEN 11L	CDF	Repl. by AALTONEN 12I

NEW

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($2.0 < q^2 < 4.3$ GeV^2/c^4)

NODE=S049FB6
NODE=S049FB6

VALUE	DOCUMENT ID	TECN	COMMENT
$0.10^{+0.14}_{-0.16}$ OUR AVERAGE [0.14 ± 0.27 OUR 2012 AVERAGE]			
$0.05^{+0.16}_{-0.20} \pm 0.04$	AAIJ 12U	LHCB	pp at 7 TeV
YOUR DATA $0.29^{+0.32}_{-0.35} \pm 0.15$	AALTONEN 12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.11^{+0.31}_{-0.36} \pm 0.07$	WEI 09A	BELL	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.19^{+0.40}_{-0.41} \pm 0.14$	AALTONEN 11L	CDF	Repl. by AALTONEN 12I

NEW

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($0.0 < q^2 < 4.3$ GeV^2/c^4)

NODE=S049FBF
NODE=S049FBF

VALUE	DOCUMENT ID	TECN	COMMENT
-0.08 ± 0.21 OUR AVERAGE [0.21 ± 0.32 OUR 2012 AVERAGE]			
YOUR DATA **$-0.08^{+0.21}_{-0.20} \pm 0.05$**	AALTONEN 12I	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.21^{+0.31}_{-0.33} \pm 0.05$	AALTONEN 11L	CDF	Repl. by AALTONEN 12I

NEW

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($1.0 < q^2 < 6.0$ GeV^2/c^4)

NODE=S049FBE
NODE=S049FBE

VALUE	DOCUMENT ID	TECN	COMMENT
0.07 ± 0.12 OUR AVERAGE [0.32 ± 0.23 OUR 2012 AVERAGE]			
$-0.06^{+0.13}_{-0.14} \pm 0.07$	AAIJ 12U	LHCB	pp at 7 TeV
YOUR DATA $0.29^{+0.20}_{-0.23} \pm 0.07$	AALTONEN 12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.26^{+0.27}_{-0.30} \pm 0.07$	WEI 09A	BELL	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.43^{+0.36}_{-0.37} \pm 0.06$	AALTONEN 11L	CDF	Repl. by AALTONEN 12I

NEW

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($4.3 < q^2 < 8.6$ GeV^2/c^4)

NODE=S049FB7
NODE=S049FB7

VALUE	DOCUMENT ID	TECN	COMMENT
$0.26^{+0.06}_{-0.07}$ OUR AVERAGE [0.24 ± 0.24 OUR 2012 AVERAGE Scale factor = 1.3]			
$0.27^{+0.06}_{-0.08} \pm 0.02$	AAIJ 12U	LHCB	pp at 7 TeV
YOUR DATA $0.01 \pm 0.20 \pm 0.09$	AALTONEN 12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.45^{+0.15}_{-0.21} \pm 0.15$	WEI 09A	BELL	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$-0.06^{+0.30}_{-0.28} \pm 0.05$	AALTONEN 11L	CDF	Repl. by AALTONEN 12I

NEW

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($10.09 < q^2 < 12.86$ GeV^2/c^4)

NODE=S049FBB
NODE=S049FBB

VALUE	DOCUMENT ID	TECN	COMMENT
$0.33^{+0.08}_{-0.10}$ OUR AVERAGE [0.53 ± 0.15 OUR 2012 AVERAGE]			
$0.27^{+0.11}_{-0.13} \pm 0.02$	AAIJ 12U	LHCB	pp at 7 TeV

NEW

YOUR DATA	$0.38^{+0.16}_{-0.19}\pm0.09$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
	$0.43^{+0.18}_{-0.20}\pm0.03$	WEI	09A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
	$0.66^{+0.23}_{-0.20}\pm0.07$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

$A_{FB}(B \rightarrow K^*\ell^+\ell^-)$ ($14.18 < q^2 < 16.0$ GeV^2/c^4)

NODE=S049FBC
NODE=S049FBC

VALUE	DOCUMENT ID	TECN	COMMENT
$0.49^{+0.06}_{-0.08}$ OUR AVERAGE			
[$0.53^{+0.13}_{-0.15}$ OUR 2012 AVERAGE]			
$0.47^{+0.06}_{-0.08}\pm0.03$	AAIJ	12U	LHCB pp at 7 TeV
YOUR DATA $0.44^{+0.18}_{-0.21}\pm0.10$	AALTONEN	12I	CDF $p\overline{p}$ at 1.96 TeV
$0.70^{+0.16}_{-0.22}\pm0.10$	WEI	09A	BELL $e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.42\pm0.16\pm0.09$	AALTONEN	11L	CDF Repl. by AALTONEN 12I

NEW

$A_{FB}(B \rightarrow K^*\ell^+\ell^-)$ ($q^2 > 16.0$ GeV^2/c^4)

NODE=S049FBD
NODE=S049FBD

VALUE	DOCUMENT ID	TECN	COMMENT
$0.39^{+0.15}_{-0.19}$ OUR AVERAGE Error includes scale factor of 1.9. See the ideogram below.			
[$0.67^{+0.10}_{-0.14}$ OUR 2012 AVERAGE]			
$0.16^{+0.11}_{-0.13}\pm0.06$	AAIJ	12U	LHCB pp at 7 TeV
YOUR DATA $0.65^{+0.17}_{-0.18}\pm0.16$	AALTONEN	12I	CDF $p\overline{p}$ at 1.96 TeV
$0.66^{+0.11}_{-0.16}\pm0.04$	WEI	09A	BELL $e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.70^{+0.16}_{-0.25}\pm0.10$	AALTONEN	11L	CDF Repl. by AALTONEN 12I

NEW

$A_{FB}(B \rightarrow K\ell^+\ell^-)$ ($q^2 < 2.0$ GeV^2/c^4)

NODE=S049FB8
NODE=S049FB8

VALUE	DOCUMENT ID	TECN	COMMENT
$0.00^{+0.06}_{-0.05}$ OUR AVERAGE			
[-0.02 ± 0.26 OUR 2012 AVERAGE]			
$0.00^{+0.06}_{-0.05}{}^{+0.03}_{-0.01}$	AAIJ	13H	LHCB pp at 7 TeV
YOUR DATA $0.13^{+0.42}_{-0.43}\pm0.07$	AALTONEN	12I	CDF $p\overline{p}$ at 1.96 TeV
$0.06^{+0.32}_{-0.35}\pm0.02$	WEI	09A	BELL $e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$-0.15^{+0.46}_{-0.39}\pm0.08$	AALTONEN	11L	CDF Repl. by AALTONEN 12I

NEW

$A_{FB}(B \rightarrow K\ell^+\ell^-)$ ($2.0 < q^2 < 4.3$ GeV^2/c^4)

NODE=S049FB9
NODE=S049FB9

VALUE	DOCUMENT ID	TECN	COMMENT
$0.09^{+0.10}_{-0.07}$ OUR AVERAGE Error includes scale factor of 1.4. [0.2 ± 0.6 OUR 2012 AVERAGE Scale factor = 2.2]			
$0.07^{+0.08}_{-0.05}{}^{+0.02}_{-0.01}$	AAIJ	13H	LHCB pp at 7 TeV
YOUR DATA $0.32^{+0.15}_{-0.16}\pm0.05$	AALTONEN	12I	CDF $p\overline{p}$ at 1.96 TeV
$-0.43^{+0.38}_{-0.40}\pm0.09$	WEI	09A	BELL $e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.72^{+0.40}_{-0.35}\pm0.07$	AALTONEN	11L	CDF Repl. by AALTONEN 12I

NEW

$A_{FB}(B \to K\ell^+\ell^-)$ ($0.0 < q^2 < 4.3$ GeV^2/c^4)

NODE=S049FBK
NODE=S049FBK

	VALUE	DOCUMENT ID		TECN	COMMENT
	0.31 ± 0.16 OUR AVERAGE [0.36 ± 0.26 OUR 2012 AVERAGE]				
YOUR DATA	**$0.31 \pm 0.16 \pm 0.04$**	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	$0.36^{+0.24}_{-0.26} \pm 0.06$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

NEW

$A_{FB}(B \to K\ell^+\ell^-)$ ($1.0 < q^2 < 6.0$ GeV^2/c^4)

NODE=S049FBJ
NODE=S049FBJ

	VALUE	DOCUMENT ID		TECN	COMMENT
	$0.034^{+0.040}_{-0.029}$ OUR AVERAGE [-0.01 ± 0.13 OUR 2012 AVERAGE]				
	$0.02\ ^{+0.05}_{-0.03}\ ^{+0.02}_{-0.01}$	AAIJ	13H	LHCB	pp at 7 TeV
YOUR DATA	$0.13 \pm 0.09 \pm 0.02$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
	$-0.04\ ^{+0.13}_{-0.16} \pm 0.05$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	$0.08\ ^{+0.27}_{-0.22} \pm 0.07$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

NEW

$A_{FB}(B \to K\ell^+\ell^-)$ ($4.3 < q^2 < 8.6$ GeV^2/c^4)

NODE=S049FBA
NODE=S049FBA

	VALUE	DOCUMENT ID		TECN	COMMENT
	$-0.04^{+0.04}_{-0.05}$ OUR AVERAGE [$-0.20^{+0.10}_{-0.13}$ OUR 2012 AVERAGE]				
	$-0.02^{+0.03}_{-0.05} \pm 0.03$	AAIJ	13H	LHCB	pp at 7 TeV
YOUR DATA	$0.01^{+0.13}_{-0.10} \pm 0.01$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
	$-0.20^{+0.12}_{-0.14} \pm 0.03$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	$-0.20^{+0.17}_{-0.28} \pm 0.03$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

NEW

$A_{FB}(B \to K\ell^+\ell^-)$ ($10.09 < q^2 < 12.86$ GeV^2/c^4)

NODE=S049FBG
NODE=S049FBG

	VALUE	DOCUMENT ID		TECN	COMMENT
	-0.05 ± 0.06 OUR AVERAGE [$-0.15^{+0.13}_{-0.12}$ OUR 2012 AVERAGE]				
	$-0.03 \pm 0.07 \pm 0.01$	AAIJ	13H	LHCB	pp at 7 TeV
YOUR DATA	$-0.03^{+0.11}_{-0.10} \pm 0.04$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
	$-0.21^{+0.17}_{-0.15} \pm 0.06$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	$-0.10^{+0.17}_{-0.15} \pm 0.07$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

NEW

$A_{FB}(B \to K\ell^+\ell^-)$ ($14.18 < q^2 < 16.0$ GeV^2/c^4)

NODE=S049FBH
NODE=S049FBH

	VALUE	DOCUMENT ID		TECN	COMMENT
	$-0.02^{+0.07}_{-0.05}$ OUR AVERAGE [$0.03^{+0.27}_{-0.14}$ OUR 2012 AVERAGE]				
	$-0.01^{+0.12}_{-0.06} \pm 0.01$	AAIJ	13H	LHCB	pp at 7 TeV
YOUR DATA	$-0.05^{+0.09}_{-0.11} \pm 0.03$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
	$0.04^{+0.32}_{-0.26} \pm 0.05$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	$0.03^{+0.49}_{-0.16} \pm 0.04$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

NEW

$A_{FB}(B \to K\ell^+\ell^-)$ ($q^2 > 16.0$ GeV^2/c^4)

NODE=S049FBI
NODE=S049FBI

VALUE	DOCUMENT ID	TECN	COMMENT
$0.04^{+0.09}_{-0.07}$ OUR AVERAGE			

NEW

	$[0.03^{+0.10}_{-0.08}$ OUR 2012 AVERAGE]				
YOUR DATA	$0.09^{+0.17}_{-0.13} \pm 0.03$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
	$0.02^{+0.11}_{-0.08} \pm 0.02$	WEI	09A	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	$0.07^{+0.30}_{-0.23} \pm 0.02$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

$B^{\pm}/B^{0}$ ADMIXTURE REFERENCES

NODE=S049

	AAIJ 13H	JHEP 1302 105	R. Aaij *et al.*	(LHCb Collab.)	REFID=54859
	AAIJ 12U	PRL 108 181806	R. Aaij *et al.*	(LHCb Collab.)	REFID=54215
YOUR PAPER	AALTONEN 12I	PRL 108 081807	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54206
	AALTONEN 11L	PRL 106 161801	T. Aaltonen *et al.*	(CDF Collab.)	REFID=16443
	WEI 09A	PRL 103 171801	J.-T. Wei *et al.*	(BELLE Collab.)	REFID=53061
	Also	EPAPS Supplement EPAPS_appendix.pdf		(BELLE Collab.)	REFID=53240;ERROR=5

Reference = AALTONEN 12L; PRL 108 211803
Verifier code = CDF

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Konstantinos Vellidis

EMAIL: vellidis@fnal.gov

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
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Berkeley, CA 94720-8153
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BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(K^+K^-)/\Gamma_{total}$ — **Γ_{285}/Γ**

NODE=S042S1
NODE=S042S1

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	0.13±0.05 OUR AVERAGE					
	0.10±0.08±0.04		[1,2] DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
	$0.12^{+0.08}_{-0.07}\pm0.01$		[3] AAIJ	12AR	LHCB	pp at 7 TeV
YOUR DATA	0.23±0.10±0.10		[4] AALTONEN	12L	CDF	$p\overline{p}$ at 1.96 TeV
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
<	0.7	90	[5] AALTONEN	09C	CDF	Repl. by AALTONEN 12L
<	0.5	90	[2] AUBERT	07B	BABR	$e^+e^- \to \Upsilon(4S)$
<	0.41	90	[2] LIN	07	BELL	Repl. by DUH 13
<	1.8	90	[6] ABULENCIA,A	06D	CDF	Repl. by AALTONEN 09C
<	0.37	90	ABE	05G	BELL	Repl. by LIN 07
<	0.7	90	CHAO	04	BELL	$e^+e^- \to \Upsilon(4S)$
<	0.8	90	[2] BORNHEIM	03	CLE2	$e^+e^- \to \Upsilon(4S)$
<	0.6	90	[2] AUBERT	02Q	BABR	$e^+e^- \to \Upsilon(4S)$
<	0.9	90	[2] CASEY	02	BELL	$e^+e^- \to \Upsilon(4S)$
<	2.7	90	[2] ABE	01H	BELL	$e^+e^- \to \Upsilon(4S)$
<	2.5	90	[2] AUBERT	01E	BABR	$e^+e^- \to \Upsilon(4S)$
<	66	90	[7] ABE	00C	SLD	$e^+e^- \to Z$
<	1.9	90	[2] CRONIN-HEN..	00	CLE2	$e^+e^- \to \Upsilon(4S)$
<	4.3	90	GODANG	98	CLE2	Repl. by CRONIN-HENNESSY 00
<	46		[8] ADAM	96D	DLPH	$e^+e^- \to Z$
<	4	90	ASNER	96	CLE2	Repl. by GODANG 98
<	18	90	[9] BUSKULIC	96V	ALEP	$e^+e^- \to Z$
<	120	90	[10] ABREU	95N	DLPH	Sup. by ADAM 96D
<	7	90	[2] BATTLE	93	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] DUH 13 reports also for the same data $B(B^0 \to K^+K^-) < 0.20 \times 10^{-6}$ at 90% CL. NODE=S042S1;LINKAGE=B

[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042S1;LINKAGE=EP

[3] AAIJ 12AR reports $[\Gamma(B^0 \to K^+K^-)/\Gamma_{total}]$ / $[B(B^0_s \to K^+K^-)]$ / $[\Gamma(\overline{b} \to B^0_s)/\Gamma(\overline{b} \to B^0)] = 0.018^{+0.008}_{-0.007} \pm 0.009$ which we multiply by our best values $B(B^0_s \to K^+K^-) = (2.52 \pm 0.17) \times 10^{-5}$, $\Gamma(\overline{b} \to B^0_s)/\Gamma(\overline{b} \to B^0) = 0.259 \pm 0.016$. Our first error is their experiment's error and our second error is the systematic error from using our best values. NODE=S042S1;LINKAGE=AI

[4] Reported a central value of $(0.23 \pm 0.10 \pm 0.10) \times 10^{-6}$ using $B(B^0 \to K^+\pi^-) = (19.4 \pm 0.6) \times 10^{-6}$. NODE=S042S1;LINKAGE=AL

[5] Obtains this result from $B(K^+K^-)/B(K^+\pi^-) = 0.020 \pm 0.008 \pm 0.006$, assuming $B(B^0 \to K^+\pi^-) = (19.4 \pm 0.6) \times 10^{-6}$. NODE=S042S1;LINKAGE=AA

[6] ABULENCIA,A 06D obtains this from $\Gamma(K^+K^-)/\Gamma(K^+\pi^-) < 0.10$ at 90% CL, assuming $B(B^0 \to K^+\pi^-) = (18.9 \pm 0.7) \times 10^{-6}$. NODE=S042S1;LINKAGE=AB

[7] ABE 00C assumes B($Z \rightarrow b\overline{b}$)=(21.7 ± 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})$% and $f_{B_s}=(10.5^{+1.8}_{-2.2})$%. NODE=S042S1;LINKAGE=KQ

[8] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$. Contributions from B^0 and B_s decays cannot be separated. Limits are given for the weighted average of the decay rates for the two neutral B mesons. NODE=S042S1;LINKAGE=DQ

[9] BUSKULIC 96V assumes PDG 96 production fractions for B^0, B^+, B_s, b baryons. NODE=S042S1;LINKAGE=BV

[10] Assumes a B^0, B^- production fraction of 0.39 and a B_s production fraction of 0.12. Contributions from B^0 and B^0_s decays cannot be separated. Limits are given for the weighted average of the decay rates for the two neutral B mesons. NODE=S042S1;LINKAGE=SR

B^0 REFERENCES

NODE=S042

	DUH	13	PR D87 031103	Y. T. Duh *et al.* (Belle)	REFID=54957
	AAIJ	12AR	JHEP 1210 037	R. Aaij *et al.* (LHCb Collab.)	REFID=54595
YOUR PAPER	AALTONEN	12L	PRL 108 211803	T. Aaltonen *et al.* (CDF Collab.)	REFID=54241
	AALTONEN	09C	PRL 103 031801	T. Aaltonen *et al.* (CDF Collab.)	REFID=52698
	AUBERT	07B	PR D75 012008	B. Aubert *et al.* (BABAR Collab.)	REFID=51610
	LIN	07	PRL 98 181804	S.-W. Lin *et al.* (BELLE Collab.)	REFID=51752
	ABULENCIA,A	06D	PRL 97 211802	A. Abulencia *et al.* (CDF Collab.)	REFID=51490
	ABE	05G	PRL 95 231802	K. Abe *et al.* (BELLE Collab.)	REFID=50936
	CHAO	04	PR D69 111102	Y. Chao *et al.* (BELLE Collab.)	REFID=50006
	BORNHEIM	03	PR D68 052002	A. Bornheim *et al.* (CLEO Collab.)	REFID=49546
	AUBERT	02Q	PRL 89 281802	B. Aubert *et al.* (BaBar Collab.)	REFID=49243
	CASEY	02	PR D66 092002	B.C.K. Casey *et al.* (BELLE Collab.)	REFID=49071
	ABE	01H	PRL 87 101801	K. Abe *et al.* (BELLE Collab.)	REFID=48247
	AUBERT	01E	PRL 87 151802	B. Aubert *et al.* (BaBar Collab.)	REFID=48378
	ABE	00C	PR D62 071101	K. Abe *et al.* (SLD Collab.)	REFID=47762
	CRONIN-HEN...	00	PRL 85 515	D. Cronin-Hennessy *et al.* (CLEO Collab.)	REFID=47659
	GODANG	98	PRL 80 3456	R. Godang *et al.* (CLEO Collab.)	REFID=45935
	ADAM	96D	ZPHY C72 207	W. Adam *et al.* (DELPHI Collab.)	REFID=45276
	ASNER	96	PR D53 1039	D.M. Asner *et al.* (CLEO Collab.)	REFID=44734
	BUSKULIC	96V	PL B384 471	D. Buskulic *et al.* (ALEPH Collab.)	REFID=44909
	PDG	96	PR D54 1	R. M. Barnett *et al.*	REFID=44495
	ABREU	95N	PL B357 255	P. Abreu *et al.* (DELPHI Collab.)	REFID=44417
	BATTLE	93	PRL 71 3922	M. Battle *et al.* (CLEO Collab.)	REFID=43640

BOTTOM, STRANGE MESONS
($B = \pm 1$, $S = \mp 1$)

NODE=MXXX046

$B^0_s = s\overline{b}$, $\overline{B}^0_s = \overline{s}\,b$, similarly for B^*_s's

NODE=MXXX046

NODE=S086

B^0_s

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions. NODE=S086

B^0_s BRANCHING RATIOS

NODE=S086230

$\Gamma(\pi^+\pi^-)/\Gamma_{total}$ — Γ_{35}/Γ

NODE=S086R15
NODE=S086R15

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
0.76±0.19 OUR AVERAGE		Error includes scale factor of 1.4.			
$0.99^{+0.23}_{-0.19}\pm0.07$		[1] AAIJ	12AR	LHCB	pp at 7 TeV
YOUR DATA $0.60\pm0.17\pm0.04$		[2] AALTONEN	12L	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<$ 12	90	[3] PENG	10	BELL	$e^+e^- \rightarrow \Upsilon(5S)$
$<$ 1.2	90	[4] AALTONEN	09C	CDF	Repl. by AALTONEN 12L
$<$ 1.7	90	[5] ABULENCIA,A	06D	CDF	Repl. by AALTONEN 09C
$<$232	90	[6] ABE	00C	SLD	$e^+e^- \rightarrow Z$
$<$170	90	[7] BUSKULIC	96V	ALEP	$e^+e^- \rightarrow Z$

[1] AAIJ 12AR reports $[\Gamma(B^0_s \rightarrow \pi^+\pi^-)/\Gamma_{total}]$ / $[B(B^0 \rightarrow \pi^+\pi^-)] \times [\Gamma(\overline{b} \rightarrow B^0_s)/\Gamma(\overline{b} \rightarrow B^0)] = 0.050^{+0.011}_{-0.009} \pm 0.004$ which we multiply or divide by our best values $B(B^0 \rightarrow \pi^+\pi^-) = (5.12 \pm 0.19) \times 10^{-6}$, $\Gamma(\overline{b} \rightarrow B^0_s)/\Gamma(\overline{b} \rightarrow B^0) = 0.259 \pm 0.016$. Our first error is their experiment's error and our second error is the systematic error from using our best values. NODE=S086R15;LINKAGE=AI

[2] AALTONEN 12L reports $[\Gamma(B^0_s \rightarrow \pi^+\pi^-)/\Gamma_{\rm total}]$ / $[B(B^0 \rightarrow K^+\pi^-)] \times [\Gamma(\overline{b} \rightarrow B^0_s)/\Gamma(\overline{b} \rightarrow B^0)] = 0.008 \pm 0.002 \pm 0.001$ which we multiply or divide by our best values $B(B^0 \rightarrow K^+\pi^-) = (1.96 \pm 0.05) \times 10^{-5}$, $\Gamma(\overline{b} \rightarrow B^0_s)/\Gamma(\overline{b} \rightarrow B^0) = 0.259 \pm 0.016$. Our first error is their experiment's error and our second error is the systematic error from using our best values. NODE=S086R15;LINKAGE=AL

[3] Uses $\Upsilon(10860) \rightarrow B^*_s \overline{B}^*_s$ and assumes $B(\Upsilon(10860) \rightarrow B^{(*)}_s \overline{B}^{(*)}_s) = (19.3 \pm 2.9)\%$ and $\Gamma(\Upsilon(10860) \rightarrow B^*_s \overline{B}^*_s)$ / $\Gamma(\Upsilon(10860) \rightarrow B^{(*)}_s \overline{B}^{(*)}_s) = (90.1^{+3.8}_{-4.0})\%$. NODE=S086R15;LINKAGE=PE

[4] Obtains this result from $(f_s/f_d) \cdot B(B_s \rightarrow \pi^+\pi^-)/B(B^0 \rightarrow K^+\pi^-) = 0.007 \pm 0.004 \pm 0.005$, assuming $f_s/f_d = 0.276 \pm 0.034$ and $B(B^0 \rightarrow K^+\pi^-) = (19.4 \pm 0.6) \times 10^{-6}$. NODE=S086R15;LINKAGE=AA

[5] ABULENCIA,A 06D obtains this from $B(B_s \rightarrow \pi^+\pi^-)$ / $B(B_s \rightarrow K^+K^-) < 0.05$ at 90% CL, assuming $B(B_s \rightarrow K^+K^-) = (33 \pm 6 \pm 7) \times 10^{-6}$. NODE=S086R15;LINKAGE=AB

[6] ABE 00C assumes $B(Z \rightarrow b\overline{b})$=(21.7 ± 0.1)% and the B fractions f_{B^0}=f_{B^+}=$(39.7^{+1.8}_{-2.2})$% and f_{B_s}=$(10.5^{+1.8}_{-2.2})$%. NODE=S086R15;LINKAGE=KQ

[7] BUSKULIC 96V assumes PDG 96 production fractions for B^0, B^+, B_s, b baryons. NODE=S086R15;LINKAGE=BV

B^0_s REFERENCES

NODE=S086

	AAIJ	12AR	JHEP 1210 037	R. Aaij *et al.*	(LHCb Collab.)	REFID=54595
YOUR PAPER	AALTONEN	12L	PRL 108 211803	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54241
	PENG	10	PR D82 072007	C.-C. Peng *et al.*	(BELLE Collab.)	REFID=53470
	AALTONEN	09C	PRL 103 031801	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52698
	ABULENCIA,A	06D	PRL 97 211802	A. Abulencia *et al.*	(CDF Collab.)	REFID=51490
	ABE	00C	PR D62 071101	K. Abe *et al.*	(SLD Collab.)	REFID=47762
	BUSKULIC	96V	PL B384 471	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=44909
	PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495

Reference = AALTONEN 12AI; PRL 109 152003
Verifier code = CDF

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Konstantinos Vellidis

EMAIL: vellidis@fnal.gov

June 4, 2013

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Thank you for helping us make the Review accurate and useful.

Sincerely,

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USA

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FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

QUARKS

NODE=QXXX005

NODE=Q007

t

$I(J^P) = 0(\frac{1}{2}^+)$

NODE=Q007

Charge $= \frac{2}{3}\ e$ Top $= +1$

t-QUARK MASS

NODE=Q007210

NODE=Q007210

We first list the direct measurements of the top quark mass which employ the event kinematics and then list the measurements which extract a top quark mass from the measured $t\bar{t}$ cross-section using theory calculations. A discussion of the definition of the top quark mass in these measurements can be found in the review "The Top Quark."

OUR EVALUATION of $173.07 \pm 0.52 \pm 0.72$ GeV is an average of published top mass measurements from Tevatron Runs. The LHC experiments are working on a combined average that should appear in the 2014 PDG edition once the correlated uncertainties between experiments are understood. The Tevatron average was provided by the Tevatron Electroweak Working Group (TEVEWWG). It takes correlated uncertainties into account and has a χ^2 of 8.4 for 11 degrees of freedom.

For earlier search limits see PDG 96, Physical Review **D54** 1 (1996). We no longer include a compilation of indirect top mass determinations from Standard Model Electroweak fits in the Listings (our last compilation can be found in the Listings of the 2007 partial update). For a discussion of current results see the reviews "The Top Quark" and "Electroweak Model and Constraints on New Physics."

t-Quark Mass (Direct Measurements)

NODE=Q007TP

NODE=Q007TP

The following measurements extract a t-quark mass from the kinematics of $t\bar{t}$ events. They are sensitive to the top quark mass used in the MC generator that is usually interpreted as the pole mass, but the theoretical uncertainty in this interpretation is hard to quantify. See the review "The Top Quark" and references therein for more information.

NODE=Q007TP

	VALUE (GeV)	DOCUMENT ID		TECN	COMMENT	
	173.07± 0.52± 0.72 OUR EVALUATION See comments in the header above. [173.5 ± 0.6 ± 0.8 GeV OUR 2012 EVALUATION]					NEW;→ UNCHECKED ←
	174.5 ± 0.6 ± 2.3	[1] AAD	12I	ATLS	$\ell + \not{E}_T + \geq 4$ jets (≥ 1 b), MT	
YOUR DATA	172.85± 0.71± 0.85	[2] AALTONEN	12AI	CDF	$\ell + \not{E}_T + \geq 4$j (0,1,2$b$) template	
	172.7 ± 9.3 ± 3.7	[3] AALTONEN	12AL	CDF	$\tau_h + \not{E}_T$ +4j ($\geq 1b$)	
	172.5 ± 1.4 ± 1.5	[4] AALTONEN	12G	CDF	6–8 jets with ≥ 1 b	
	173.9 ± 1.9 ± 1.6	[5] ABAZOV	12AB	D0	$\ell\ell + \not{E}_T + \geq 2$j ($\nu$WT+MWT)	OCCUR=2
	172.5 ± 0.4 ± 1.5	[6] CHATRCHYAN	12BA	CMS	$\ell\ell + \not{E}_T + \geq 2$j ($\geq 1b$), AMWT	
	173.49± 0.43± 0.98	[7] CHATRCHYAN	12BP	CMS	$\ell + \not{E}_T + \geq 4$j ($\geq 2b$)	
	172.3 ± 2.4 ± 1.0	[8] AALTONEN	11AK	CDF	$\not{E}_T + \geq 4$ jets (≥ 1 b-tag)	
	172.1 ± 1.1 ± 0.9	[9] AALTONEN	11E	CDF	ℓ + jets and dilepton	
	174.94± 0.83± 1.24	[10] ABAZOV	11P	D0	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag)	
	173.0 ± 1.2	[11] AALTONEN	10AE	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag), ME method	
	170.7 ± 6.3 ± 2.6	[12] AALTONEN	10D	CDF	$\ell + \not{E}_T$ + 4 jets (b-tag)	
	180.1 ± 3.6 ± 3.9	[13,14] ABAZOV	04G	D0	lepton + jets	
	176.1 ± 5.1 ± 5.3	[15] AFFOLDER	01	CDF	lepton + jets	
	167.4 ±10.3 ± 4.8	[16,17] ABE	99B	CDF	dilepton	OCCUR=2
	168.4 ±12.3 ± 3.6	[14] ABBOTT	98D	D0	dilepton	
	186 ±10 ± 5.7	[16,18] ABE	97R	CDF	6 or more jets	
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	173.18± 0.56± 0.75	[19] AALTONEN	12AP	TEVA	CDF, D0 combination	
	173.7 ± 2.8 ± 1.5	[20] ABAZOV	12AB	D0	$\ell\ell + \not{E}_T + \geq 2$ j (νWT)	
	172.4 ± 1.4 ± 1.3	[21] AALTONEN	11AC	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag)	
	176.9 ± 8.0 ± 2.7	[22] AALTONEN	11T	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag), $p_T(\ell)$ shape	
	174.0 ± 1.8 ± 2.4	[23] ABAZOV	11R	D0	dilepton + $\not{E}_T + \geq 2$ jets	
	175.5 ± 4.6 ± 4.6	[24] CHATRCHYAN	11F	CMS	dilepton + $\not{E}_T$ + jets	
	169.3 ± 2.7 ± 3.2	[25] AALTONEN	10C	CDF	dilepton + b-tag (MT2+NWA)	
	174.8 ± 2.4 $^{+1.2}_{-1.0}$	[26] AALTONEN	10E	CDF	≥ 6 jets, vtx b-tag	

$180.5 \pm 12.0 \pm 3.6$	[27] AALTONEN	09AK	CDF	$\ell + \not{E}_T$ + jets (soft μ b-tag)	
$172.7 \pm 1.8 \pm 1.2$	[28] AALTONEN	09J	CDF	$\ell + \not{E}_T$ + 4 jets (b-tag)	
$171.1 \pm 3.7 \pm 2.1$	[29] AALTONEN	09K	CDF	6 jets, vtx b-tag	
$171.9 \pm 1.7 \pm 1.1$	[30] AALTONEN	09L	CDF	ℓ + jets, $\ell\ell$ + jets	
$171.2 \pm 2.7 \pm 2.9$	[31] AALTONEN	09O	CDF	dilepton	
$165.5 {}^{+3.4}_{-3.3} \pm 3.1$	[32] AALTONEN	09X	CDF	$\ell\ell + \not{E}_T$ ($\nu\phi$ weighting)	
$174.7 \pm 4.4 \pm 2.0$	[33] ABAZOV	09AH	D0	dilepton + b-tag (νWT+MWT)	
$170.7 {}^{+4.2}_{-3.9} \pm 3.5$	[34,35] AALTONEN	08C	CDF	dilepton, $\sigma_{t\bar{t}}$ constrained	
$171.5 \pm 1.8 \pm 1.1$	[36] ABAZOV	08AH	D0	$\ell + \not{E}_T$ + 4 jets	
$177.1 \pm 4.9 \pm 4.7$	[37,38] AALTONEN	07	CDF	6 jets with ≥ 1 b vtx	
$172.3 {}^{+10.8}_{-9.6} \pm 10.8$	[39] AALTONEN	07B	CDF	≥ 4 jets (b-tag)	
$174.0 \pm 2.2 \pm 4.8$	[40] AALTONEN	07D	CDF	≥ 6 jets, vtx b-tag	
$170.8 \pm 2.2 \pm 1.4$	[41,42] AALTONEN	07I	CDF	lepton + jets (b-tag)	
$173.7 \pm 4.4 {}^{+2.1}_{-2.0}$	[38,43] ABAZOV	07F	D0	lepton + jets	
$176.2 \pm 9.2 \pm 3.9$	[44] ABAZOV	07W	D0	dilepton (MWT)	
$179.5 \pm 7.4 \pm 5.6$	[44] ABAZOV	07W	D0	dilepton (νWT)	OCCUR=2
$164.5 \pm 3.9 \pm 3.9$	[42,45] ABULENCIA	07D	CDF	dilepton	
$180.7 {}^{+15.5}_{-13.4} \pm 8.6$	[46] ABULENCIA	07J	CDF	lepton + jets	
$170.3 {}^{+4.1}_{-4.5} {}^{+1.2}_{-1.8}$	[42,47] ABAZOV	06U	D0	lepton + jets (b-tag)	
$173.2 {}^{+2.6}_{-2.4} \pm 3.2$	[48,49] ABULENCIA	06D	CDF	lepton + jets	
$173.5 {}^{+3.7}_{-3.6} \pm 1.3$	[35,48] ABULENCIA	06D	CDF	lepton + jets	OCCUR=2
$165.2 \pm 6.1 \pm 3.4$	[42,50] ABULENCIA	06G	CDF	dilepton	
$170.1 \pm 6.0 \pm 4.1$	[35,51] ABULENCIA	06V	CDF	dilepton	
$178.5 \pm 13.7 \pm 7.7$	[52,53] ABAZOV	05	D0	6 or more jets	
176.1 ± 6.6	[54] AFFOLDER	01	CDF	dilepton, lepton+jets, all-jets	OCCUR=2
$172.1 \pm 5.2 \pm 4.9$	[55] ABBOTT	99G	D0	di-lepton, lepton+jets	
176.0 ± 6.5	[17,56] ABE	99B	CDF	dilepton, lepton+jets, all-jets	
$173.3 \pm 5.6 \pm 5.5$	[14,57] ABBOTT	98F	D0	lepton + jets	
$175.9 \pm 4.8 \pm 5.3$	[16,58] ABE	98E	CDF	lepton + jets	
$161 \pm 17 \pm 10$	[16] ABE	98F	CDF	dilepton	
$172.1 \pm 5.2 \pm 4.9$	[59] BHAT	98B	RVUE	dilepton and lepton+jets	
173.8 ± 5.0	[60] BHAT	98B	RVUE	dilepton, lepton+jets, all-jets	OCCUR=2
$173.3 \pm 5.6 \pm 6.2$	[14] ABACHI	97E	D0	lepton + jets	
$199 {}^{+19}_{-21} \pm 22$	ABACHI	95	D0	lepton + jets	
$176 \pm 8 \pm 10$	ABE	95F	CDF	lepton + b-jet	
$174 \pm 10 {}^{+13}_{-12}$	ABE	94E	CDF	lepton + b-jet	

[1] Based on 1.04 fb^{-1} of data at LHC7. Uses 2d-template analysis (MT) with m_t and jet energy scale factor (JSF) from m_W mass fit. NODE=Q007TP;LINKAGE=GD

[2] Based on 8.7 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. The JES is calibrated by using the dijet mass from the W boson decay. NODE=Q007TP;LINKAGE=CL

[3] Use the ME method based on 2.2 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. NODE=Q007TP;LINKAGE=CD

[4] Based on 5.8 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. The quoted systematic error is the sum of JES($\pm$1.0) and systematic($\pm$1.0) uncertainties. The measurement is performed with a liklihood fit technique which simultaneously determines m_t and JES. NODE=Q007TP;LINKAGE=OA

[5] Combination with the result in 1 fb^{-1} of preceding data reported in ABAZOV 09AH as well as the MWT result of ABAZOV 11R with a statistical correlation of 60%. NODE=Q007TP;LINKAGE=VB

[6] Based on 5.0 fb^{-1} of data at LHC7. Uses an analytical matrix weighting technique (AMWT) and full kinematic analysis (KIN). NODE=Q007TP;LINKAGE=CA

[7] Based on 5.0 fb^{-1} of data at LHC7. The first error is statistical and JES combined, and the second is systematic. Ideogram method is used to obtain 2D liklihood for the kinematical fit with two parameters mtop and JES. NODE=Q007TP;LINKAGE=RC

[8] Based on 5.7 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. Events with an identified charged lepton or small $\not{E}_T$ are rejected from the event sample, so that the measurement is statistically independent from those in the ℓ + jets and all hadronic channels while being sensitive to those events with a τ lepton in the final state. Supersedes AALTONEN 07B. NODE=Q007TP;LINKAGE=TL

[9] Based on 5.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. Employs a multi-dimensional template likelihood technique where the lepton plus jets (one or two b-tags) channel gives $172.2 \pm 1.2 \pm 0.9$ GeV while the dilepton channel yields $170.3 \pm 2.0 \pm 3.1$ GeV. The results are combined. OUR EVALUATION includes the measurement in the dilepton channel only. NODE=Q007TP;LINKAGE=NT

[10] Based on 3.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. ABAZOV 11P reports $174.94 \pm 0.83 \pm 0.78 \pm 0.96$ GeV, where the first uncertainty is from statistics, the second from JES, and the last from other systematic uncertainties. We combine the JES and systematic uncertainties. A matrix-element method is used where the JES uncertainty is constrained NODE=Q007TP;LINKAGE=ZA

by the W mass. ABAZOV 11P describes a measurement based on 2.6 fb^{-1} that is combined with ABAZOV 08AH, which employs an independent 1 fb^{-1} of data.

[11] Based on 5.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The likelihood calculated using a matrix element method gives m_t = 173.0 ± 0.7(stat)±0.6(JES)±0.9(syst) GeV, for a total uncertainty of 1.2 GeV. NODE=Q007TP;LINKAGE=NA

[12] Based on 1.9 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The result is from the measurement using the transverse decay lenght of b-hadrons and that using the transverse momentum of the W decay muons, which are both insensitive to the JES (jet energy scale) uncertainty. OUR EVALUATION uses only the measurement exploiting the decay length significance which yields $166.9^{+9.5}_{-8.5}$(stat)±2.9 (syst) GeV. The measurement that uses the lepton transverse momentum is excluded from the average because of a statistical correlation with other samples. NODE=Q007TP;LINKAGE=AE

[13] Obtained by re-analysis of the lepton + jets candidate events that led to ABBOTT 98F. It is based upon the maximum likelihood method which makes use of the leading order matrix elements. NODE=Q007TP;LINKAGE=AO

[14] Based on 125 ± 7 pb^{-1} of data at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=WW

[15] Based on ∼ 106 pb^{-1} of data at $\sqrt{s}$= 1.8 TeV. NODE=Q007TP;LINKAGE=F1

[16] Based on 109 ± 7 pb^{-1} of data at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=XX

[17] See AFFOLDER 01 for details of systematic error re-evaluation. NODE=Q007TP;LINKAGE=XZ

[18] Based on the first observation of all hadronic decays of $t\overline{t}$ pairs. Single b-quark tagging with jet-shape variable constraints was used to select signal enriched multi-jet events. The updated systematic error is listed. See AFFOLDER 01, appendix C. NODE=Q007TP;LINKAGE=AR

[19] Combination based on up to 5.8 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. NODE=Q007TP;LINKAGE=EA

[20] Based on 4.3 fb^{-1} of data in p-pbar collisions at 1.96 TeV. The measurement reduces the JES uncertainty by using the single lepton channel study of ABAZOV 11P. NODE=Q007TP;LINKAGE=VA

[21] Based on 3.2 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and JES combined, and the latter is from the other systematic uncertainties. The result is obtained using an unbinned maximum likelihood method where the top quark mass and the JES are measured simultaneously, with Δ_{JES} = 0.3 ± 0.3(stat). NODE=Q007TP;LINKAGE=NL

[22] Uses a likelihood fit of the lepton p_T distribution based on 2.7 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=NN

[23] Based on a matrix-element method which employs 5.4 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. Superseded by ABAZOV 12AB. NODE=Q007TP;LINKAGE=OZ

[24] Based on 36 pb^{-1} of pp collisions at $\sqrt{s}$ = 7 TeV. A Kinematic Method using b-tagging and an analytical Matrix Weighting Technique give consistent results and are combined. Superseded by CHATRCHYAN 12BA. NODE=Q007TP;LINKAGE=CH

[25] Based on 3.4 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The result is obtained by combining the MT2 variable method and the NWA (Neutrino Weighting Algorithm). The MT2 method alone gives $m_t = 168.0^{+4.8}_{-4.0}$(stat)±2.9(syst) GeV with smaller systematic error due to small JES uncertainty. NODE=Q007TP;LINKAGE=TA

[26] Based on 2.9 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and JES uncertainty, and the latter is from the other systematics. Neural-network-based kinematical selection of 6 highest E_T jets with a vtx b-tag is used to distinguish signal from background. Superseded by AALTONEN 12G. NODE=Q007TP;LINKAGE=LN

[27] Based on 2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The top mass is obtained from the measurement of the invariant mass of the lepton (e or μ) from W decays and the soft μ in b-jet. The result is insensitive to jet energy scaling. NODE=Q007TP;LINKAGE=NO

[28] Based on 1.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and jet energy scale uncertainty, and the latter is from the other systematics. Matrix element method with effective propagators. NODE=Q007TP;LINKAGE=LO

[29] Based on 943 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistical and jet-energy-scale uncertainties, and the latter is from other systematics. AALTONEN 09K selected 6 jet events with one or more vertex b-tags and used the tree-level matrix element to construct template models of signal and background. NODE=Q007TP;LINKAGE=OT

[30] Based on 1.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistical and jet-energy-scale (JES) uncertainties, and the second is from other systematics. Events with lepton + jets and those with dilepton + jets were simultaneously fit to constrain m_t and JES. Lepton + jets data only give m_t = 171.8 ± 2.2 GeV, and dilepton data only give $m_t = 171.2^{+5.3}_{-5.1}$ GeV. NODE=Q007TP;LINKAGE=EN

[31] Based on 2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Matrix Element method. Optimal selection criteria for candidate events with two high p_T leptons, high $\not{E}_T$, and two or more jets with and without b-tag are obtained by neural network with neuroevolution technique to minimize the statistical error of m_t. NODE=Q007TP;LINKAGE=TE

[32] Based on 2.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Mass m_t is estimated from the likelihood for the eight-fold kinematical solutions in the plane of the azimuthal angles of the two neutrino momenta. NODE=Q007TP;LINKAGE=ON

[33] Based on 1 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Events with two identified leptons, and those with one lepton plus one isolated track and a b-tag were used to constrain m_t. The result is a combination of the νWT (ν Weighting Technique) result of 176.2 ± 4.8 ± 2.1 GeV and the MWT (Matrix-element Weighting Technique) result of 173.2 ± 4.9 ± 2.0 GeV. NODE=Q007TP;LINKAGE=ZV

[34] Reports measurement of $170.7^{+4.2}_{-3.9} \pm 2.6 \pm 2.4$ GeV based on 1.2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The last error is due to the theoretical uncertainty on $\sigma_{t\bar{t}}$. Without the cross-section constraint a top mass of $169.7^{+5.2}_{-4.9} \pm 3.1$ GeV is obtained. NODE=Q007TP;LINKAGE=AN

[35] Template method. NODE=Q007TP;LINKAGE=BC

[36] Result is based on 1 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and jet energy scale uncertainty, and the latter is from the other systematics. NODE=Q007TP;LINKAGE=BV

[37] Based on 310 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=TN

[38] Ideogram method. NODE=Q007TP;LINKAGE=TO

[39] Based on 311 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Events with 4 or more jets with $E_T >$ 15 GeV, significant missing E_T, and secondary vertex b-tag are used in the fit. About 44% of the signal acceptance is from $\tau\nu$ + 4 jets. Events with identified e or μ are vetoed to provide a statistically independent measurement. NODE=Q007TP;LINKAGE=LT

[40] Based on 1.02 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Superseded by AALTONEN 12G. NODE=Q007TP;LINKAGE=NE

[41] Based on 955 pb^{-1} of data $\sqrt{s}$ = 1.96 TeV. m_t and JES (Jet Energy Scale) are fitted simultaneously, and the first error contains the JES contribution of 1.5 GeV. NODE=Q007TP;LINKAGE=LA

[42] Matrix element method. NODE=Q007TP;LINKAGE=UB

[43] Based on 425 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is a combination of statistics and JES (Jet Energy Scale) uncertainty, which has been measured simultaneously to give JES = 0.989 ± 0.029(stat). NODE=Q007TP;LINKAGE=OV

[44] Based on 370 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Combined result of MWT (Matrix-element Weighting Technique) and νWT (ν Weighting Technique) analyses is 178.1 ± 6.7 ± 4.8 GeV. NODE=Q007TP;LINKAGE=ZO

[45] Based on 1.0 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. ABULENCIA 07D improves the matrix element description by including the effects of initial-state radiation. NODE=Q007TP;LINKAGE=LE

[46] Based on 695 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The transverse decay length of the b hadron is used to determine m_t, and the result is free from the JES (jet energy scale) uncertainty. NODE=Q007TP;LINKAGE=UL

[47] Based on ∼ 400 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error includes statistical and systematic jet energy scale uncertainties, the second error is from the other systematics. The result is obtained with the b-tagging information. The result without b-tagging is $169.2^{+5.0}_{-7.4}{}^{+1.5}_{-1.4}$ GeV. Superseded by ABAZOV 08AH. NODE=Q007TP;LINKAGE=BZ

[48] Based on 318 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=BA

[49] Dynamical likelihood method. NODE=Q007TP;LINKAGE=BB

[50] Based on 340 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=UA

[51] Based on 360 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=AL

[52] Based on 110.2 ± 5.8 pb^{-1} at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=AA

[53] Based on the all hadronic decays of $t\bar{t}$ pairs. Single b-quark tagging via the decay chain $b \rightarrow c \rightarrow \mu$ was used to select signal enriched multijet events. The result was obtained by the maximum likelihood method after bias correction. NODE=Q007TP;LINKAGE=AZ

[54] Obtained by combining the measurements in the lepton + jets [AFFOLDER 01], all-jets [ABE 97R, ABE 99B], and dilepton [ABE 99B] decay topologies. NODE=Q007TP;LINKAGE=F2

[55] Obtained by combining the D0 result m_t (GeV) = 168.4 ± 12.3 ± 3.6 from 6 di-lepton events (see also ABBOTT 98D) and m_t (GeV) = 173.3 ± 5.6 ± 5.5 from lepton+jet events (ABBOTT 98F). NODE=Q007TP;LINKAGE=DG

[56] Obtained by combining the CDF results of m_t (GeV)=167.4 ± 10.3 ± 4.8 from 8 dilepton events, m_t (GeV)=175.9 ± 4.8 ± 5.3 from lepton+jet events (ABE 98E), and m_t (GeV)=186.0 ± 10.0 ± 5.7 from all-jet events (ABE 97R). The systematic errors in the latter two measurements are changed in this paper. NODE=Q007TP;LINKAGE=BG

[57] See ABAZOV 04G. NODE=Q007TP;LINKAGE=AT

[58] The updated systematic error is listed. See AFFOLDER 01, appendix C. NODE=Q007TP;LINKAGE=XY

[59] Obtained by combining the DØ results of m_t(GeV)=168.4 ± 12.3 ± 3.6 from 6 dilepton events and m_t(GeV)=173.3 ± 5.6 ± 5.5 from 77 lepton+jet events. NODE=Q007TP;LINKAGE=BE

[60] Obtained by combining the DØ results from dilepton and lepton+jet events, and the CDF results (ABE 99B) from dilepton, lepton+jet events, and all-jet events. NODE=Q007TP;LINKAGE=BF

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ABBOTT	98F	PR D58 052001	B. Abbott *et al.*	(D0 Collab.)	REFID=45967
ABE	98E	PRL 80 2767	F. Abe *et al.*	(CDF Collab.)	REFID=45941
ABE	98F	PRL 80 2779	F. Abe *et al.*	(CDF Collab.)	REFID=45942
BHAT	98B	IJMP A13 5113	P.C. Bhat, H.B. Prosper, S.S. Snyder		REFID=46531
ABACHI	97E	PRL 79 1197	S. Abachi *et al.*	(D0 Collab.)	REFID=45590
ABE	97R	PRL 79 1992	F. Abe *et al.*	(CDF Collab.)	REFID=45594
PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495
ABACHI	95	PRL 74 2632	S. Abachi *et al.*	(D0 Collab.)	REFID=44167
ABE	95F	PRL 74 2626	F. Abe *et al.*	(CDF Collab.)	REFID=44170
ABE	94E	PR D50 2966	F. Abe *et al.*	(CDF Collab.)	REFID=43810
Also		PRL 73 225	F. Abe *et al.*	(CDF Collab.)	REFID=43823

Reference = AALTONEN 12AJ; PRL 109 171802
Verifier code = CDF

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Konstantinos Vellidis

EMAIL: vellidis@fnal.gov

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

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FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM, STRANGE MESONS ($B = \pm 1$, $S = \mp 1$)

NODE=MXXX046

$B_s^0 = s\overline{b}$, $\overline{B}_s^0 = \overline{s}\,b$, similarly for B_s^*'s

NODE=MXXX046

B_s^0

NODE=S086

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

$\Delta\Gamma_{B_s^0}$

NODE=S086DGS

"OUR EVALUATION" has been obtained by the Heavy Flavor Averaging Group (HFAG) using the constraint of the flavor-specific lifetime average in a way similar to $\Delta\Gamma_{B_s^0}/\Gamma_{B_s^0}$.

NODE=S086DGS

	VALUE (10^{12} s^{-1})	DOCUMENT ID		TECN	COMMENT
	0.081±0.011 OUR EVALUATION				
	[(0.100 ± 0.013) × 10^{12} s^{-1} OUR 2012 EVALUATION]				
	0.080±0.020 OUR AVERAGE Error includes scale factor of 1.3. See the ideogram below.				
	[(0.109 ± 0.022) × 10^{12} s^{-1} OUR 2012 AVERAGE]				
	0.053±0.021±0.010	[1] AAD	12CV	ATLS	pp at 7 TeV
	0.123±0.029±0.011	[1] AAIJ	12D	LHCB	pp at 7 TeV
YOUR DATA	0.068±0.026±0.007	[1] AALTONEN	12AJ	CDF	$p\overline{p}$ at 1.96 TeV
	$0.163^{+0.065}_{-0.064}$	[2,3] ABAZOV	12D	D0	$p\overline{p}$ at 1.96 TeV
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	0.075±0.035±0.006	[4] AALTONEN	12D	CDF	Repl. by AALTONEN 12AJ
	$0.085^{+0.072}_{-0.078}$±0.001	[5] ABAZOV	09E	D0	Repl. by ABAZOV 08AM
	$0.076^{+0.059}_{-0.063}$±0.006	[6] AALTONEN	08J	CDF	Repl. by AALTONEN 12D
	0.19 ±0.07 $^{+0.02}_{-0.01}$	[3,7] ABAZOV	08AM	D0	Repl. by ABAZOV 12D
	0.12 $^{+0.08}_{-0.10}$ ±0.02	[6,8] ABAZOV	07	D0	Repl. by ABAZOV 07N
	0.13 ±0.09	[9] ABAZOV	07N	D0	Repl. by ABAZOV 09E
	0.47 $^{+0.19}_{-0.24}$ ±0.01	[6] ACOSTA	05	CDF	Repl. by AALTONEN 08J

NODE=S086DGS

NEW;→ UNCHECKED ←

NEW

[1] Measured using the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.

[2] The error includes both statistical and systematic uncertainties.

[3] Measured using fully reconstructed $B_s \to J/\psi\phi$ decays.

[4] Uses the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays and assuming CP-violating angle $\beta_s(B^0 \to J/\psi\phi) = 0.02$.

[5] Measured the angular and lifetime parameters for the time-dependent angular untagged decays $B_d^0 \to J/\psi K^{*0}$ and $B_s^0 \to J/\psi\phi$.

[6] Measured using the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays and assuming CP-violating phase $\phi_s = 0$.

[7] Obtaines 90% CL interval $-0.06 < \Delta\Gamma_s < 0.30$.

[8] ABAZOV 07 reports $0.17 \pm 0.09 \pm 0.02$ with CP-violating phase ϕ_s as a free parameter.

[9] Combines D^0 measurements of time-dependent angular distributions in $B_s^0 \to J/\psi\phi$ and charge asymmetry in semileptonic decays. There is a 4-fold ambiguity in the solution.

NODE=S086DGS;LINKAGE=AJ
NODE=S086DGS;LINKAGE=CE
NODE=S086DGS;LINKAGE=OV
NODE=S086DGS;LINKAGE=AT
NODE=S086DGS;LINKAGE=AB
NODE=S086DGS;LINKAGE=AC
NODE=S086DGS;LINKAGE=ZV
NODE=S086DGS;LINKAGE=BZ
NODE=S086DGS;LINKAGE=ZO

$1 / \Gamma_{B_s^0}$

NODE=S086MLF

"OUR EVALUATION" has been obtained by the Heavy Flavor Averaging Group (HFAG) using the constraint of the flavor-specific lifetime average in a way similar to $\Delta\Gamma_{B_s^0}/\Gamma_{B_s^0}$.

NODE=S086MLF

VALUE (10^{-12} s)	DOCUMENT ID		TECN	COMMENT
1.516±0.011 OUR EVALUATION				
[(1.497 ± 0.015) × 10^{-12} s OUR 2012 EVALUATION]				
1.497±0.017 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below.				
[(1.508 ± 0.024) × 10^{-12} s OUR 2012 AVERAGE Scale factor = 1.4]				
1.477±0.015±0.009	[1] AAD	12CV	ATLS	pp at 7 TeV
1.522±0.021±0.019	[2] AAIJ	12D	LHCB	pp at 7 TeV
YOUR DATA 1.528±0.019±0.009	[3] AALTONEN	12AJ	CDF	$p\overline{p}$ at 1.96 TeV
$1.443^{+0.038}_{-0.035}$	[3,4] ABAZOV	12D	D0	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.529±0.025±0.012	[3] AALTONEN	12D	CDF	Repl. by AALTONEN 12AJ
1.487±0.060±0.028	[3] ABAZOV	09E	D0	Repl. by ABAZOV 08AM
1.52 ±0.04 ±0.02	[3] AALTONEN	08J	CDF	Repl. by AALTONEN 12D
1.52 ±0.05 ±0.01	[3] ABAZOV	08AM	D0	Repl. by ABAZOV 12D

[1] AAD 12CV reports $\Gamma_{B^0_s} = 0.677 \pm 0.007 \pm 0.004$ ps^{-1} measured using a time-dependent angular analysis of $B^0_s \rightarrow J/\psi\phi$ decays. NODE=S086MLF;LINKAGE=AD

[2] AAIJ 12D reports average deacy width of B^0_s, $\Gamma_{B^0_s} = 0.657 \pm 0.009 \pm 0.008$ ps^{-1} that we converted to $1/\Gamma_{B^0_s}$. NODE=S086MLF;LINKAGE=AJ

[3] Measured using the time-dependent angular analysis of $B^0_s \rightarrow J/\psi\phi$ decays. NODE=S086MLF;LINKAGE=AC

[4] The error includes both statistical and systematic uncertainties. NODE=S086MLF;LINKAGE=CE

CP VIOLATION PARAMETERS in B^0_s

NODE=S086240

CP Violation phase β_s

NODE=S086PHS

$-2\beta_s$ is the weak phase difference between B^0_s mixing amplitude and the $B^0_s \rightarrow J/\psi\phi$ decay amplitude. The Standard Model value of β_s is arg($-\frac{V_{ts}V^*_{tb}}{V_{cs}V^*_{cb}}$). NODE=S086PHS

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/scaling procedure takes into account correlation between the measurements.

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
4 $^{+10}_{-13}$ OUR EVALUATION				
[$0.08^{+0.05}_{-0.07}$ OUR 2012 EVALUATION]				
− 1 ± 6 OUR AVERAGE				
[0.02 ± 0.11 OUR 2012 AVERAGE Scale factor = 1.3]				
−11.0 ±20.5 ±5.0	[1] AAD	12CV	ATLS	pp at 7 TeV
− 8 ± 9 ±3	[2] AAIJ	12D	LHCB	pp at 7 TeV
$0.95^{+8.70+0.15}_{-8.65-0.20}$	[3] AAIJ	12Q	LHCB	pp at 7 TeV
YOUR DATA	[4] AALTONEN	12AJ	CDF	$p\overline{p}$ at 1.96 TeV
28^{+18}_{-19}	[5,6,7] ABAZOV	12D	D0	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
22 ±22 ±1	[8] AAIJ	12B	LHCB	Repl. by AAIJ 12Q
	[9] AALTONEN	12D	CDF	Repl. by AALTONEN 12AJ
	[10] AALTONEN	08G	CDF	Repl. by AALTONEN 12D
28^{+12}_{-15} $^{+4}_{-1}$	[6,11] ABAZOV	08AM	D0	Repl. by ABAZOV 12D
39.5 ±28.0 $^{+0.5}_{-7.0}$	[7,12] ABAZOV	07	D0	Repl. by ABAZOV 07N
35^{+20}_{-24}	[7,13] ABAZOV	07N	D0	Repl. by ABAZOV 08AM

[1] AAD 12CV reports $\phi_s = -2\,\beta_s = 0.22 \pm 0.41 \pm 0.10$ rad. that was measured using a time-dependent angular analysis of $B^0_s \rightarrow J/\psi\phi$ decays. NODE=S086PHS;LINKAGE=AD

[2] Reports $\phi_s = -2\,\beta_s = 0.15 \pm 0.18 \pm 0.06$ that was measured using a time-dependent angular analysis of $B^0_s \rightarrow J/\psi\phi$ decays. NODE=S086PHS;LINKAGE=AJ

[3] Reports $\phi_s = -2\,\beta_s = -0.019^{+0.173+0.004}_{-0.174-0.003}$ radians which was measured using a time-dependent fit to $B^0_s \rightarrow J/\psi\pi^+\pi^-$ decays, with the $\pi^+\pi^-$ mass within 775–1550 MeV. Searches for, but finds no evidence, for direct *CP* violation in $B^0_s \rightarrow J/\psi\pi\pi$ decays. NODE=S086PHS;LINKAGE=IA

[4] AALTONEN 12AJ reports $-\pi/2 < \beta_s < -1.51$ or $-0.06 < \beta_s < 0.30$, or $1.26 < \beta_s < \pi/2$ at 68% CL. Measured using the time-dependent angular analysis of $B^0_s \rightarrow J/\psi\phi$ decays. NODE=S086PHS;LINKAGE=AL

[5] The error includes both statistical and systematic uncertainties. NODE=S086PHS;LINKAGE=CE

[6] Measured using fully reconstructed $B_s \rightarrow J/\psi\phi$ decays. NODE=S086PHS;LINKAGE=OV

[7] Reports ϕ_s which equals to $-2\beta_s$. NODE=S086PHS;LINKAGE=RP

[8] Reports $\phi_s = -2\,\beta_s = -0.44 \pm 0.44 \pm 0.02$ that was measured using a time-dependent fit to $B^0_s \rightarrow J/\psi f_0(980)$ decays. NODE=S086PHS;LINKAGE=AI

[9] Reports $0.02 < \phi_s < 0.52$ or $1.08 < \phi_s < 1.55$ at 68% C.L. confidence regions in the two-dimensional space of ϕ_s and $\Delta\Gamma_{B^0_s}$ from $B^0_s \rightarrow J/\psi\phi$ decays. NODE=S086PHS;LINKAGE=AT

[10] Reports $0.32 < 2\beta_s < 2.82$ at 68% C.L. and confidence regions in the two-dimensional space of $2\beta_s$ and $\Delta\Gamma$ from the first measurement of $B^0_s \rightarrow J/\psi\phi$ decays using flavor tagging. The probability of a deviation from SM prediction as large as the level of observed data is 15%. NODE=S086PHS;LINKAGE=AA

[11] Reports $\phi_s = -2\,\beta_s$ and obtains 90% CL interval $-0.03 < \beta_s < 0.60$. NODE=S086PHS;LINKAGE=ZV

[12] The first direct measurement of the *CP*-violating mixing phase is reported from the time-dependent analysis of flavor untagged $B^0_s \rightarrow J/\psi\phi$ decays. NODE=S086PHS;LINKAGE=AZ

[13] Combines D0 collaboration measurements of time-dependent angular distributions in $B^0_s \rightarrow J/\psi\phi$ and charge asymmetry in semileptonic decays. There is a 4-fold ambiguity in the solution. NODE=S086PHS;LINKAGE=ZO

B^0_s REFERENCES

NODE=S086

	AAD	12CV	JHEP 1212 072	G. Aad *et al.*	(ATLAS Colalb.)	REFID=54785
	AAIJ	12B	PL B707 497	R. Aaij *et al.*	(LHCb Collab.)	REFID=54034
	AAIJ	12D	PRL 108 101803	R. Aaij *et al.*	(LHCb Collab.)	REFID=54036
	AAIJ	12Q	PL B713 378	R. Aaij *et al.*	(LHCb Collab.)	REFID=54190
YOUR PAPER	AALTONEN	12AJ	PRL 109 171802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54598
	AALTONEN	12D	PR D85 072002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54070
	ABAZOV	12D	PR D85 032006	V.M. Abazov *et al.*	(D0 Collab.)	REFID=54062
	ABAZOV	09E	PRL 102 032001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52650
	AALTONEN	08G	PRL 100 161802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52228
	AALTONEN	08J	PRL 100 121803	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52234
	ABAZOV	08AM	PRL 101 241801	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52604
	ABAZOV	07	PRL 98 121801	V.M. Abazov *et al.*	(D0 Collab.)	REFID=51664
	ABAZOV	07N	PR D76 057101	V.M. Abazov *et al.*	(D0 Collab.)	REFID=51936
	ACOSTA	05	PRL 94 101803	D. Acosta *et al.*	(CDF Collab.)	REFID=50519

Reference = AALTONEN 12AL; PRL 109 192001
Verifier code = CDF

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Konstantinos Vellidis

EMAIL: vellidis@fnal.gov

June 4, 2013

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(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

QUARKS

NODE=QXXX005

NODE=Q007

t

$I(J^P) = 0(\frac{1}{2}^+)$

NODE=Q007

Charge $= \frac{2}{3}\ e$ Top $= +1$

t-QUARK MASS

NODE=Q007210

NODE=Q007210

We first list the direct measurements of the top quark mass which employ the event kinematics and then list the measurements which extract a top quark mass from the measured $t\bar{t}$ cross-section using theory calculations. A discussion of the definition of the top quark mass in these measurements can be found in the review "The Top Quark."

OUR EVALUATION of $173.07 \pm 0.52 \pm 0.72$ GeV is an average of published top mass measurements from Tevatron Runs. The LHC experiments are working on a combined average that should appear in the 2014 PDG edition once the correlated uncertainties between experiments are understood. The Tevatron average was provided by the Tevatron Electroweak Working Group (TEVEWWG). It takes correlated uncertainties into account and has a χ^2 of 8.4 for 11 degrees of freedom.

For earlier search limits see PDG 96, Physical Review **D54** 1 (1996). We no longer include a compilation of indirect top mass determinations from Standard Model Electroweak fits in the Listings (our last compilation can be found in the Listings of the 2007 partial update). For a discussion of current results see the reviews "The Top Quark" and "Electroweak Model and Constraints on New Physics."

t-Quark Mass (Direct Measurements)

NODE=Q007TP

NODE=Q007TP

The following measurements extract a t-quark mass from the kinematics of $t\bar{t}$ events. They are sensitive to the top quark mass used in the MC generator that is usually interpreted as the pole mass, but the theoretical uncertainty in this interpretation is hard to quantify. See the review "The Top Quark" and references therein for more information.

NODE=Q007TP

	VALUE (GeV)	DOCUMENT ID		TECN	COMMENT	
	173.07± 0.52± 0.72 OUR EVALUATION	See comments in the header above.				NEW;→ UNCHECKED ←
	[173.5 ± 0.6 ± 0.8 GeV OUR 2012 EVALUATION]					
	174.5 ± 0.6 ± 2.3	[1] AAD	12I	ATLS	$\ell+\not{E}_T+\geq 4$ jets (≥ 1 b), MT	
	172.85± 0.71± 0.85	[2] AALTONEN	12AI	CDF	$\ell+\not{E}_T+\geq 4$j (0,1,2b) template	
YOUR DATA	172.7 ± 9.3 ± 3.7	[3] AALTONEN	12AL	CDF	$\tau_h + \not{E}_T$ +4j ($\geq 1b$)	
	172.5 ± 1.4 ± 1.5	[4] AALTONEN	12G	CDF	6–8 jets with ≥ 1 b	
	173.9 ± 1.9 ± 1.6	[5] ABAZOV	12AB	D0	$\ell\ell+\not{E}_T+\geq 2$j ($\nu$WT+MWT)	OCCUR=2
	172.5 ± 0.4 ± 1.5	[6] CHATRCHYAN	12BA	CMS	$\ell\ell+\not{E}_T+\geq 2$j ($\geq 1b$), AMWT	
	173.49± 0.43± 0.98	[7] CHATRCHYAN	12BP	CMS	$\ell+\not{E}_T+\geq 4$j ($\geq 2b$)	
	172.3 ± 2.4 ± 1.0	[8] AALTONEN	11AK	CDF	$\not{E}_T$ + ≥ 4 jets (≥ 1 b-tag)	
	172.1 ± 1.1 ± 0.9	[9] AALTONEN	11E	CDF	ℓ + jets and dilepton	
	174.94± 0.83± 1.24	[10] ABAZOV	11P	D0	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag)	
	173.0 ± 1.2	[11] AALTONEN	10AE	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag), ME method	
	170.7 ± 6.3 ± 2.6	[12] AALTONEN	10D	CDF	$\ell + \not{E}_T$ + 4 jets (b-tag)	
	180.1 ± 3.6 ± 3.9	[13,14] ABAZOV	04G	D0	lepton + jets	
	176.1 ± 5.1 ± 5.3	[15] AFFOLDER	01	CDF	lepton + jets	
	167.4 ±10.3 ± 4.8	[16,17] ABE	99B	CDF	dilepton	OCCUR=2
	168.4 ±12.3 ± 3.6	[14] ABBOTT	98D	D0	dilepton	
	186 ±10 ± 5.7	[16,18] ABE	97R	CDF	6 or more jets	
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	173.18± 0.56± 0.75	[19] AALTONEN	12AP	TEVA	CDF, D0 combination	
	173.7 ± 2.8 ± 1.5	[20] ABAZOV	12AB	D0	$\ell\ell + \not{E}_T + \geq 2$ j (νWT)	
	172.4 ± 1.4 ± 1.3	[21] AALTONEN	11AC	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag)	
	176.9 ± 8.0 ± 2.7	[22] AALTONEN	11T	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag), $p_T(\ell)$ shape	
	174.0 ± 1.8 ± 2.4	[23] ABAZOV	11R	D0	dilepton + $\not{E}_T$ + ≥ 2 jets	
	175.5 ± 4.6 ± 4.6	[24] CHATRCHYAN	11F	CMS	dilepton + $\not{E}_T$ + jets	
	169.3 ± 2.7 ± 3.2	[25] AALTONEN	10C	CDF	dilepton + b-tag (MT2+NWA)	
	174.8 ± 2.4 $^{+1.2}_{-1.0}$	[26] AALTONEN	10E	CDF	≥ 6 jets, vtx b-tag	

$180.5 \pm 12.0 \pm 3.6$	[27] AALTONEN	09AK	CDF	$\ell + \not{E}_T$ + jets (soft μ b-tag)	
$172.7 \pm 1.8 \pm 1.2$	[28] AALTONEN	09J	CDF	$\ell + \not{E}_T$ + 4 jets (b-tag)	
$171.1 \pm 3.7 \pm 2.1$	[29] AALTONEN	09K	CDF	6 jets, vtx b-tag	
$171.9 \pm 1.7 \pm 1.1$	[30] AALTONEN	09L	CDF	ℓ + jets, $\ell\ell$ + jets	
$171.2 \pm 2.7 \pm 2.9$	[31] AALTONEN	09O	CDF	dilepton	
$165.5 {}^{+3.4}_{-3.3} \pm 3.1$	[32] AALTONEN	09X	CDF	$\ell\ell + \not{E}_T$ ($\nu\phi$ weighting)	
$174.7 \pm 4.4 \pm 2.0$	[33] ABAZOV	09AH	D0	dilepton + b-tag (νWT+MWT)	
$170.7 {}^{+4.2}_{-3.9} \pm 3.5$	[34,35] AALTONEN	08C	CDF	dilepton, $\sigma_{t\bar{t}}$ constrained	
$171.5 \pm 1.8 \pm 1.1$	[36] ABAZOV	08AH	D0	$\ell + \not{E}_T$ + 4 jets	
$177.1 \pm 4.9 \pm 4.7$	[37,38] AALTONEN	07	CDF	6 jets with ≥ 1 b vtx	
$172.3 {}^{+10.8}_{-9.6} \pm 10.8$	[39] AALTONEN	07B	CDF	≥ 4 jets (b-tag)	
$174.0 \pm 2.2 \pm 4.8$	[40] AALTONEN	07D	CDF	≥ 6 jets, vtx b-tag	
$170.8 \pm 2.2 \pm 1.4$	[41,42] AALTONEN	07I	CDF	lepton + jets (b-tag)	
$173.7 \pm 4.4 {}^{+2.1}_{-2.0}$	[38,43] ABAZOV	07F	D0	lepton + jets	
$176.2 \pm 9.2 \pm 3.9$	[44] ABAZOV	07W	D0	dilepton (MWT)	
$179.5 \pm 7.4 \pm 5.6$	[44] ABAZOV	07W	D0	dilepton (νWT)	OCCUR=2
$164.5 \pm 3.9 \pm 3.9$	[42,45] ABULENCIA	07D	CDF	dilepton	
$180.7 {}^{+15.5}_{-13.4} \pm 8.6$	[46] ABULENCIA	07J	CDF	lepton + jets	
$170.3 {}^{+4.1}_{-4.5} {}^{+1.2}_{-1.8}$	[42,47] ABAZOV	06U	D0	lepton + jets (b-tag)	
$173.2 {}^{+2.6}_{-2.4} \pm 3.2$	[48,49] ABULENCIA	06D	CDF	lepton + jets	
$173.5 {}^{+3.7}_{-3.6} \pm 1.3$	[35,48] ABULENCIA	06D	CDF	lepton + jets	OCCUR=2
$165.2 \pm 6.1 \pm 3.4$	[42,50] ABULENCIA	06G	CDF	dilepton	
$170.1 \pm 6.0 \pm 4.1$	[35,51] ABULENCIA	06V	CDF	dilepton	
$178.5 \pm 13.7 \pm 7.7$	[52,53] ABAZOV	05	D0	6 or more jets	
176.1 ± 6.6	[54] AFFOLDER	01	CDF	dilepton, lepton+jets, all-jets	OCCUR=2
$172.1 \pm 5.2 \pm 4.9$	[55] ABBOTT	99G	D0	di-lepton, lepton+jets	
176.0 ± 6.5	[17,56] ABE	99B	CDF	dilepton, lepton+jets, all-jets	
$173.3 \pm 5.6 \pm 5.5$	[14,57] ABBOTT	98F	D0	lepton + jets	
$175.9 \pm 4.8 \pm 5.3$	[16,58] ABE	98E	CDF	lepton + jets	
$161 \pm 17 \pm 10$	[16] ABE	98F	CDF	dilepton	
$172.1 \pm 5.2 \pm 4.9$	[59] BHAT	98B	RVUE	dilepton and lepton+jets	
173.8 ± 5.0	[60] BHAT	98B	RVUE	dilepton, lepton+jets, all-jets	OCCUR=2
$173.3 \pm 5.6 \pm 6.2$	[14] ABACHI	97E	D0	lepton + jets	
$199 {}^{+19}_{-21} \pm 22$	ABACHI	95	D0	lepton + jets	
$176 \pm 8 \pm 10$	ABE	95F	CDF	lepton + b-jet	
$174 \pm 10 {}^{+13}_{-12}$	ABE	94E	CDF	lepton + b-jet	

[1] Based on 1.04 fb^{-1} of data at LHC7. Uses 2d-template analysis (MT) with m_t and jet energy scale factor (JSF) from m_W mass fit. NODE=Q007TP;LINKAGE=GD

[2] Based on 8.7 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. The JES is calibrated by using the dijet mass from the W boson decay. NODE=Q007TP;LINKAGE=CL

[3] Use the ME method based on 2.2 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. NODE=Q007TP;LINKAGE=CD

[4] Based on 5.8 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. The quoted systematic error is the sum of JES($\pm$1.0) and systematic($\pm$1.0) uncertainties. The measurement is performed with a liklihood fit technique which simultaneously determines m_t and JES. NODE=Q007TP;LINKAGE=OA

[5] Combination with the result in 1 fb^{-1} of preceding data reported in ABAZOV 09AH as well as the MWT result of ABAZOV 11R with a statistical correlation of 60%. NODE=Q007TP;LINKAGE=VB

[6] Based on 5.0 fb^{-1} of data at LHC7. Uses an analytical matrix weighting technique (AMWT) and full kinematic analysis (KIN). NODE=Q007TP;LINKAGE=CA

[7] Based on 5.0 fb^{-1} of data at LHC7. The first error is statistical and JES combined, and the second is systematic. Ideogram method is used to obtain 2D liklihood for the kinematical fit with two parameters mtop and JES. NODE=Q007TP;LINKAGE=RC

[8] Based on 5.7 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. Events with an identified charged lepton or small $\not{E}_T$ are rejected from the event sample, so that the measurement is statistically independent from those in the ℓ + jets and all hadronic channels while being sensitive to those events with a τ lepton in the final state. Supersedes AALTONEN 07B. NODE=Q007TP;LINKAGE=TL

[9] Based on 5.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. Employs a multi-dimensional template likelihood technique where the lepton plus jets (one or two b-tags) channel gives $172.2 \pm 1.2 \pm 0.9$ GeV while the dilepton channel yields $170.3 \pm 2.0 \pm 3.1$ GeV. The results are combined. OUR EVALUATION includes the measurement in the dilepton channel only. NODE=Q007TP;LINKAGE=NT

[10] Based on 3.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. ABAZOV 11P reports $174.94 \pm 0.83 \pm 0.78 \pm 0.96$ GeV, where the first uncertainty is from statistics, the second from JES, and the last from other systematic uncertainties. We combine the JES and systematic uncertainties. A matrix-element method is used where the JES uncertainty is constrained NODE=Q007TP;LINKAGE=ZA

by the W mass. ABAZOV 11P describes a measurement based on 2.6 fb^{-1} that is combined with ABAZOV 08AH, which employs an independent 1 fb^{-1} of data.

[11] Based on 5.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The likelihood calculated using a matrix element method gives m_t = 173.0 ± 0.7(stat)±0.6(JES)±0.9(syst) GeV, for a total uncertainty of 1.2 GeV. NODE=Q007TP;LINKAGE=NA

[12] Based on 1.9 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The result is from the measurement using the transverse decay lenght of b-hadrons and that using the transverse momentum of the W decay muons, which are both insensitive to the JES (jet energy scale) uncertainty. OUR EVALUATION uses only the measurement exploiting the decay length significance which yields $166.9^{+9.5}_{-8.5}$(stat)±2.9 (syst) GeV. The measurement that uses the lepton transverse momentum is excluded from the average because of a statistical correlation with other samples. NODE=Q007TP;LINKAGE=AE

[13] Obtained by re-analysis of the lepton + jets candidate events that led to ABBOTT 98F. It is based upon the maximum likelihood method which makes use of the leading order matrix elements. NODE=Q007TP;LINKAGE=AO

[14] Based on 125 ± 7 pb^{-1} of data at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=WW

[15] Based on ∼ 106 pb^{-1} of data at $\sqrt{s}$= 1.8 TeV. NODE=Q007TP;LINKAGE=F1

[16] Based on 109 ± 7 pb^{-1} of data at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=XX

[17] See AFFOLDER 01 for details of systematic error re-evaluation. NODE=Q007TP;LINKAGE=XZ

[18] Based on the first observation of all hadronic decays of $t\overline{t}$ pairs. Single b-quark tagging with jet-shape variable constraints was used to select signal enriched multi-jet events. The updated systematic error is listed. See AFFOLDER 01, appendix C. NODE=Q007TP;LINKAGE=AR

[19] Combination based on up to 5.8 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. NODE=Q007TP;LINKAGE=EA

[20] Based on 4.3 fb^{-1} of data in p-pbar collisions at 1.96 TeV. The measurement reduces the JES uncertainty by using the single lepton channel study of ABAZOV 11P. NODE=Q007TP;LINKAGE=VA

[21] Based on 3.2 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and JES combined, and the latter is from the other systematic uncertainties. The result is obtained using an unbinned maximum likelihood method where the top quark mass and the JES are measured simultaneously, with Δ_{JES} = 0.3 ± 0.3(stat). NODE=Q007TP;LINKAGE=NL

[22] Uses a likelihood fit of the lepton p_T distribution based on 2.7 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=NN

[23] Based on a matrix-element method which employs 5.4 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. Superseded by ABAZOV 12AB. NODE=Q007TP;LINKAGE=OZ

[24] Based on 36 pb^{-1} of pp collisions at $\sqrt{s}$ = 7 TeV. A Kinematic Method using b-tagging and an analytical Matrix Weighting Technique give consistent results and are combined. Superseded by CHATRCHYAN 12BA. NODE=Q007TP;LINKAGE=CH

[25] Based on 3.4 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The result is obtained by combining the MT2 variable method and the NWA (Neutrino Weighting Algorithm). The MT2 method alone gives $m_t = 168.0^{+4.8}_{-4.0}$(stat)±2.9(syst) GeV with smaller systematic error due to small JES uncertainty. NODE=Q007TP;LINKAGE=TA

[26] Based on 2.9 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and JES uncertainty, and the latter is from the other systematics. Neural-network-based kinematical selection of 6 highest E_T jets with a vtx b-tag is used to distinguish signal from background. Superseded by AALTONEN 12G. NODE=Q007TP;LINKAGE=LN

[27] Based on 2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The top mass is obtained from the measurement of the invariant mass of the lepton (e or μ) from W decays and the soft μ in b-jet. The result is insensitive to jet energy scaling. NODE=Q007TP;LINKAGE=NO

[28] Based on 1.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and jet energy scale uncertainty, and the latter is from the other systematics. Matrix element method with effective propagators. NODE=Q007TP;LINKAGE=LO

[29] Based on 943 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistical and jet-energy-scale uncertainties, and the latter is from other systematics. AALTONEN 09K selected 6 jet events with one or more vertex b-tags and used the tree-level matrix element to construct template models of signal and background. NODE=Q007TP;LINKAGE=OT

[30] Based on 1.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistical and jet-energy-scale (JES) uncertainties, and the second is from other systematics. Events with lepton + jets and those with dilepton + jets were simultaneously fit to constrain m_t and JES. Lepton + jets data only give m_t = 171.8 ± 2.2 GeV, and dilepton data only give $m_t = 171.2^{+5.3}_{-5.1}$ GeV. NODE=Q007TP;LINKAGE=EN

[31] Based on 2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Matrix Element method. Optimal selection criteria for candidate events with two high p_T leptons, high $\not{E}_T$, and two or more jets with and without b-tag are obtained by neural network with neuroevolution technique to minimize the statistical error of m_t. NODE=Q007TP;LINKAGE=TE

[32] Based on 2.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Mass m_t is estimated from the likelihood for the eight-fold kinematical solutions in the plane of the azimuthal angles of the two neutrino momenta. NODE=Q007TP;LINKAGE=ON

[33] Based on 1 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Events with two identified leptons, and those with one lepton plus one isolated track and a b-tag were used to constrain m_t. The result is a combination of the νWT (ν Weighting Technique) result of 176.2 ± 4.8 ± 2.1 GeV and the MWT (Matrix-element Weighting Technique) result of 173.2 ± 4.9 ± 2.0 GeV. NODE=Q007TP;LINKAGE=ZV

[34] Reports measurement of $170.7^{+4.2}_{-3.9} \pm 2.6 \pm 2.4$ GeV based on 1.2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The last error is due to the theoretical uncertainty on $\sigma_{t\bar{t}}$. Without the cross-section constraint a top mass of $169.7^{+5.2}_{-4.9} \pm 3.1$ GeV is obtained. NODE=Q007TP;LINKAGE=AN

[35] Template method. NODE=Q007TP;LINKAGE=BC

[36] Result is based on 1 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and jet energy scale uncertainty, and the latter is from the other systematics. NODE=Q007TP;LINKAGE=BV

[37] Based on 310 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=TN

[38] Ideogram method. NODE=Q007TP;LINKAGE=TO

[39] Based on 311 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Events with 4 or more jets with $E_T >$ 15 GeV, significant missing E_T, and secondary vertex b-tag are used in the fit. About 44% of the signal acceptance is from $\tau\nu$ + 4 jets. Events with identified e or μ are vetoed to provide a statistically independent measurement. NODE=Q007TP;LINKAGE=LT

[40] Based on 1.02 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Superseded by AALTONEN 12G. NODE=Q007TP;LINKAGE=NE

[41] Based on 955 pb^{-1} of data $\sqrt{s}$ = 1.96 TeV. m_t and JES (Jet Energy Scale) are fitted simultaneously, and the first error contains the JES contribution of 1.5 GeV. NODE=Q007TP;LINKAGE=LA

[42] Matrix element method. NODE=Q007TP;LINKAGE=UB

[43] Based on 425 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is a combination of statistics and JES (Jet Energy Scale) uncertainty, which has been measured simultaneously to give JES = 0.989 ± 0.029(stat). NODE=Q007TP;LINKAGE=OV

[44] Based on 370 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Combined result of MWT (Matrix-element Weighting Technique) and νWT (ν Weighting Technique) analyses is 178.1 ± 6.7 ± 4.8 GeV. NODE=Q007TP;LINKAGE=ZO

[45] Based on 1.0 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. ABULENCIA 07D improves the matrix element description by including the effects of initial-state radiation. NODE=Q007TP;LINKAGE=LE

[46] Based on 695 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The transverse decay length of the b hadron is used to determine m_t, and the result is free from the JES (jet energy scale) uncertainty. NODE=Q007TP;LINKAGE=UL

[47] Based on ∼ 400 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error includes statistical and systematic jet energy scale uncertainties, the second error is from the other systematics. The result is obtained with the b-tagging information. The result without b-tagging is $169.2^{+5.0}_{-7.4}{}^{+1.5}_{-1.4}$ GeV. Superseded by ABAZOV 08AH. NODE=Q007TP;LINKAGE=BZ

[48] Based on 318 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=BA

[49] Dynamical likelihood method. NODE=Q007TP;LINKAGE=BB

[50] Based on 340 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=UA

[51] Based on 360 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=AL

[52] Based on 110.2 ± 5.8 pb^{-1} at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=AA

[53] Based on the all hadronic decays of $t\bar{t}$ pairs. Single b-quark tagging via the decay chain $b \rightarrow c \rightarrow \mu$ was used to select signal enriched multijet events. The result was obtained by the maximum likelihood method after bias correction. NODE=Q007TP;LINKAGE=AZ

[54] Obtained by combining the measurements in the lepton + jets [AFFOLDER 01], all-jets [ABE 97R, ABE 99B], and dilepton [ABE 99B] decay topologies. NODE=Q007TP;LINKAGE=F2

[55] Obtained by combining the D0 result m_t (GeV) = 168.4 ± 12.3 ± 3.6 from 6 di-lepton events (see also ABBOTT 98D) and m_t (GeV) = 173.3 ± 5.6 ± 5.5 from lepton+jet events (ABBOTT 98F). NODE=Q007TP;LINKAGE=DG

[56] Obtained by combining the CDF results of m_t (GeV)=167.4 ± 10.3 ± 4.8 from 8 dilepton events, m_t (GeV)=175.9 ± 4.8 ± 5.3 from lepton+jet events (ABE 98E), and m_t (GeV)=186.0 ± 10.0 ± 5.7 from all-jet events (ABE 97R). The systematic errors in the latter two measurements are changed in this paper. NODE=Q007TP;LINKAGE=BG

[57] See ABAZOV 04G. NODE=Q007TP;LINKAGE=AT

[58] The updated systematic error is listed. See AFFOLDER 01, appendix C. NODE=Q007TP;LINKAGE=XY

[59] Obtained by combining the DØ results of m_t(GeV)=168.4 ± 12.3 ± 3.6 from 6 dilepton events and m_t(GeV)=173.3 ± 5.6 ± 5.5 from 77 lepton+jet events. NODE=Q007TP;LINKAGE=BE

[60] Obtained by combining the DØ results from dilepton and lepton+jet events, and the CDF results (ABE 99B) from dilepton, lepton+jet events, and all-jet events. NODE=Q007TP;LINKAGE=BF

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ABULENCIA	07J	PR D75 071102	A. Abulencia *et al.*	(CDF Collab.)	REFID=51783
ABAZOV	06U	PR D74 092005	V.M. Abazov *et al.*	(D0 Collab.)	REFID=51503
ABULENCIA	06D	PRL 96 022004	A. Abulencia *et al.*	(CDF Collab.)	REFID=51102
Also		PR D73 032003	A. Abulencia *et al.*	(CDF Collab.)	REFID=51103
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Also		PRL 73 225	F. Abe *et al.*	(CDF Collab.)	REFID=43823

Reference = AALTONEN 12AP; PR D86 092003
Verifier code = CDF

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Konstantinos Vellidis

EMAIL: vellidis@fnal.gov

June 4, 2013

Dear Colleague,

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Sincerely,

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QUARKS

NODE=QXXX005

NODE=Q007

t

$I(J^P) = 0(\frac{1}{2}^+)$

NODE=Q007

Charge $= \frac{2}{3}\ e$ Top $= +1$

t-QUARK MASS

NODE=Q007210

NODE=Q007210

We first list the direct measurements of the top quark mass which employ the event kinematics and then list the measurements which extract a top quark mass from the measured $t\bar{t}$ cross-section using theory calculations. A discussion of the definition of the top quark mass in these measurements can be found in the review "The Top Quark."

OUR EVALUATION of $173.07 \pm 0.52 \pm 0.72$ GeV is an average of published top mass measurements from Tevatron Runs. The LHC experiments are working on a combined average that should appear in the 2014 PDG edition once the correlated uncertainties between experiments are understood. The Tevatron average was provided by the Tevatron Electroweak Working Group (TEVEWWG). It takes correlated uncertainties into account and has a χ^2 of 8.4 for 11 degrees of freedom.

For earlier search limits see PDG 96, Physical Review **D54** 1 (1996). We no longer include a compilation of indirect top mass determinations from Standard Model Electroweak fits in the Listings (our last compilation can be found in the Listings of the 2007 partial update). For a discussion of current results see the reviews "The Top Quark" and "Electroweak Model and Constraints on New Physics."

t-Quark Mass (Direct Measurements)

NODE=Q007TP

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The following measurements extract a t-quark mass from the kinematics of $t\bar{t}$ events. They are sensitive to the top quark mass used in the MC generator that is usually interpreted as the pole mass, but the theoretical uncertainty in this interpretation is hard to quantify. See the review "The Top Quark" and references therein for more information.

NODE=Q007TP

VALUE (GeV)	DOCUMENT ID		TECN	COMMENT
173.07± 0.52± 0.72 OUR EVALUATION	See comments in the header above.			NEW;→ UNCHECKED ←
[173.5 ± 0.6 ± 0.8 GeV OUR 2012 EVALUATION]				
174.5 ± 0.6 ± 2.3	[1] AAD	12I	ATLS	$\ell+\not{E}_T+\geq 4$ jets (≥ 1 b), MT
172.85± 0.71± 0.85	[2] AALTONEN	12AI	CDF	$\ell+\not{E}_T+\geq 4$j (0,1,2b) template
172.7 ± 9.3 ± 3.7	[3] AALTONEN	12AL	CDF	$\tau_h + \not{E}_T$ +4j ($\geq 1b$)
172.5 ± 1.4 ± 1.5	[4] AALTONEN	12G	CDF	6–8 jets with ≥ 1 b
173.9 ± 1.9 ± 1.6	[5] ABAZOV	12AB	D0	$\ell\ell+\not{E}_T+\geq 2$j ($\nu$WT+MWT)
172.5 ± 0.4 ± 1.5	[6] CHATRCHYAN	12BA	CMS	$\ell\ell+\not{E}_T+\geq 2$j ($\geq 1b$), AMWT
173.49± 0.43± 0.98	[7] CHATRCHYAN	12BP	CMS	$\ell+\not{E}_T+\geq 4$j ($\geq 2b$)
172.3 ± 2.4 ± 1.0	[8] AALTONEN	11AK	CDF	$\not{E}_T + \geq 4$ jets (≥ 1 b-tag)
172.1 ± 1.1 ± 0.9	[9] AALTONEN	11E	CDF	ℓ + jets and dilepton
174.94± 0.83± 1.24	[10] ABAZOV	11P	D0	$\ell + \not{E}_T + 4$ jets (≥ 1 b-tag)
173.0 ± 1.2	[11] AALTONEN	10AE	CDF	$\ell + \not{E}_T + 4$ jets (≥ 1 b-tag), ME method
170.7 ± 6.3 ± 2.6	[12] AALTONEN	10D	CDF	$\ell + \not{E}_T + 4$ jets (b-tag)
180.1 ± 3.6 ± 3.9	[13,14] ABAZOV	04G	D0	lepton + jets
176.1 ± 5.1 ± 5.3	[15] AFFOLDER	01	CDF	lepton + jets
167.4 ±10.3 ± 4.8	[16,17] ABE	99B	CDF	dilepton
168.4 ±12.3 ± 3.6	[14] ABBOTT	98D	D0	dilepton
186 ±10 ± 5.7	[16,18] ABE	97R	CDF	6 or more jets
• • • We do not use the following data for averages, fits, limits, etc. • • •				
YOUR DATA 173.18± 0.56± 0.75	[19] AALTONEN	12AP	TEVA	CDF, D0 combination
173.7 ± 2.8 ± 1.5	[20] ABAZOV	12AB	D0	$\ell\ell + \not{E}_T + \geq 2$ j (νWT)
172.4 ± 1.4 ± 1.3	[21] AALTONEN	11AC	CDF	$\ell + \not{E}_T + 4$ jets (≥ 1 b-tag)
176.9 ± 8.0 ± 2.7	[22] AALTONEN	11T	CDF	$\ell + \not{E}_T + 4$ jets (≥ 1 b-tag), $p_T(\ell)$ shape
174.0 ± 1.8 ± 2.4	[23] ABAZOV	11R	D0	dilepton + $\not{E}_T + \geq 2$ jets
175.5 ± 4.6 ± 4.6	[24] CHATRCHYAN	11F	CMS	dilepton + $\not{E}_T$ + jets
169.3 ± 2.7 ± 3.2	[25] AALTONEN	10C	CDF	dilepton + b-tag (MT2+NWA)
174.8 ± 2.4 $^{+1.2}_{-1.0}$	[26] AALTONEN	10E	CDF	≥ 6 jets, vtx b-tag

OCCUR=2

OCCUR=2

$180.5 \pm 12.0 \pm 3.6$	[27] AALTONEN	09AK	CDF	$\ell + \not{E}_T$ + jets (soft μ b-tag)	
$172.7 \pm 1.8 \pm 1.2$	[28] AALTONEN	09J	CDF	$\ell + \not{E}_T$ + 4 jets (b-tag)	
$171.1 \pm 3.7 \pm 2.1$	[29] AALTONEN	09K	CDF	6 jets, vtx b-tag	
$171.9 \pm 1.7 \pm 1.1$	[30] AALTONEN	09L	CDF	ℓ + jets, $\ell\ell$ + jets	
$171.2 \pm 2.7 \pm 2.9$	[31] AALTONEN	09O	CDF	dilepton	
$165.5 {}^{+3.4}_{-3.3} \pm 3.1$	[32] AALTONEN	09X	CDF	$\ell\ell + \not{E}_T$ ($\nu\phi$ weighting)	
$174.7 \pm 4.4 \pm 2.0$	[33] ABAZOV	09AH	D0	dilepton + b-tag (νWT+MWT)	
$170.7 {}^{+4.2}_{-3.9} \pm 3.5$	[34,35] AALTONEN	08C	CDF	dilepton, $\sigma_{t\bar{t}}$ constrained	
$171.5 \pm 1.8 \pm 1.1$	[36] ABAZOV	08AH	D0	$\ell + \not{E}_T$ + 4 jets	
$177.1 \pm 4.9 \pm 4.7$	[37,38] AALTONEN	07	CDF	6 jets with ≥ 1 b vtx	
$172.3 {}^{+10.8}_{-9.6} \pm 10.8$	[39] AALTONEN	07B	CDF	≥ 4 jets (b-tag)	
$174.0 \pm 2.2 \pm 4.8$	[40] AALTONEN	07D	CDF	≥ 6 jets, vtx b-tag	
$170.8 \pm 2.2 \pm 1.4$	[41,42] AALTONEN	07I	CDF	lepton + jets (b-tag)	
$173.7 \pm 4.4 {}^{+2.1}_{-2.0}$	[38,43] ABAZOV	07F	D0	lepton + jets	
$176.2 \pm 9.2 \pm 3.9$	[44] ABAZOV	07W	D0	dilepton (MWT)	
$179.5 \pm 7.4 \pm 5.6$	[44] ABAZOV	07W	D0	dilepton (νWT)	OCCUR=2
$164.5 \pm 3.9 \pm 3.9$	[42,45] ABULENCIA	07D	CDF	dilepton	
$180.7 {}^{+15.5}_{-13.4} \pm 8.6$	[46] ABULENCIA	07J	CDF	lepton + jets	
$170.3 {}^{+4.1}_{-4.5} {}^{+1.2}_{-1.8}$	[42,47] ABAZOV	06U	D0	lepton + jets (b-tag)	
$173.2 {}^{+2.6}_{-2.4} \pm 3.2$	[48,49] ABULENCIA	06D	CDF	lepton + jets	
$173.5 {}^{+3.7}_{-3.6} \pm 1.3$	[35,48] ABULENCIA	06D	CDF	lepton + jets	OCCUR=2
$165.2 \pm 6.1 \pm 3.4$	[42,50] ABULENCIA	06G	CDF	dilepton	
$170.1 \pm 6.0 \pm 4.1$	[35,51] ABULENCIA	06V	CDF	dilepton	
$178.5 \pm 13.7 \pm 7.7$	[52,53] ABAZOV	05	D0	6 or more jets	
176.1 ± 6.6	[54] AFFOLDER	01	CDF	dilepton, lepton+jets, all-jets	OCCUR=2
$172.1 \pm 5.2 \pm 4.9$	[55] ABBOTT	99G	D0	di-lepton, lepton+jets	
176.0 ± 6.5	[17,56] ABE	99B	CDF	dilepton, lepton+jets, all-jets	
$173.3 \pm 5.6 \pm 5.5$	[14,57] ABBOTT	98F	D0	lepton + jets	
$175.9 \pm 4.8 \pm 5.3$	[16,58] ABE	98E	CDF	lepton + jets	
$161 \pm 17 \pm 10$	[16] ABE	98F	CDF	dilepton	
$172.1 \pm 5.2 \pm 4.9$	[59] BHAT	98B	RVUE	dilepton and lepton+jets	
173.8 ± 5.0	[60] BHAT	98B	RVUE	dilepton, lepton+jets, all-jets	OCCUR=2
$173.3 \pm 5.6 \pm 6.2$	[14] ABACHI	97E	D0	lepton + jets	
$199 {}^{+19}_{-21} \pm 22$	ABACHI	95	D0	lepton + jets	
$176 \pm 8 \pm 10$	ABE	95F	CDF	lepton + b-jet	
$174 \pm 10 {}^{+13}_{-12}$	ABE	94E	CDF	lepton + b-jet	

[1] Based on 1.04 fb^{-1} of data at LHC7. Uses 2d-template analysis (MT) with m_t and jet energy scale factor (JSF) from m_W mass fit. NODE=Q007TP;LINKAGE=GD

[2] Based on 8.7 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. The JES is calibrated by using the dijet mass from the W boson decay. NODE=Q007TP;LINKAGE=CL

[3] Use the ME method based on 2.2 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. NODE=Q007TP;LINKAGE=CD

[4] Based on 5.8 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. The quoted systematic error is the sum of JES($\pm$1.0) and systematic($\pm$1.0) uncertainties. The measurement is performed with a liklihood fit technique which simultaneously determines m_t and JES. NODE=Q007TP;LINKAGE=OA

[5] Combination with the result in 1 fb^{-1} of preceding data reported in ABAZOV 09AH as well as the MWT result of ABAZOV 11R with a statistical correlation of 60%. NODE=Q007TP;LINKAGE=VB

[6] Based on 5.0 fb^{-1} of data at LHC7. Uses an analytical matrix weighting technique (AMWT) and full kinematic analysis (KIN). NODE=Q007TP;LINKAGE=CA

[7] Based on 5.0 fb^{-1} of data at LHC7. The first error is statistical and JES combined, and the second is systematic. Ideogram method is used to obtain 2D liklihood for the kinematical fit with two parameters mtop and JES. NODE=Q007TP;LINKAGE=RC

[8] Based on 5.7 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. Events with an identified charged lepton or small $\not{E}_T$ are rejected from the event sample, so that the measurement is statistically independent from those in the ℓ + jets and all hadronic channels while being sensitive to those events with a τ lepton in the final state. Supersedes AALTONEN 07B. NODE=Q007TP;LINKAGE=TL

[9] Based on 5.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. Employs a multi-dimensional template likelihood technique where the lepton plus jets (one or two b-tags) channel gives $172.2 \pm 1.2 \pm 0.9$ GeV while the dilepton channel yields $170.3 \pm 2.0 \pm 3.1$ GeV. The results are combined. OUR EVALUATION includes the measurement in the dilepton channel only. NODE=Q007TP;LINKAGE=NT

[10] Based on 3.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. ABAZOV 11P reports $174.94 \pm 0.83 \pm 0.78 \pm 0.96$ GeV, where the first uncertainty is from statistics, the second from JES, and the last from other systematic uncertainties. We combine the JES and systematic uncertainties. A matrix-element method is used where the JES uncertainty is constrained NODE=Q007TP;LINKAGE=ZA

by the W mass. ABAZOV 11P describes a measurement based on 2.6 fb^{-1} that is combined with ABAZOV 08AH, which employs an independent 1 fb^{-1} of data.

[11] Based on 5.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The likelihood calculated using a matrix element method gives m_t = 173.0 ± 0.7(stat)±0.6(JES)±0.9(syst) GeV, for a total uncertainty of 1.2 GeV. NODE=Q007TP;LINKAGE=NA

[12] Based on 1.9 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The result is from the measurement using the transverse decay lenght of b-hadrons and that using the transverse momentum of the W decay muons, which are both insensitive to the JES (jet energy scale) uncertainty. OUR EVALUATION uses only the measurement exploiting the decay length significance which yields $166.9^{+9.5}_{-8.5}$(stat)±2.9 (syst) GeV. The measurement that uses the lepton transverse momentum is excluded from the average because of a statistical correlation with other samples. NODE=Q007TP;LINKAGE=AE

[13] Obtained by re-analysis of the lepton + jets candidate events that led to ABBOTT 98F. It is based upon the maximum likelihood method which makes use of the leading order matrix elements. NODE=Q007TP;LINKAGE=AO

[14] Based on 125 ± 7 pb^{-1} of data at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=WW

[15] Based on ∼ 106 pb^{-1} of data at $\sqrt{s}$= 1.8 TeV. NODE=Q007TP;LINKAGE=F1

[16] Based on 109 ± 7 pb^{-1} of data at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=XX

[17] See AFFOLDER 01 for details of systematic error re-evaluation. NODE=Q007TP;LINKAGE=XZ

[18] Based on the first observation of all hadronic decays of $t\overline{t}$ pairs. Single b-quark tagging with jet-shape variable constraints was used to select signal enriched multi-jet events. The updated systematic error is listed. See AFFOLDER 01, appendix C. NODE=Q007TP;LINKAGE=AR

[19] Combination based on up to 5.8 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. NODE=Q007TP;LINKAGE=EA

[20] Based on 4.3 fb^{-1} of data in p-pbar collisions at 1.96 TeV. The measurement reduces the JES uncertainty by using the single lepton channel study of ABAZOV 11P. NODE=Q007TP;LINKAGE=VA

[21] Based on 3.2 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and JES combined, and the latter is from the other systematic uncertainties. The result is obtained using an unbinned maximum likelihood method where the top quark mass and the JES are measured simultaneously, with Δ_{JES} = 0.3 ± 0.3(stat). NODE=Q007TP;LINKAGE=NL

[22] Uses a likelihood fit of the lepton p_T distribution based on 2.7 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=NN

[23] Based on a matrix-element method which employs 5.4 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. Superseded by ABAZOV 12AB. NODE=Q007TP;LINKAGE=OZ

[24] Based on 36 pb^{-1} of pp collisions at $\sqrt{s}$ = 7 TeV. A Kinematic Method using b-tagging and an analytical Matrix Weighting Technique give consistent results and are combined. Superseded by CHATRCHYAN 12BA. NODE=Q007TP;LINKAGE=CH

[25] Based on 3.4 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The result is obtained by combining the MT2 variable method and the NWA (Neutrino Weighting Algorithm). The MT2 method alone gives $m_t = 168.0^{+4.8}_{-4.0}$(stat)±2.9(syst) GeV with smaller systematic error due to small JES uncertainty. NODE=Q007TP;LINKAGE=TA

[26] Based on 2.9 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and JES uncertainty, and the latter is from the other systematics. Neural-network-based kinematical selection of 6 highest E_T jets with a vtx b-tag is used to distinguish signal from background. Superseded by AALTONEN 12G. NODE=Q007TP;LINKAGE=LN

[27] Based on 2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The top mass is obtained from the measurement of the invariant mass of the lepton (e or μ) from W decays and the soft μ in b-jet. The result is insensitive to jet energy scaling. NODE=Q007TP;LINKAGE=NO

[28] Based on 1.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and jet energy scale uncertainty, and the latter is from the other systematics. Matrix element method with effective propagators. NODE=Q007TP;LINKAGE=LO

[29] Based on 943 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistical and jet-energy-scale uncertainties, and the latter is from other systematics. AALTONEN 09K selected 6 jet events with one or more vertex b-tags and used the tree-level matrix element to construct template models of signal and background. NODE=Q007TP;LINKAGE=OT

[30] Based on 1.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistical and jet-energy-scale (JES) uncertainties, and the second is from other systematics. Events with lepton + jets and those with dilepton + jets were simultaneously fit to constrain m_t and JES. Lepton + jets data only give m_t = 171.8 ± 2.2 GeV, and dilepton data only give $m_t = 171.2^{+5.3}_{-5.1}$ GeV. NODE=Q007TP;LINKAGE=EN

[31] Based on 2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Matrix Element method. Optimal selection criteria for candidate events with two high p_T leptons, high $\not{E}_T$, and two or more jets with and without b-tag are obtained by neural network with neuroevolution technique to minimize the statistical error of m_t. NODE=Q007TP;LINKAGE=TE

[32] Based on 2.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Mass m_t is estimated from the likelihood for the eight-fold kinematical solutions in the plane of the azimuthal angles of the two neutrino momenta. NODE=Q007TP;LINKAGE=ON

[33] Based on 1 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Events with two identified leptons, and those with one lepton plus one isolated track and a b-tag were used to constrain m_t. The result is a combination of the νWT (ν Weighting Technique) result of 176.2 ± 4.8 ± 2.1 GeV and the MWT (Matrix-element Weighting Technique) result of 173.2 ± 4.9 ± 2.0 GeV. NODE=Q007TP;LINKAGE=ZV

[34] Reports measurement of $170.7^{+4.2}_{-3.9} \pm 2.6 \pm 2.4$ GeV based on 1.2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The last error is due to the theoretical uncertainty on $\sigma_{t\bar{t}}$. Without the cross-section constraint a top mass of $169.7^{+5.2}_{-4.9} \pm 3.1$ GeV is obtained. NODE=Q007TP;LINKAGE=AN

[35] Template method. NODE=Q007TP;LINKAGE=BC

[36] Result is based on 1 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and jet energy scale uncertainty, and the latter is from the other systematics. NODE=Q007TP;LINKAGE=BV

[37] Based on 310 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=TN

[38] Ideogram method. NODE=Q007TP;LINKAGE=TO

[39] Based on 311 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Events with 4 or more jets with $E_T >$ 15 GeV, significant missing E_T, and secondary vertex b-tag are used in the fit. About 44% of the signal acceptance is from $\tau\nu$ + 4 jets. Events with identified e or μ are vetoed to provide a statistically independent measurement. NODE=Q007TP;LINKAGE=LT

[40] Based on 1.02 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Superseded by AALTONEN 12G. NODE=Q007TP;LINKAGE=NE

[41] Based on 955 pb^{-1} of data $\sqrt{s}$ = 1.96 TeV. m_t and JES (Jet Energy Scale) are fitted simultaneously, and the first error contains the JES contribution of 1.5 GeV. NODE=Q007TP;LINKAGE=LA

[42] Matrix element method. NODE=Q007TP;LINKAGE=UB

[43] Based on 425 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is a combination of statistics and JES (Jet Energy Scale) uncertainty, which has been measured simultaneously to give JES = 0.989 ± 0.029(stat). NODE=Q007TP;LINKAGE=OV

[44] Based on 370 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Combined result of MWT (Matrix-element Weighting Technique) and νWT (ν Weighting Technique) analyses is 178.1 ± 6.7 ± 4.8 GeV. NODE=Q007TP;LINKAGE=ZO

[45] Based on 1.0 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. ABULENCIA 07D improves the matrix element description by including the effects of initial-state radiation. NODE=Q007TP;LINKAGE=LE

[46] Based on 695 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The transverse decay length of the b hadron is used to determine m_t, and the result is free from the JES (jet energy scale) uncertainty. NODE=Q007TP;LINKAGE=UL

[47] Based on ∼ 400 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error includes statistical and systematic jet energy scale uncertainties, the second error is from the other systematics. The result is obtained with the b-tagging information. The result without b-tagging is $169.2^{+5.0}_{-7.4}{}^{+1.5}_{-1.4}$ GeV. Superseded by ABAZOV 08AH. NODE=Q007TP;LINKAGE=BZ

[48] Based on 318 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=BA

[49] Dynamical likelihood method. NODE=Q007TP;LINKAGE=BB

[50] Based on 340 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=UA

[51] Based on 360 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=AL

[52] Based on 110.2 ± 5.8 pb^{-1} at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=AA

[53] Based on the all hadronic decays of $t\bar{t}$ pairs. Single b-quark tagging via the decay chain $b \rightarrow c \rightarrow \mu$ was used to select signal enriched multijet events. The result was obtained by the maximum likelihood method after bias correction. NODE=Q007TP;LINKAGE=AZ

[54] Obtained by combining the measurements in the lepton + jets [AFFOLDER 01], all-jets [ABE 97R, ABE 99B], and dilepton [ABE 99B] decay topologies. NODE=Q007TP;LINKAGE=F2

[55] Obtained by combining the D0 result m_t (GeV) = 168.4 ± 12.3 ± 3.6 from 6 di-lepton events (see also ABBOTT 98D) and m_t (GeV) = 173.3 ± 5.6 ± 5.5 from lepton+jet events (ABBOTT 98F). NODE=Q007TP;LINKAGE=DG

[56] Obtained by combining the CDF results of m_t (GeV)=167.4 ± 10.3 ± 4.8 from 8 dilepton events, m_t (GeV)=175.9 ± 4.8 ± 5.3 from lepton+jet events (ABE 98E), and m_t (GeV)=186.0 ± 10.0 ± 5.7 from all-jet events (ABE 97R). The systematic errors in the latter two measurements are changed in this paper. NODE=Q007TP;LINKAGE=BG

[57] See ABAZOV 04G. NODE=Q007TP;LINKAGE=AT

[58] The updated systematic error is listed. See AFFOLDER 01, appendix C. NODE=Q007TP;LINKAGE=XY

[59] Obtained by combining the DØ results of m_t(GeV)=168.4 ± 12.3 ± 3.6 from 6 dilepton events and m_t(GeV)=173.3 ± 5.6 ± 5.5 from 77 lepton+jet events. NODE=Q007TP;LINKAGE=BE

[60] Obtained by combining the DØ results from dilepton and lepton+jet events, and the CDF results (ABE 99B) from dilepton, lepton+jet events, and all-jet events. NODE=Q007TP;LINKAGE=BF

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AALTONEN	08C	PRL 100 062005	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52193
ABAZOV	08AH	PRL 101 182001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52548
AALTONEN	07	PRL 98 142001	T. Aaltonen *et al.*	(CDF Collab.)	REFID=51684
AALTONEN	07B	PR D75 111103	T. Aaltonen *et al.*	(CDF Collab.)	REFID=51802
AALTONEN	07D	PR D76 072009	T. Aaltonen *et al.*	(CDF Collab.)	REFID=51996
AALTONEN	07I	PRL 99 182002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52044
ABAZOV	07F	PR D75 092001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=51792
ABAZOV	07W	PL B655 7	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52026
ABULENCIA	07D	PR D75 031105	A. Abulencia *et al.*	(CDF Collab.)	REFID=51683
ABULENCIA	07J	PR D75 071102	A. Abulencia *et al.*	(CDF Collab.)	REFID=51783
ABAZOV	06U	PR D74 092005	V.M. Abazov *et al.*	(D0 Collab.)	REFID=51503
ABULENCIA	06D	PRL 96 022004	A. Abulencia *et al.*	(CDF Collab.)	REFID=51102
Also		PR D73 032003	A. Abulencia *et al.*	(CDF Collab.)	REFID=51103
Also		PR D73 092002	A. Abulencia *et al.*	(CDF Collab.)	REFID=51306
ABULENCIA	06G	PRL 96 152002	A. Abulencia *et al.*	(CDF Collab.)	REFID=51104
Also		PR D74 032009	A. Abulencia *et al.*	(CDF Collab.)	REFID=51329
ABULENCIA	06V	PR D73 112006	A. Abulencia *et al.*	(CDF Collab.)	REFID=51285
ABAZOV	05	PL B606 25	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50386
ABAZOV	04G	NAT 429 638	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50556
AFFOLDER	01	PR D63 032003	T. Affolder *et al.*	(CDF Collab.)	REFID=48049
ABBOTT	99G	PR D60 052001	B. Abbott *et al.*	(D0 Collab.)	REFID=47135
ABE	99B	PRL 82 271	F. Abe *et al.*	(CDF Collab.)	REFID=46548
Also		PRL 82 2808 (erratum)	F. Abe *et al.*	(CDF Collab.)	REFID=46822
ABBOTT	98D	PRL 80 2063	B. Abbott *et al.*	(D0 Collab.)	REFID=45940
ABBOTT	98F	PR D58 052001	B. Abbott *et al.*	(D0 Collab.)	REFID=45967
ABE	98E	PRL 80 2767	F. Abe *et al.*	(CDF Collab.)	REFID=45941
ABE	98F	PRL 80 2779	F. Abe *et al.*	(CDF Collab.)	REFID=45942
BHAT	98B	IJMP A13 5113	P.C. Bhat, H.B. Prosper, S.S. Snyder		REFID=46531
ABACHI	97E	PRL 79 1197	S. Abachi *et al.*	(D0 Collab.)	REFID=45590
ABE	97R	PRL 79 1992	F. Abe *et al.*	(CDF Collab.)	REFID=45594
PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495
ABACHI	95	PRL 74 2632	S. Abachi *et al.*	(D0 Collab.)	REFID=44167
ABE	95F	PRL 74 2626	F. Abe *et al.*	(CDF Collab.)	REFID=44170
ABE	94E	PR D50 2966	F. Abe *et al.*	(CDF Collab.)	REFID=43810
Also		PRL 73 225	F. Abe *et al.*	(CDF Collab.)	REFID=43823

Reference = AALTONEN 13; PR D87 011101
Verifier code = CDF

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Konstantinos Vellidis

EMAIL: vellidis@fnal.gov

June 4, 2013

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Thank you for helping us make the Review accurate and useful.

Sincerely,

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FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM, CHARMED MESONS ($B = C = \pm 1$)

NODE=MXXX049

$B_c^+ = c\bar{b}$, $B_c^- = \bar{c}b$, similarly for B_c^*'s

NODE=MXXX049

NODE=S091

$B_c^\pm$

$I(J^P) = 0(0^-)$
I, J, P need confirmation.

Quantum numbers shown are quark-model predictions.

NODE=S091

$B_c^\pm$ MEAN LIFE

NODE=S091T

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements.

NODE=S091T

	VALUE (10^{-12} s)	DOCUMENT ID		TECN	COMMENT
	0.452±0.033 OUR EVALUATION				
	[$(0.453 \pm 0.041) \times 10^{-12}$ s OUR 2012 EVALUATION]				
	0.452±0.032 OUR AVERAGE				
	[$(0.45 \pm 0.04) \times 10^{-12}$ s OUR 2012 AVERAGE]				
YOUR DATA	$0.452 \pm 0.048 \pm 0.027$	[5] AALTONEN	13	CDF	$p\bar{p}$ at 1.96 TeV
	$0.448^{+0.038}_{-0.036} \pm 0.032$	[6] ABAZOV	09H	D0	$p\bar{p}$ at 1.96 TeV
	$0.463^{+0.073}_{-0.065} \pm 0.036$	[6] ABULENCIA	06O	CDF	$p\bar{p}$ at 1.96 TeV
	$0.46\ ^{+0.18}_{-0.16} \pm 0.03$	[6] ABE	98M	CDF	$p\bar{p}$ 1.8 TeV

NODE=S091T

NEW;→ UNCHECKED ←

NEW

[5] Uses fully reconstructed $B_c^+ \to J/\psi\pi^+$ decays.

[6] The lifetime is measured from the $J/\psi e$ decay vertices.

NODE=S091T;LINKAGE=AL

NODE=S091T;LINKAGE=A

B_c^+ BRANCHING RATIOS

NODE=S091225

$\Gamma(J/\psi(1S)\pi^+)/\Gamma_{total} \times B(\bar{b} \to B_c)$ **$\Gamma_2/\Gamma \times B$**

NODE=S091R2

NODE=S091R2

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	seen		AALTONEN	13	CDF	$p\bar{p}$ at 1.96 TeV
	seen		[11] AAIJ	12AV	LHCB	pp at 7 TeV
	seen		AALTONEN	08M	CDF	$p\bar{p}$ at 1.96 TeV
	seen		ABAZOV	08T	D0	$p\bar{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	$<2.4 \times 10^{-4}$	90	[12] ACKERSTAFF	98O	OPAL	$e^+e^- \to Z$
	$<3.4 \times 10^{-4}$	90	[13] ABREU	97E	DLPH	$e^+e^- \to Z$
	$<8.2 \times 10^{-5}$	90	[14] BARATE	97H	ALEP	$e^+e^- \to Z$
	$<2.0 \times 10^{-5}$	95	[15] ABE	96R	CDF	$p\bar{p}$ 1.8 TeV

[11] AAIJ 12AV reports a measurement of $B(B_c^+ \to J/\psi\pi^+)/B(B^+ \to J/\psi K^+)\ f_c/f_u = (0.68 \pm 0.10 \pm 0.03 \pm 0.05)\%$ at $p_T(B) > 4$ GeV and $2.5 < \eta(B) < 4.5$.

NODE=S091R2;LINKAGE=AA

[12] ACKERSTAFF 98O reports $B(Z \to B_c X)/B(Z \to qq) \times B(B_c \to J/\psi(1S)\pi^+) < 1.06 \times 10^{-4}$ at 90%CL. We rescale to our PDG 98 values of $B(Z \to b\bar{b})$.

NODE=S091R2;LINKAGE=D

[13] ABREU 97E value listed is for an assumed $\tau_{B_c} = 0.4$ ps and improves to 2.7×10^{-4} for $\tau_{B_c} = 1.4$ ps.

NODE=S091R2;LINKAGE=A

[14] BARATE 97H reports $B(Z \to B_c X)/B(Z \to qq) \cdot B(B_c \to J/\psi(1S)\pi) < 3.6 \times 10^{-5}$ at 90%CL. We rescale to our PDG 96 values of $B(Z \to b\bar{b})$.

NODE=S091R2;LINKAGE=B

[15] ABE 96R reports $B(b \to B_c X)/B(b \to B^+ X) \cdot B(B_c^+ \to J/\psi(1S)\pi^+)/B(B^+ \to J/\psi(1S)K^+) < 0.053$ at 95%CL for $\tau_{B_c} = 0.8$ ps. It changes from 0.15 to 0.04 for 0.17 ps$< \tau_{B_c} <$ 1.6 ps. We rescale to our PDG 96 values of $B(b \to B^+) = 0.378 \pm 0.022$ and $B(B^+ \to J/\psi(1S)K^+) = 0.00101 \pm 0.00014$.

NODE=S091R2;LINKAGE=C

$B_c^{\pm}$ REFERENCES

NODE=S091

YOUR PAPER	AALTONEN	13	PR D87 011101	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54798
	AAIJ	12AV	PRL 109 232001	R. Aaij *et al.*	(LHCb Colalb.)	REFID=54764
	ABAZOV	09H	PRL 102 092001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52702
	AALTONEN	08M	PRL 100 182002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52252
	ABAZOV	08T	PRL 101 012001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52398
	ABULENCIA	06O	PRL 97 012002	A. Abulencia *et al.*	(CDF Collab.)	REFID=51241
	ABE	98M	PRL 81 2432	F. Abe *et al.*	(CDF Collab.)	REFID=46120
	Also		PR D58 112004	F. Abe *et al.*	(CDF Collab.)	REFID=46488
	ACKERSTAFF	98O	PL B420 157	K. Ackerstaff *et al.*	(OPAL Collab.)	REFID=46029
	PDG	98	EPJ C3 1	C. Caso *et al.*		REFID=45838
	ABREU	97E	PL B398 207	P. Abreu *et al.*	(DELPHI Collab.)	REFID=45322
	BARATE	97H	PL B402 213	R. Barate *et al.*	(ALEPH Collab.)	REFID=45480
	ABE	96R	PRL 77 5176	F. Abe *et al.*	(CDF Collab.)	REFID=45159
	PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495

Reference = CHATRCHYAN 12S; PRL 108 252002
Verifier code = CMS

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Paris Sphicas

EMAIL: paris.sphicas@cern.ch

June 4, 2013

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM BARYONS
$(B = -1)$

$\Lambda_b^0 = u\,d\,b$, $\Xi_b^0 = u\,s\,b$, $\Xi_b^- = d\,s\,b$, $\Omega_b^- = s\,s\,b$

NODE=BXXX045

NODE=BXXX045

NODE=B161

$\Xi_b(5945)^0$

$J^P = \frac{3}{2}^+$ Status: ***

Quantum numbers are based on quark model expectations.

NODE=B161

$\Xi_b(5945)^0$ MASS

NODE=B161M

	VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
YOUR DATA	**5945.5±0.8±2.2**	[1] CHATRCHYAN 12S	CMS	pp at 7 TeV, 5.3 fb^{-1}

NODE=B161M

NODE=B161M;LINKAGE=CH

[1] CHATRCHYAN 12S measures $m(\Xi_b(5945)^0) - m(\Xi_b^-) - m(\pi^+) = 14.84 \pm 0.74 \pm 0.28$ MeV. We have adjusted the measurement to our best values of $m(\Xi_b^-) = 5791.1 \pm 2.2$ MeV, $m(\pi^+) = 139.57018 \pm 0.00035$ MeV. Our first error is their experiment's error and our second error is the systematic error from using our best values.

$\Xi_b(5945)^0$ WIDTH

NODE=B161W

	VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
YOUR DATA	**2.1±1.7**	[2] CHATRCHYAN 12S	CMS	pp at 7 TeV, 5.3 fb^{-1}

NODE=B161W

NODE=B161W;LINKAGE=CH

[2] Systematic uncertainty not evaluated.

$\Xi_b(5945)^0$ BRANCHING RATIOS

NODE=B161220

$\Gamma(\Xi_b^- \pi^+)/\Gamma_{total}$ **Γ_1/Γ**

NODE=B161R01

	VALUE	DOCUMENT ID	TECN	COMMENT
YOUR DATA	**seen**	CHATRCHYAN 12S	CMS	pp at 7 TeV, 5.3 fb^{-1}

NODE=B161R01

$\Xi_b(5945)^0$ REFERENCES

NODE=B161

YOUR PAPER CHATRCHYAN 12S PRL 108 252002 S. Chatrchyan *et al.* (CMS Collab.)

REFID=54250

Reference = CHATRCHYAN 12AK; JHEP 1202 011
Verifier code = CMS

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PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

$B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE

NODE=S051

$B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE BRANCHING RATIOS

NODE=S051215

$\Gamma(\psi(2S)\text{anything})/\Gamma(J/\psi(1S)\text{anything})$ — Γ_{50}/Γ_{49}

NODE=S051R95

NODE=S051R95

	VALUE	DOCUMENT ID		TECN	COMMENT
	0.242±0.014 OUR AVERAGE				
	0.237±0.015±0.006	[1,2] AAIJ	12BD	LHCB	pp at 7 TeV
YOUR DATA	0.262±0.015±0.029	[3,4] CHATRCHYAN	12AK	CMS	pp at 7 TeV

[1] AAIJ 12BD reports 0.235 ± 0.005 ± 0.015 from a measurement of $[\Gamma(\overline{b} \to \psi(2S)\text{anything})/\Gamma(\overline{b} \to J/\psi(1S)\text{anything})] \times [B(J/\psi(1S) \to \mu^+\mu^-)] / [B(\psi(2S) \to e^+e^-)]$ assuming $B(J/\psi(1S) \to \mu^+\mu^-) = (5.93 \pm 0.06) \times 10^{-2}$, $B(\psi(2S) \to e^+e^-) = (7.72 \pm 0.17) \times 10^{-3}$, which we rescale to our best values $B(J/\psi(1S) \to \mu^+\mu^-) = (5.93 \pm 0.06) \times 10^{-2}$, $B(\psi(2S) \to e^+e^-) = (7.78 \pm 0.17) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=S051R95;LINKAGE=A

[2] Assumes lepton universality imposing $B(\psi(2s) \to \mu^+\mu^-) = B(\psi(2s) \to e^+e^-)$.

NODE=S051R95;LINKAGE=B

[3] CHATRCHYAN 12AK really reports $\Gamma_{50}/\Gamma = (3.08 \pm 0.12 \pm 0.13 \pm 0.42) \times 10^{-3}$ assuming PDG 10 value of $\Gamma_{49}/\Gamma = (1.16 \pm 0.10) \times 10^{-2}$ which we present as a ratio of $\Gamma_{50}/\Gamma_{49} = (26.5 \pm 1.0 \pm 1.1 \pm 2.8) \times 10^{-2}$.

NODE=S051R95;LINKAGE=AA

[4] CHATRCHYAN 12AK reports $(26.5 \pm 1.0 \pm 1.1 \pm 2.8) \times 10^{-2}$ from a measurement of $[\Gamma(\overline{b} \to \psi(2S)\text{anything})/\Gamma(\overline{b} \to J/\psi(1S)\text{anything})] \times [B(\psi(2S) \to \mu^+\mu^-)] / [B(J/\psi(1S) \to \mu^+\mu^-)]$ assuming $B(\psi(2S) \to \mu^+\mu^-) = (7.7 \pm 0.8) \times 10^{-3}$, $B(J/\psi(1S) \to \mu^+\mu^-) = (5.93 \pm 0.06) \times 10^{-2}$, which we rescale to our best values $B(\psi(2S) \to \mu^+\mu^-) = (7.8 \pm 0.9) \times 10^{-3}$, $B(J/\psi(1S) \to \mu^+\mu^-) = (5.93 \pm 0.06) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=S051R95;LINKAGE=CH

$B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE REFERENCES

NODE=S051

	AAIJ	12BD	EPJ C72 2100	R. Aaij *et al.*	(LHCb Collab.)
YOUR PAPER	CHATRCHYAN	12AK	JHEP 1202 011	S. Chatrchyan *et al.*	(CMS Collab.)
	PDG	10	JPG 37 075021	K. Nakamura *et al.*	(PDG Collab.)

REFID=54850
REFID=54566
REFID=53229

Reference = CHATRCHYAN 12BA; EPJ C72 2202
Verifier code = CMS

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QUARKS

NODE=QXXX005

NODE=Q007

t

$I(J^P) = 0(\frac{1}{2}^+)$

NODE=Q007

Charge $= \frac{2}{3}\ e$ Top $= +1$

t-QUARK MASS

NODE=Q007210

NODE=Q007210

We first list the direct measurements of the top quark mass which employ the event kinematics and then list the measurements which extract a top quark mass from the measured $t\bar{t}$ cross-section using theory calculations. A discussion of the definition of the top quark mass in these measurements can be found in the review "The Top Quark."

OUR EVALUATION of $173.07 \pm 0.52 \pm 0.72$ GeV is an average of published top mass measurements from Tevatron Runs. The LHC experiments are working on a combined average that should appear in the 2014 PDG edition once the correlated uncertainties between experiments are understood. The Tevatron average was provided by the Tevatron Electroweak Working Group (TEVEWWG). It takes correlated uncertainties into account and has a χ^2 of 8.4 for 11 degrees of freedom.

For earlier search limits see PDG 96, Physical Review **D54** 1 (1996). We no longer include a compilation of indirect top mass determinations from Standard Model Electroweak fits in the Listings (our last compilation can be found in the Listings of the 2007 partial update). For a discussion of current results see the reviews "The Top Quark" and "Electroweak Model and Constraints on New Physics."

t-Quark Mass (Direct Measurements)

NODE=Q007TP

NODE=Q007TP

The following measurements extract a t-quark mass from the kinematics of $t\bar{t}$ events. They are sensitive to the top quark mass used in the MC generator that is usually interpreted as the pole mass, but the theoretical uncertainty in this interpretation is hard to quantify. See the review "The Top Quark" and references therein for more information.

NODE=Q007TP

	VALUE (GeV)	DOCUMENT ID		TECN	COMMENT	
	173.07± 0.52± 0.72 OUR EVALUATION	See comments in the header above.				NEW;→ UNCHECKED ←
	[173.5 ± 0.6 ± 0.8 GeV OUR 2012 EVALUATION]					
	174.5 ± 0.6 ± 2.3	[1] AAD	12I	ATLS	$\ell+\not{E}_T+\geq 4$ jets (≥ 1 b), MT	
	172.85± 0.71± 0.85	[2] AALTONEN	12AI	CDF	$\ell+\not{E}_T+\geq 4$j (0,1,2b) template	
	172.7 ± 9.3 ± 3.7	[3] AALTONEN	12AL	CDF	$\tau_h + \not{E}_T$ +4j ($\geq 1b$)	
	172.5 ± 1.4 ± 1.5	[4] AALTONEN	12G	CDF	6–8 jets with ≥ 1 b	
	173.9 ± 1.9 ± 1.6	[5] ABAZOV	12AB	D0	$\ell\ell+\not{E}_T+\geq 2$j ($\nu$WT+MWT)	OCCUR=2
YOUR DATA	172.5 ± 0.4 ± 1.5	[6] CHATRCHYAN	12BA	CMS	$\ell\ell+\not{E}_T+\geq 2$j ($\geq 1b$), AMWT	
	173.49± 0.43± 0.98	[7] CHATRCHYAN	12BP	CMS	$\ell+\not{E}_T+\geq 4$j ($\geq 2b$)	
	172.3 ± 2.4 ± 1.0	[8] AALTONEN	11AK	CDF	$\not{E}_T + \geq 4$ jets (≥ 1 b-tag)	
	172.1 ± 1.1 ± 0.9	[9] AALTONEN	11E	CDF	ℓ + jets and dilepton	
	174.94± 0.83± 1.24	[10] ABAZOV	11P	D0	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag)	
	173.0 ± 1.2	[11] AALTONEN	10AE	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag), ME method	
	170.7 ± 6.3 ± 2.6	[12] AALTONEN	10D	CDF	$\ell + \not{E}_T$ + 4 jets (b-tag)	
	180.1 ± 3.6 ± 3.9	[13,14] ABAZOV	04G	D0	lepton + jets	
	176.1 ± 5.1 ± 5.3	[15] AFFOLDER	01	CDF	lepton + jets	
	167.4 ±10.3 ± 4.8	[16,17] ABE	99B	CDF	dilepton	OCCUR=2
	168.4 ±12.3 ± 3.6	[14] ABBOTT	98D	D0	dilepton	
	186 ±10 ± 5.7	[16,18] ABE	97R	CDF	6 or more jets	
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	173.18± 0.56± 0.75	[19] AALTONEN	12AP	TEVA	CDF, D0 combination	
	173.7 ± 2.8 ± 1.5	[20] ABAZOV	12AB	D0	$\ell\ell + \not{E}_T + \geq 2$ j (νWT)	
	172.4 ± 1.4 ± 1.3	[21] AALTONEN	11AC	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag)	
	176.9 ± 8.0 ± 2.7	[22] AALTONEN	11T	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag), $p_T(\ell)$ shape	
	174.0 ± 1.8 ± 2.4	[23] ABAZOV	11R	D0	dilepton + $\not{E}_T + \geq 2$ jets	
	175.5 ± 4.6 ± 4.6	[24] CHATRCHYAN	11F	CMS	dilepton + $\not{E}_T$ + jets	
	169.3 ± 2.7 ± 3.2	[25] AALTONEN	10C	CDF	dilepton + b-tag (MT2+NWA)	
	174.8 ± 2.4 $^{+1.2}_{-1.0}$	[26] AALTONEN	10E	CDF	≥ 6 jets, vtx b-tag	

$180.5 \pm 12.0 \pm 3.6$	[27] AALTONEN	09AK	CDF	$\ell + \not{E}_T$ + jets (soft μ b-tag)	
$172.7 \pm 1.8 \pm 1.2$	[28] AALTONEN	09J	CDF	$\ell + \not{E}_T$ + 4 jets (b-tag)	
$171.1 \pm 3.7 \pm 2.1$	[29] AALTONEN	09K	CDF	6 jets, vtx b-tag	
$171.9 \pm 1.7 \pm 1.1$	[30] AALTONEN	09L	CDF	ℓ + jets, $\ell\ell$ + jets	
$171.2 \pm 2.7 \pm 2.9$	[31] AALTONEN	09O	CDF	dilepton	
$165.5 {}^{+3.4}_{-3.3} \pm 3.1$	[32] AALTONEN	09X	CDF	$\ell\ell + \not{E}_T$ ($\nu\phi$ weighting)	
$174.7 \pm 4.4 \pm 2.0$	[33] ABAZOV	09AH	D0	dilepton + b-tag (νWT+MWT)	
$170.7 {}^{+4.2}_{-3.9} \pm 3.5$	[34,35] AALTONEN	08C	CDF	dilepton, $\sigma_{t\bar{t}}$ constrained	
$171.5 \pm 1.8 \pm 1.1$	[36] ABAZOV	08AH	D0	$\ell + \not{E}_T$ + 4 jets	
$177.1 \pm 4.9 \pm 4.7$	[37,38] AALTONEN	07	CDF	6 jets with ≥ 1 b vtx	
$172.3 {}^{+10.8}_{-9.6} \pm 10.8$	[39] AALTONEN	07B	CDF	≥ 4 jets (b-tag)	
$174.0 \pm 2.2 \pm 4.8$	[40] AALTONEN	07D	CDF	≥ 6 jets, vtx b-tag	
$170.8 \pm 2.2 \pm 1.4$	[41,42] AALTONEN	07I	CDF	lepton + jets (b-tag)	
$173.7 \pm 4.4 {}^{+2.1}_{-2.0}$	[38,43] ABAZOV	07F	D0	lepton + jets	
$176.2 \pm 9.2 \pm 3.9$	[44] ABAZOV	07W	D0	dilepton (MWT)	
$179.5 \pm 7.4 \pm 5.6$	[44] ABAZOV	07W	D0	dilepton (νWT)	OCCUR=2
$164.5 \pm 3.9 \pm 3.9$	[42,45] ABULENCIA	07D	CDF	dilepton	
$180.7 {}^{+15.5}_{-13.4} \pm 8.6$	[46] ABULENCIA	07J	CDF	lepton + jets	
$170.3 {}^{+4.1}_{-4.5} {}^{+1.2}_{-1.8}$	[42,47] ABAZOV	06U	D0	lepton + jets (b-tag)	
$173.2 {}^{+2.6}_{-2.4} \pm 3.2$	[48,49] ABULENCIA	06D	CDF	lepton + jets	
$173.5 {}^{+3.7}_{-3.6} \pm 1.3$	[35,48] ABULENCIA	06D	CDF	lepton + jets	OCCUR=2
$165.2 \pm 6.1 \pm 3.4$	[42,50] ABULENCIA	06G	CDF	dilepton	
$170.1 \pm 6.0 \pm 4.1$	[35,51] ABULENCIA	06V	CDF	dilepton	
$178.5 \pm 13.7 \pm 7.7$	[52,53] ABAZOV	05	D0	6 or more jets	
176.1 ± 6.6	[54] AFFOLDER	01	CDF	dilepton, lepton+jets, all-jets	OCCUR=2
$172.1 \pm 5.2 \pm 4.9$	[55] ABBOTT	99G	D0	di-lepton, lepton+jets	
176.0 ± 6.5	[17,56] ABE	99B	CDF	dilepton, lepton+jets, all-jets	
$173.3 \pm 5.6 \pm 5.5$	[14,57] ABBOTT	98F	D0	lepton + jets	
$175.9 \pm 4.8 \pm 5.3$	[16,58] ABE	98E	CDF	lepton + jets	
$161 \pm 17 \pm 10$	[16] ABE	98F	CDF	dilepton	
$172.1 \pm 5.2 \pm 4.9$	[59] BHAT	98B	RVUE	dilepton and lepton+jets	
173.8 ± 5.0	[60] BHAT	98B	RVUE	dilepton, lepton+jets, all-jets	OCCUR=2
$173.3 \pm 5.6 \pm 6.2$	[14] ABACHI	97E	D0	lepton + jets	
$199 {}^{+19}_{-21} \pm 22$	ABACHI	95	D0	lepton + jets	
$176 \pm 8 \pm 10$	ABE	95F	CDF	lepton + b-jet	
$174 \pm 10 {}^{+13}_{-12}$	ABE	94E	CDF	lepton + b-jet	

[1] Based on 1.04 fb^{-1} of data at LHC7. Uses 2d-template analysis (MT) with m_t and jet energy scale factor (JSF) from m_W mass fit. NODE=Q007TP;LINKAGE=GD

[2] Based on 8.7 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. The JES is calibrated by using the dijet mass from the W boson decay. NODE=Q007TP;LINKAGE=CL

[3] Use the ME method based on 2.2 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. NODE=Q007TP;LINKAGE=CD

[4] Based on 5.8 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. The quoted systematic error is the sum of JES($\pm$1.0) and systematic($\pm$1.0) uncertainties. The measurement is performed with a liklihood fit technique which simultaneously determines m_t and JES. NODE=Q007TP;LINKAGE=OA

[5] Combination with the result in 1 fb^{-1} of preceding data reported in ABAZOV 09AH as well as the MWT result of ABAZOV 11R with a statistical correlation of 60%. NODE=Q007TP;LINKAGE=VB

[6] Based on 5.0 fb^{-1} of data at LHC7. Uses an analytical matrix weighting technique (AMWT) and full kinematic analysis (KIN). NODE=Q007TP;LINKAGE=CA

[7] Based on 5.0 fb^{-1} of data at LHC7. The first error is statistical and JES combined, and the second is systematic. Ideogram method is used to obtain 2D liklihood for the kinematical fit with two parameters mtop and JES. NODE=Q007TP;LINKAGE=RC

[8] Based on 5.7 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. Events with an identified charged lepton or small $\not{E}_T$ are rejected from the event sample, so that the measurement is statistically independent from those in the ℓ + jets and all hadronic channels while being sensitive to those events with a τ lepton in the final state. Supersedes AALTONEN 07B. NODE=Q007TP;LINKAGE=TL

[9] Based on 5.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. Employs a multi-dimensional template likelihood technique where the lepton plus jets (one or two b-tags) channel gives $172.2 \pm 1.2 \pm 0.9$ GeV while the dilepton channel yields $170.3 \pm 2.0 \pm 3.1$ GeV. The results are combined. OUR EVALUATION includes the measurement in the dilepton channel only. NODE=Q007TP;LINKAGE=NT

[10] Based on 3.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. ABAZOV 11P reports $174.94 \pm 0.83 \pm 0.78 \pm 0.96$ GeV, where the first uncertainty is from statistics, the second from JES, and the last from other systematic uncertainties. We combine the JES and systematic uncertainties. A matrix-element method is used where the JES uncertainty is constrained NODE=Q007TP;LINKAGE=ZA

by the W mass. ABAZOV 11P describes a measurement based on 2.6 fb^{-1} that is combined with ABAZOV 08AH, which employs an independent 1 fb^{-1} of data.

[11] Based on 5.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The likelihood calculated using a matrix element method gives m_t = 173.0 ± 0.7(stat)±0.6(JES)±0.9(syst) GeV, for a total uncertainty of 1.2 GeV. NODE=Q007TP;LINKAGE=NA

[12] Based on 1.9 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The result is from the measurement using the transverse decay lenght of b-hadrons and that using the transverse momentum of the W decay muons, which are both insensitive to the JES (jet energy scale) uncertainty. OUR EVALUATION uses only the measurement exploiting the decay length significance which yields $166.9^{+9.5}_{-8.5}$(stat)±2.9 (syst) GeV. The measurement that uses the lepton transverse momentum is excluded from the average because of a statistical correlation with other samples. NODE=Q007TP;LINKAGE=AE

[13] Obtained by re-analysis of the lepton + jets candidate events that led to ABBOTT 98F. It is based upon the maximum likelihood method which makes use of the leading order matrix elements. NODE=Q007TP;LINKAGE=AO

[14] Based on 125 ± 7 pb^{-1} of data at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=WW

[15] Based on ∼ 106 pb^{-1} of data at $\sqrt{s}$= 1.8 TeV. NODE=Q007TP;LINKAGE=F1

[16] Based on 109 ± 7 pb^{-1} of data at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=XX

[17] See AFFOLDER 01 for details of systematic error re-evaluation. NODE=Q007TP;LINKAGE=XZ

[18] Based on the first observation of all hadronic decays of $t\overline{t}$ pairs. Single b-quark tagging with jet-shape variable constraints was used to select signal enriched multi-jet events. The updated systematic error is listed. See AFFOLDER 01, appendix C. NODE=Q007TP;LINKAGE=AR

[19] Combination based on up to 5.8 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. NODE=Q007TP;LINKAGE=EA

[20] Based on 4.3 fb^{-1} of data in p-pbar collisions at 1.96 TeV. The measurement reduces the JES uncertainty by using the single lepton channel study of ABAZOV 11P. NODE=Q007TP;LINKAGE=VA

[21] Based on 3.2 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and JES combined, and the latter is from the other systematic uncertainties. The result is obtained using an unbinned maximum likelihood method where the top quark mass and the JES are measured simultaneously, with Δ_{JES} = 0.3 ± 0.3(stat). NODE=Q007TP;LINKAGE=NL

[22] Uses a likelihood fit of the lepton p_T distribution based on 2.7 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=NN

[23] Based on a matrix-element method which employs 5.4 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. Superseded by ABAZOV 12AB. NODE=Q007TP;LINKAGE=OZ

[24] Based on 36 pb^{-1} of pp collisions at $\sqrt{s}$ = 7 TeV. A Kinematic Method using b-tagging and an analytical Matrix Weighting Technique give consistent results and are combined. Superseded by CHATRCHYAN 12BA. NODE=Q007TP;LINKAGE=CH

[25] Based on 3.4 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The result is obtained by combining the MT2 variable method and the NWA (Neutrino Weighting Algorithm). The MT2 method alone gives $m_t = 168.0^{+4.8}_{-4.0}$(stat)±2.9(syst) GeV with smaller systematic error due to small JES uncertainty. NODE=Q007TP;LINKAGE=TA

[26] Based on 2.9 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and JES uncertainty, and the latter is from the other systematics. Neural-network-based kinematical selection of 6 highest E_T jets with a vtx b-tag is used to distinguish signal from background. Superseded by AALTONEN 12G. NODE=Q007TP;LINKAGE=LN

[27] Based on 2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The top mass is obtained from the measurement of the invariant mass of the lepton (e or μ) from W decays and the soft μ in b-jet. The result is insensitive to jet energy scaling. NODE=Q007TP;LINKAGE=NO

[28] Based on 1.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and jet energy scale uncertainty, and the latter is from the other systematics. Matrix element method with effective propagators. NODE=Q007TP;LINKAGE=LO

[29] Based on 943 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistical and jet-energy-scale uncertainties, and the latter is from other systematics. AALTONEN 09K selected 6 jet events with one or more vertex b-tags and used the tree-level matrix element to construct template models of signal and background. NODE=Q007TP;LINKAGE=OT

[30] Based on 1.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistical and jet-energy-scale (JES) uncertainties, and the second is from other systematics. Events with lepton + jets and those with dilepton + jets were simultaneously fit to constrain m_t and JES. Lepton + jets data only give m_t = 171.8 ± 2.2 GeV, and dilepton data only give $m_t = 171.2^{+5.3}_{-5.1}$ GeV. NODE=Q007TP;LINKAGE=EN

[31] Based on 2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Matrix Element method. Optimal selection criteria for candidate events with two high p_T leptons, high $\not{E}_T$, and two or more jets with and without b-tag are obtained by neural network with neuroevolution technique to minimize the statistical error of m_t. NODE=Q007TP;LINKAGE=TE

[32] Based on 2.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Mass m_t is estimated from the likelihood for the eight-fold kinematical solutions in the plane of the azimuthal angles of the two neutrino momenta. NODE=Q007TP;LINKAGE=ON

[33] Based on 1 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Events with two identified leptons, and those with one lepton plus one isolated track and a b-tag were used to constrain m_t. The result is a combination of the νWT (ν Weighting Technique) result of 176.2 ± 4.8 ± 2.1 GeV and the MWT (Matrix-element Weighting Technique) result of 173.2 ± 4.9 ± 2.0 GeV. NODE=Q007TP;LINKAGE=ZV

[34] Reports measurement of $170.7^{+4.2}_{-3.9} \pm 2.6 \pm 2.4$ GeV based on 1.2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The last error is due to the theoretical uncertainty on $\sigma_{t\bar{t}}$. Without the cross-section constraint a top mass of $169.7^{+5.2}_{-4.9} \pm 3.1$ GeV is obtained. NODE=Q007TP;LINKAGE=AN

[35] Template method. NODE=Q007TP;LINKAGE=BC

[36] Result is based on 1 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and jet energy scale uncertainty, and the latter is from the other systematics. NODE=Q007TP;LINKAGE=BV

[37] Based on 310 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=TN

[38] Ideogram method. NODE=Q007TP;LINKAGE=TO

[39] Based on 311 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Events with 4 or more jets with $E_T >$ 15 GeV, significant missing E_T, and secondary vertex b-tag are used in the fit. About 44% of the signal acceptance is from $\tau\nu$ + 4 jets. Events with identified e or μ are vetoed to provide a statistically independent measurement. NODE=Q007TP;LINKAGE=LT

[40] Based on 1.02 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Superseded by AALTONEN 12G. NODE=Q007TP;LINKAGE=NE

[41] Based on 955 pb^{-1} of data $\sqrt{s}$ = 1.96 TeV. m_t and JES (Jet Energy Scale) are fitted simultaneously, and the first error contains the JES contribution of 1.5 GeV. NODE=Q007TP;LINKAGE=LA

[42] Matrix element method. NODE=Q007TP;LINKAGE=UB

[43] Based on 425 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is a combination of statistics and JES (Jet Energy Scale) uncertainty, which has been measured simultaneously to give JES = 0.989 ± 0.029(stat). NODE=Q007TP;LINKAGE=OV

[44] Based on 370 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Combined result of MWT (Matrix-element Weighting Technique) and νWT (ν Weighting Technique) analyses is 178.1 ± 6.7 ± 4.8 GeV. NODE=Q007TP;LINKAGE=ZO

[45] Based on 1.0 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. ABULENCIA 07D improves the matrix element description by including the effects of initial-state radiation. NODE=Q007TP;LINKAGE=LE

[46] Based on 695 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The transverse decay length of the b hadron is used to determine m_t, and the result is free from the JES (jet energy scale) uncertainty. NODE=Q007TP;LINKAGE=UL

[47] Based on ∼ 400 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error includes statistical and systematic jet energy scale uncertainties, the second error is from the other systematics. The result is obtained with the b-tagging information. The result without b-tagging is $169.2^{+5.0}_{-7.4}{}^{+1.5}_{-1.4}$ GeV. Superseded by ABAZOV 08AH. NODE=Q007TP;LINKAGE=BZ

[48] Based on 318 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=BA

[49] Dynamical likelihood method. NODE=Q007TP;LINKAGE=BB

[50] Based on 340 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=UA

[51] Based on 360 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=AL

[52] Based on 110.2 ± 5.8 pb^{-1} at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=AA

[53] Based on the all hadronic decays of $t\bar{t}$ pairs. Single b-quark tagging via the decay chain $b \rightarrow c \rightarrow \mu$ was used to select signal enriched multijet events. The result was obtained by the maximum likelihood method after bias correction. NODE=Q007TP;LINKAGE=AZ

[54] Obtained by combining the measurements in the lepton + jets [AFFOLDER 01], all-jets [ABE 97R, ABE 99B], and dilepton [ABE 99B] decay topologies. NODE=Q007TP;LINKAGE=F2

[55] Obtained by combining the D0 result m_t (GeV) = 168.4 ± 12.3 ± 3.6 from 6 di-lepton events (see also ABBOTT 98D) and m_t (GeV) = 173.3 ± 5.6 ± 5.5 from lepton+jet events (ABBOTT 98F). NODE=Q007TP;LINKAGE=DG

[56] Obtained by combining the CDF results of m_t (GeV)=167.4 ± 10.3 ± 4.8 from 8 dilepton events, m_t (GeV)=175.9 ± 4.8 ± 5.3 from lepton+jet events (ABE 98E), and m_t (GeV)=186.0 ± 10.0 ± 5.7 from all-jet events (ABE 97R). The systematic errors in the latter two measurements are changed in this paper. NODE=Q007TP;LINKAGE=BG

[57] See ABAZOV 04G. NODE=Q007TP;LINKAGE=AT

[58] The updated systematic error is listed. See AFFOLDER 01, appendix C. NODE=Q007TP;LINKAGE=XY

[59] Obtained by combining the DØ results of m_t(GeV)=168.4 ± 12.3 ± 3.6 from 6 dilepton events and m_t(GeV)=173.3 ± 5.6 ± 5.5 from 77 lepton+jet events. NODE=Q007TP;LINKAGE=BE

[60] Obtained by combining the DØ results from dilepton and lepton+jet events, and the CDF results (ABE 99B) from dilepton, lepton+jet events, and all-jet events. NODE=Q007TP;LINKAGE=BF

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ABAZOV	06U	PR D74 092005	V.M. Abazov *et al.*	(D0 Collab.)	REFID=51503
ABULENCIA	06D	PRL 96 022004	A. Abulencia *et al.*	(CDF Collab.)	REFID=51102
Also		PR D73 032003	A. Abulencia *et al.*	(CDF Collab.)	REFID=51103
Also		PR D73 092002	A. Abulencia *et al.*	(CDF Collab.)	REFID=51306
ABULENCIA	06G	PRL 96 152002	A. Abulencia *et al.*	(CDF Collab.)	REFID=51104
Also		PR D74 032009	A. Abulencia *et al.*	(CDF Collab.)	REFID=51329
ABULENCIA	06V	PR D73 112006	A. Abulencia *et al.*	(CDF Collab.)	REFID=51285
ABAZOV	05	PL B606 25	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50386
ABAZOV	04G	NAT 429 638	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50556
AFFOLDER	01	PR D63 032003	T. Affolder *et al.*	(CDF Collab.)	REFID=48049
ABBOTT	99G	PR D60 052001	B. Abbott *et al.*	(D0 Collab.)	REFID=47135
ABE	99B	PRL 82 271	F. Abe *et al.*	(CDF Collab.)	REFID=46548
Also		PRL 82 2808 (erratum)	F. Abe *et al.*	(CDF Collab.)	REFID=46822
ABBOTT	98D	PRL 80 2063	B. Abbott *et al.*	(D0 Collab.)	REFID=45940
ABBOTT	98F	PR D58 052001	B. Abbott *et al.*	(D0 Collab.)	REFID=45967
ABE	98E	PRL 80 2767	F. Abe *et al.*	(CDF Collab.)	REFID=45941
ABE	98F	PRL 80 2779	F. Abe *et al.*	(CDF Collab.)	REFID=45942
BHAT	98B	IJMP A13 5113	P.C. Bhat, H.B. Prosper, S.S. Snyder		REFID=46531
ABACHI	97E	PRL 79 1197	S. Abachi *et al.*	(D0 Collab.)	REFID=45590
ABE	97R	PRL 79 1992	F. Abe *et al.*	(CDF Collab.)	REFID=45594
PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495
ABACHI	95	PRL 74 2632	S. Abachi *et al.*	(D0 Collab.)	REFID=44167
ABE	95F	PRL 74 2626	F. Abe *et al.*	(CDF Collab.)	REFID=44170
ABE	94E	PR D50 2966	F. Abe *et al.*	(CDF Collab.)	REFID=43810
Also		PRL 73 225	F. Abe *et al.*	(CDF Collab.)	REFID=43823

Reference = CHATRCHYAN 12BP; JHEP 1212 105
Verifier code = CMS

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Paris Sphicas

EMAIL: paris.sphicas@cern.ch

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

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Thank you for helping us make the Review accurate and useful.

Sincerely,

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QUARKS

NODE=QXXX005

NODE=Q007

t

$I(J^P) = 0(\frac{1}{2}^+)$

NODE=Q007

Charge $= \frac{2}{3}\ e$ Top $= +1$

t-QUARK MASS

NODE=Q007210

NODE=Q007210

We first list the direct measurements of the top quark mass which employ the event kinematics and then list the measurements which extract a top quark mass from the measured $t\bar{t}$ cross-section using theory calculations. A discussion of the definition of the top quark mass in these measurements can be found in the review "The Top Quark."

OUR EVALUATION of $173.07 \pm 0.52 \pm 0.72$ GeV is an average of published top mass measurements from Tevatron Runs. The LHC experiments are working on a combined average that should appear in the 2014 PDG edition once the correlated uncertainties between experiments are understood. The Tevatron average was provided by the Tevatron Electroweak Working Group (TEVEWWG). It takes correlated uncertainties into account and has a χ^2 of 8.4 for 11 degrees of freedom.

For earlier search limits see PDG 96, Physical Review **D54** 1 (1996). We no longer include a compilation of indirect top mass determinations from Standard Model Electroweak fits in the Listings (our last compilation can be found in the Listings of the 2007 partial update). For a discussion of current results see the reviews "The Top Quark" and "Electroweak Model and Constraints on New Physics."

t-Quark Mass (Direct Measurements)

NODE=Q007TP

NODE=Q007TP

The following measurements extract a t-quark mass from the kinematics of $t\bar{t}$ events. They are sensitive to the top quark mass used in the MC generator that is usually interpreted as the pole mass, but the theoretical uncertainty in this interpretation is hard to quantify. See the review "The Top Quark" and references therein for more information.

NODE=Q007TP

	VALUE (GeV)	DOCUMENT ID		TECN	COMMENT
	173.07± 0.52± 0.72 OUR EVALUATION	See comments in the header above.			NEW;→ UNCHECKED ←
	[173.5 ± 0.6 ± 0.8 GeV OUR 2012 EVALUATION]				
	174.5 ± 0.6 ± 2.3	[1] AAD	12I	ATLS	$\ell+\not{E}_T+\geq 4$ jets (≥ 1 b), MT
	172.85± 0.71± 0.85	[2] AALTONEN	12AI	CDF	$\ell+\not{E}_T+\geq 4$j (0,1,2b) template
	172.7 ± 9.3 ± 3.7	[3] AALTONEN	12AL	CDF	$\tau_h + \not{E}_T$ +4j ($\geq 1b$)
	172.5 ± 1.4 ± 1.5	[4] AALTONEN	12G	CDF	6–8 jets with ≥ 1 b
	173.9 ± 1.9 ± 1.6	[5] ABAZOV	12AB	D0	$\ell\ell+\not{E}_T+\geq 2$j ($\nu$WT+MWT)
	172.5 ± 0.4 ± 1.5	[6] CHATRCHYAN	12BA	CMS	$\ell\ell+\not{E}_T+\geq 2$j ($\geq 1b$), AMWT
YOUR DATA	173.49± 0.43± 0.98	[7] CHATRCHYAN	12BP	CMS	$\ell+\not{E}_T+\geq 4$j ($\geq 2b$)
	172.3 ± 2.4 ± 1.0	[8] AALTONEN	11AK	CDF	$\not{E}_T + \geq 4$ jets (≥ 1 b-tag)
	172.1 ± 1.1 ± 0.9	[9] AALTONEN	11E	CDF	ℓ + jets and dilepton
	174.94± 0.83± 1.24	[10] ABAZOV	11P	D0	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag)
	173.0 ± 1.2	[11] AALTONEN	10AE	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag), ME method
	170.7 ± 6.3 ± 2.6	[12] AALTONEN	10D	CDF	$\ell + \not{E}_T$ + 4 jets (b-tag)
	180.1 ± 3.6 ± 3.9	[13,14] ABAZOV	04G	D0	lepton + jets
	176.1 ± 5.1 ± 5.3	[15] AFFOLDER	01	CDF	lepton + jets
	167.4 ±10.3 ± 4.8	[16,17] ABE	99B	CDF	dilepton
	168.4 ±12.3 ± 3.6	[14] ABBOTT	98D	D0	dilepton
	186 ±10 ± 5.7	[16,18] ABE	97R	CDF	6 or more jets
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	173.18± 0.56± 0.75	[19] AALTONEN	12AP	TEVA	CDF, D0 combination
	173.7 ± 2.8 ± 1.5	[20] ABAZOV	12AB	D0	$\ell\ell + \not{E}_T + \geq 2$ j (νWT)
	172.4 ± 1.4 ± 1.3	[21] AALTONEN	11AC	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag)
	176.9 ± 8.0 ± 2.7	[22] AALTONEN	11T	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag), $p_T(\ell)$ shape
	174.0 ± 1.8 ± 2.4	[23] ABAZOV	11R	D0	dilepton + $\not{E}_T + \geq 2$ jets
	175.5 ± 4.6 ± 4.6	[24] CHATRCHYAN	11F	CMS	dilepton + $\not{E}_T$ + jets
	169.3 ± 2.7 ± 3.2	[25] AALTONEN	10C	CDF	dilepton + b-tag (MT2+NWA)
	174.8 ± 2.4 $^{+1.2}_{-1.0}$	[26] AALTONEN	10E	CDF	≥ 6 jets, vtx b-tag

OCCUR=2

OCCUR=2

$180.5 \pm 12.0 \pm 3.6$	[27] AALTONEN	09AK	CDF	$\ell + \not{E}_T$ + jets (soft μ b-tag)	
$172.7 \pm 1.8 \pm 1.2$	[28] AALTONEN	09J	CDF	$\ell + \not{E}_T$ + 4 jets (b-tag)	
$171.1 \pm 3.7 \pm 2.1$	[29] AALTONEN	09K	CDF	6 jets, vtx b-tag	
$171.9 \pm 1.7 \pm 1.1$	[30] AALTONEN	09L	CDF	ℓ + jets, $\ell\ell$ + jets	
$171.2 \pm 2.7 \pm 2.9$	[31] AALTONEN	09O	CDF	dilepton	
$165.5 {}^{+3.4}_{-3.3} \pm 3.1$	[32] AALTONEN	09X	CDF	$\ell\ell + \not{E}_T$ ($\nu\phi$ weighting)	
$174.7 \pm 4.4 \pm 2.0$	[33] ABAZOV	09AH	D0	dilepton + b-tag (νWT+MWT)	
$170.7 {}^{+4.2}_{-3.9} \pm 3.5$	[34,35] AALTONEN	08C	CDF	dilepton, $\sigma_{t\bar{t}}$ constrained	
$171.5 \pm 1.8 \pm 1.1$	[36] ABAZOV	08AH	D0	$\ell + \not{E}_T$ + 4 jets	
$177.1 \pm 4.9 \pm 4.7$	[37,38] AALTONEN	07	CDF	6 jets with ≥ 1 b vtx	
$172.3 {}^{+10.8}_{-9.6} \pm 10.8$	[39] AALTONEN	07B	CDF	≥ 4 jets (b-tag)	
$174.0 \pm 2.2 \pm 4.8$	[40] AALTONEN	07D	CDF	≥ 6 jets, vtx b-tag	
$170.8 \pm 2.2 \pm 1.4$	[41,42] AALTONEN	07I	CDF	lepton + jets (b-tag)	
$173.7 \pm 4.4 {}^{+2.1}_{-2.0}$	[38,43] ABAZOV	07F	D0	lepton + jets	
$176.2 \pm 9.2 \pm 3.9$	[44] ABAZOV	07W	D0	dilepton (MWT)	
$179.5 \pm 7.4 \pm 5.6$	[44] ABAZOV	07W	D0	dilepton (νWT)	OCCUR=2
$164.5 \pm 3.9 \pm 3.9$	[42,45] ABULENCIA	07D	CDF	dilepton	
$180.7 {}^{+15.5}_{-13.4} \pm 8.6$	[46] ABULENCIA	07J	CDF	lepton + jets	
$170.3 {}^{+4.1}_{-4.5} {}^{+1.2}_{-1.8}$	[42,47] ABAZOV	06U	D0	lepton + jets (b-tag)	
$173.2 {}^{+2.6}_{-2.4} \pm 3.2$	[48,49] ABULENCIA	06D	CDF	lepton + jets	
$173.5 {}^{+3.7}_{-3.6} \pm 1.3$	[35,48] ABULENCIA	06D	CDF	lepton + jets	OCCUR=2
$165.2 \pm 6.1 \pm 3.4$	[42,50] ABULENCIA	06G	CDF	dilepton	
$170.1 \pm 6.0 \pm 4.1$	[35,51] ABULENCIA	06V	CDF	dilepton	
$178.5 \pm 13.7 \pm 7.7$	[52,53] ABAZOV	05	D0	6 or more jets	
176.1 ± 6.6	[54] AFFOLDER	01	CDF	dilepton, lepton+jets, all-jets	OCCUR=2
$172.1 \pm 5.2 \pm 4.9$	[55] ABBOTT	99G	D0	di-lepton, lepton+jets	
176.0 ± 6.5	[17,56] ABE	99B	CDF	dilepton, lepton+jets, all-jets	
$173.3 \pm 5.6 \pm 5.5$	[14,57] ABBOTT	98F	D0	lepton + jets	
$175.9 \pm 4.8 \pm 5.3$	[16,58] ABE	98E	CDF	lepton + jets	
$161 \pm 17 \pm 10$	[16] ABE	98F	CDF	dilepton	
$172.1 \pm 5.2 \pm 4.9$	[59] BHAT	98B	RVUE	dilepton and lepton+jets	
173.8 ± 5.0	[60] BHAT	98B	RVUE	dilepton, lepton+jets, all-jets	OCCUR=2
$173.3 \pm 5.6 \pm 6.2$	[14] ABACHI	97E	D0	lepton + jets	
$199 {}^{+19}_{-21} \pm 22$	ABACHI	95	D0	lepton + jets	
$176 \pm 8 \pm 10$	ABE	95F	CDF	lepton + b-jet	
$174 \pm 10 {}^{+13}_{-12}$	ABE	94E	CDF	lepton + b-jet	

[1] Based on 1.04 fb^{-1} of data at LHC7. Uses 2d-template analysis (MT) with m_t and jet energy scale factor (JSF) from m_W mass fit. NODE=Q007TP;LINKAGE=GD

[2] Based on 8.7 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. The JES is calibrated by using the dijet mass from the W boson decay. NODE=Q007TP;LINKAGE=CL

[3] Use the ME method based on 2.2 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. NODE=Q007TP;LINKAGE=CD

[4] Based on 5.8 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. The quoted systematic error is the sum of JES($\pm$1.0) and systematic($\pm$1.0) uncertainties. The measurement is performed with a liklihood fit technique which simultaneously determines m_t and JES. NODE=Q007TP;LINKAGE=OA

[5] Combination with the result in 1 fb^{-1} of preceding data reported in ABAZOV 09AH as well as the MWT result of ABAZOV 11R with a statistical correlation of 60%. NODE=Q007TP;LINKAGE=VB

[6] Based on 5.0 fb^{-1} of data at LHC7. Uses an analytical matrix weighting technique (AMWT) and full kinematic analysis (KIN). NODE=Q007TP;LINKAGE=CA

[7] Based on 5.0 fb^{-1} of data at LHC7. The first error is statistical and JES combined, and the second is systematic. Ideogram method is used to obtain 2D liklihood for the kinematical fit with two parameters mtop and JES. NODE=Q007TP;LINKAGE=RC

[8] Based on 5.7 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. Events with an identified charged lepton or small $\not{E}_T$ are rejected from the event sample, so that the measurement is statistically independent from those in the ℓ + jets and all hadronic channels while being sensitive to those events with a τ lepton in the final state. Supersedes AALTONEN 07B. NODE=Q007TP;LINKAGE=TL

[9] Based on 5.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. Employs a multi-dimensional template likelihood technique where the lepton plus jets (one or two b-tags) channel gives $172.2 \pm 1.2 \pm 0.9$ GeV while the dilepton channel yields $170.3 \pm 2.0 \pm 3.1$ GeV. The results are combined. OUR EVALUATION includes the measurement in the dilepton channel only. NODE=Q007TP;LINKAGE=NT

[10] Based on 3.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. ABAZOV 11P reports $174.94 \pm 0.83 \pm 0.78 \pm 0.96$ GeV, where the first uncertainty is from statistics, the second from JES, and the last from other systematic uncertainties. We combine the JES and systematic uncertainties. A matrix-element method is used where the JES uncertainty is constrained NODE=Q007TP;LINKAGE=ZA

by the W mass. ABAZOV 11P describes a measurement based on 2.6 fb^{-1} that is combined with ABAZOV 08AH, which employs an independent 1 fb^{-1} of data.

[11] Based on 5.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The likelihood calculated using a matrix element method gives m_t = 173.0 ± 0.7(stat)±0.6(JES)±0.9(syst) GeV, for a total uncertainty of 1.2 GeV. NODE=Q007TP;LINKAGE=NA

[12] Based on 1.9 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The result is from the measurement using the transverse decay lenght of b-hadrons and that using the transverse momentum of the W decay muons, which are both insensitive to the JES (jet energy scale) uncertainty. OUR EVALUATION uses only the measurement exploiting the decay length significance which yields $166.9^{+9.5}_{-8.5}$(stat)±2.9 (syst) GeV. The measurement that uses the lepton transverse momentum is excluded from the average because of a statistical correlation with other samples. NODE=Q007TP;LINKAGE=AE

[13] Obtained by re-analysis of the lepton + jets candidate events that led to ABBOTT 98F. It is based upon the maximum likelihood method which makes use of the leading order matrix elements. NODE=Q007TP;LINKAGE=AO

[14] Based on 125 ± 7 pb^{-1} of data at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=WW

[15] Based on ∼ 106 pb^{-1} of data at $\sqrt{s}$= 1.8 TeV. NODE=Q007TP;LINKAGE=F1

[16] Based on 109 ± 7 pb^{-1} of data at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=XX

[17] See AFFOLDER 01 for details of systematic error re-evaluation. NODE=Q007TP;LINKAGE=XZ

[18] Based on the first observation of all hadronic decays of $t\overline{t}$ pairs. Single b-quark tagging with jet-shape variable constraints was used to select signal enriched multi-jet events. The updated systematic error is listed. See AFFOLDER 01, appendix C. NODE=Q007TP;LINKAGE=AR

[19] Combination based on up to 5.8 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. NODE=Q007TP;LINKAGE=EA

[20] Based on 4.3 fb^{-1} of data in p-pbar collisions at 1.96 TeV. The measurement reduces the JES uncertainty by using the single lepton channel study of ABAZOV 11P. NODE=Q007TP;LINKAGE=VA

[21] Based on 3.2 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and JES combined, and the latter is from the other systematic uncertainties. The result is obtained using an unbinned maximum likelihood method where the top quark mass and the JES are measured simultaneously, with Δ_{JES} = 0.3 ± 0.3(stat). NODE=Q007TP;LINKAGE=NL

[22] Uses a likelihood fit of the lepton p_T distribution based on 2.7 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=NN

[23] Based on a matrix-element method which employs 5.4 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. Superseded by ABAZOV 12AB. NODE=Q007TP;LINKAGE=OZ

[24] Based on 36 pb^{-1} of pp collisions at $\sqrt{s}$ = 7 TeV. A Kinematic Method using b-tagging and an analytical Matrix Weighting Technique give consistent results and are combined. Superseded by CHATRCHYAN 12BA. NODE=Q007TP;LINKAGE=CH

[25] Based on 3.4 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The result is obtained by combining the MT2 variable method and the NWA (Neutrino Weighting Algorithm). The MT2 method alone gives $m_t = 168.0^{+4.8}_{-4.0}$(stat)±2.9(syst) GeV with smaller systematic error due to small JES uncertainty. NODE=Q007TP;LINKAGE=TA

[26] Based on 2.9 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and JES uncertainty, and the latter is from the other systematics. Neural-network-based kinematical selection of 6 highest E_T jets with a vtx b-tag is used to distinguish signal from background. Superseded by AALTONEN 12G. NODE=Q007TP;LINKAGE=LN

[27] Based on 2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The top mass is obtained from the measurement of the invariant mass of the lepton (e or μ) from W decays and the soft μ in b-jet. The result is insensitive to jet energy scaling. NODE=Q007TP;LINKAGE=NO

[28] Based on 1.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and jet energy scale uncertainty, and the latter is from the other systematics. Matrix element method with effective propagators. NODE=Q007TP;LINKAGE=LO

[29] Based on 943 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistical and jet-energy-scale uncertainties, and the latter is from other systematics. AALTONEN 09K selected 6 jet events with one or more vertex b-tags and used the tree-level matrix element to construct template models of signal and background. NODE=Q007TP;LINKAGE=OT

[30] Based on 1.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistical and jet-energy-scale (JES) uncertainties, and the second is from other systematics. Events with lepton + jets and those with dilepton + jets were simultaneously fit to constrain m_t and JES. Lepton + jets data only give m_t = 171.8 ± 2.2 GeV, and dilepton data only give $m_t = 171.2^{+5.3}_{-5.1}$ GeV. NODE=Q007TP;LINKAGE=EN

[31] Based on 2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Matrix Element method. Optimal selection criteria for candidate events with two high p_T leptons, high $\not{E}_T$, and two or more jets with and without b-tag are obtained by neural network with neuroevolution technique to minimize the statistical error of m_t. NODE=Q007TP;LINKAGE=TE

[32] Based on 2.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Mass m_t is estimated from the likelihood for the eight-fold kinematical solutions in the plane of the azimuthal angles of the two neutrino momenta. NODE=Q007TP;LINKAGE=ON

[33] Based on 1 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Events with two identified leptons, and those with one lepton plus one isolated track and a b-tag were used to constrain m_t. The result is a combination of the νWT (ν Weighting Technique) result of 176.2 ± 4.8 ± 2.1 GeV and the MWT (Matrix-element Weighting Technique) result of 173.2 ± 4.9 ± 2.0 GeV. NODE=Q007TP;LINKAGE=ZV

[34] Reports measurement of $170.7^{+4.2}_{-3.9} \pm 2.6 \pm 2.4$ GeV based on 1.2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The last error is due to the theoretical uncertainty on $\sigma_{t\bar{t}}$. Without the cross-section constraint a top mass of $169.7^{+5.2}_{-4.9} \pm 3.1$ GeV is obtained. NODE=Q007TP;LINKAGE=AN

[35] Template method. NODE=Q007TP;LINKAGE=BC

[36] Result is based on 1 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and jet energy scale uncertainty, and the latter is from the other systematics. NODE=Q007TP;LINKAGE=BV

[37] Based on 310 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=TN

[38] Ideogram method. NODE=Q007TP;LINKAGE=TO

[39] Based on 311 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Events with 4 or more jets with $E_T >$ 15 GeV, significant missing E_T, and secondary vertex b-tag are used in the fit. About 44% of the signal acceptance is from $\tau\nu$ + 4 jets. Events with identified e or μ are vetoed to provide a statistically independent measurement. NODE=Q007TP;LINKAGE=LT

[40] Based on 1.02 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Superseded by AALTONEN 12G. NODE=Q007TP;LINKAGE=NE

[41] Based on 955 pb^{-1} of data $\sqrt{s}$ = 1.96 TeV. m_t and JES (Jet Energy Scale) are fitted simultaneously, and the first error contains the JES contribution of 1.5 GeV. NODE=Q007TP;LINKAGE=LA

[42] Matrix element method. NODE=Q007TP;LINKAGE=UB

[43] Based on 425 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is a combination of statistics and JES (Jet Energy Scale) uncertainty, which has been measured simultaneously to give JES = 0.989 ± 0.029(stat). NODE=Q007TP;LINKAGE=OV

[44] Based on 370 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Combined result of MWT (Matrix-element Weighting Technique) and νWT (ν Weighting Technique) analyses is 178.1 ± 6.7 ± 4.8 GeV. NODE=Q007TP;LINKAGE=ZO

[45] Based on 1.0 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. ABULENCIA 07D improves the matrix element description by including the effects of initial-state radiation. NODE=Q007TP;LINKAGE=LE

[46] Based on 695 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The transverse decay length of the b hadron is used to determine m_t, and the result is free from the JES (jet energy scale) uncertainty. NODE=Q007TP;LINKAGE=UL

[47] Based on ∼ 400 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error includes statistical and systematic jet energy scale uncertainties, the second error is from the other systematics. The result is obtained with the b-tagging information. The result without b-tagging is $169.2^{+5.0}_{-7.4}{}^{+1.5}_{-1.4}$ GeV. Superseded by ABAZOV 08AH. NODE=Q007TP;LINKAGE=BZ

[48] Based on 318 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=BA

[49] Dynamical likelihood method. NODE=Q007TP;LINKAGE=BB

[50] Based on 340 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=UA

[51] Based on 360 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=AL

[52] Based on 110.2 ± 5.8 pb^{-1} at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=AA

[53] Based on the all hadronic decays of $t\bar{t}$ pairs. Single b-quark tagging via the decay chain $b \rightarrow c \rightarrow \mu$ was used to select signal enriched multijet events. The result was obtained by the maximum likelihood method after bias correction. NODE=Q007TP;LINKAGE=AZ

[54] Obtained by combining the measurements in the lepton + jets [AFFOLDER 01], all-jets [ABE 97R, ABE 99B], and dilepton [ABE 99B] decay topologies. NODE=Q007TP;LINKAGE=F2

[55] Obtained by combining the D0 result m_t (GeV) = 168.4 ± 12.3 ± 3.6 from 6 di-lepton events (see also ABBOTT 98D) and m_t (GeV) = 173.3 ± 5.6 ± 5.5 from lepton+jet events (ABBOTT 98F). NODE=Q007TP;LINKAGE=DG

[56] Obtained by combining the CDF results of m_t (GeV)=167.4 ± 10.3 ± 4.8 from 8 dilepton events, m_t (GeV)=175.9 ± 4.8 ± 5.3 from lepton+jet events (ABE 98E), and m_t (GeV)=186.0 ± 10.0 ± 5.7 from all-jet events (ABE 97R). The systematic errors in the latter two measurements are changed in this paper. NODE=Q007TP;LINKAGE=BG

[57] See ABAZOV 04G. NODE=Q007TP;LINKAGE=AT

[58] The updated systematic error is listed. See AFFOLDER 01, appendix C. NODE=Q007TP;LINKAGE=XY

[59] Obtained by combining the DØ results of m_t(GeV)=168.4 ± 12.3 ± 3.6 from 6 dilepton events and m_t(GeV)=173.3 ± 5.6 ± 5.5 from 77 lepton+jet events. NODE=Q007TP;LINKAGE=BE

[60] Obtained by combining the DØ results from dilepton and lepton+jet events, and the CDF results (ABE 99B) from dilepton, lepton+jet events, and all-jet events. NODE=Q007TP;LINKAGE=BF

t-Quark REFERENCES

NODE=Q007

	AAD 12I	EPJ C72 2046	G. Aad *et al.*	(ATLAS Collab.)	REFID=54125
	AALTONEN 12AI	PRL 109 152003	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54597
	AALTONEN 12AL	PRL 109 192001	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54600
	AALTONEN 12AP	PR D86 092003	T. Aaltonen *et al.*	(CDF, D0 Collab.)	REFID=54700
	AALTONEN 12G	PL B714 24	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54192
	ABAZOV 12AB	PR D86 051103	V.M. Abazov *et al.*	(D0 Collab.)	REFID=54604
	CHATRCHYAN 12BA	EPJ C72 2202	S. Chatrchyan *et al.*	(CMS Collab.)	REFID=54677
YOUR PAPER	CHATRCHYAN 12BP	JHEP 1212 105	S. Chatrchyan *et al.*	(CMS Collab.)	REFID=54779
	AALTONEN 11AC	PR D84 071105	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53800
	AALTONEN 11AK	PRL 107 232002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53944
	AALTONEN 11E	PR D83 111101	T. Aaltonen *et al.*	(CDF Collab.)	REFID=16429
	AALTONEN 11T	PL B698 371	T. Aaltonen *et al.*	(CDF Collab.)	REFID=16459
	ABAZOV 11P	PR D84 032004	V.M. Abazov *et al.*	(D0 Collab.)	REFID=53708
	ABAZOV 11R	PRL 107 082004	V.M. Abazov *et al.*	(D0 Collab.)	REFID=53710
	CHATRCHYAN 11F	JHEP 1107 049	S. Chatrchyan *et al.*	(CMS Collab.)	REFID=16357
	AALTONEN 10AE	PRL 105 252001	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53561
	AALTONEN 10C	PR D81 031102	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53266
	AALTONEN 10D	PR D81 032002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53267
	AALTONEN 10E	PR D81 052011	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53268

AALTONEN	09AK	PR D80 051104	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53018
AALTONEN	09J	PR D79 072001	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52804
AALTONEN	09K	PR D79 072010	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52805
AALTONEN	09L	PR D79 092005	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52806
AALTONEN	09O	PRL 102 152001	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52854
AALTONEN	09X	PR D79 072005	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52881
ABAZOV	09AH	PR D80 092006	V.M. Abazov *et al.*	(D0 Collab.)	REFID=53080
AALTONEN	08C	PRL 100 062005	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52193
ABAZOV	08AH	PRL 101 182001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52548
AALTONEN	07	PRL 98 142001	T. Aaltonen *et al.*	(CDF Collab.)	REFID=51684
AALTONEN	07B	PR D75 111103	T. Aaltonen *et al.*	(CDF Collab.)	REFID=51802
AALTONEN	07D	PR D76 072009	T. Aaltonen *et al.*	(CDF Collab.)	REFID=51996
AALTONEN	07I	PRL 99 182002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52044
ABAZOV	07F	PR D75 092001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=51792
ABAZOV	07W	PL B655 7	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52026
ABULENCIA	07D	PR D75 031105	A. Abulencia *et al.*	(CDF Collab.)	REFID=51683
ABULENCIA	07J	PR D75 071102	A. Abulencia *et al.*	(CDF Collab.)	REFID=51783
ABAZOV	06U	PR D74 092005	V.M. Abazov *et al.*	(D0 Collab.)	REFID=51503
ABULENCIA	06D	PRL 96 022004	A. Abulencia *et al.*	(CDF Collab.)	REFID=51102
Also		PR D73 032003	A. Abulencia *et al.*	(CDF Collab.)	REFID=51103
Also		PR D73 092002	A. Abulencia *et al.*	(CDF Collab.)	REFID=51306
ABULENCIA	06G	PRL 96 152002	A. Abulencia *et al.*	(CDF Collab.)	REFID=51104
Also		PR D74 032009	A. Abulencia *et al.*	(CDF Collab.)	REFID=51329
ABULENCIA	06V	PR D73 112006	A. Abulencia *et al.*	(CDF Collab.)	REFID=51285
ABAZOV	05	PL B606 25	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50386
ABAZOV	04G	NAT 429 638	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50556
AFFOLDER	01	PR D63 032003	T. Affolder *et al.*	(CDF Collab.)	REFID=48049
ABBOTT	99G	PR D60 052001	B. Abbott *et al.*	(D0 Collab.)	REFID=47135
ABE	99B	PRL 82 271	F. Abe *et al.*	(CDF Collab.)	REFID=46548
Also		PRL 82 2808 (erratum)	F. Abe *et al.*	(CDF Collab.)	REFID=46822
ABBOTT	98D	PRL 80 2063	B. Abbott *et al.*	(D0 Collab.)	REFID=45940
ABBOTT	98F	PR D58 052001	B. Abbott *et al.*	(D0 Collab.)	REFID=45967
ABE	98E	PRL 80 2767	F. Abe *et al.*	(CDF Collab.)	REFID=45941
ABE	98F	PRL 80 2779	F. Abe *et al.*	(CDF Collab.)	REFID=45942
BHAT	98B	IJMP A13 5113	P.C. Bhat, H.B. Prosper, S.S. Snyder		REFID=46531
ABACHI	97E	PRL 79 1197	S. Abachi *et al.*	(D0 Collab.)	REFID=45590
ABE	97R	PRL 79 1992	F. Abe *et al.*	(CDF Collab.)	REFID=45594
PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495
ABACHI	95	PRL 74 2632	S. Abachi *et al.*	(D0 Collab.)	REFID=44167
ABE	95F	PRL 74 2626	F. Abe *et al.*	(CDF Collab.)	REFID=44170
ABE	94E	PR D50 2966	F. Abe *et al.*	(CDF Collab.)	REFID=43810
Also		PRL 73 225	F. Abe *et al.*	(CDF Collab.)	REFID=43823

Reference = ABAZOV 08T; PRL 101 012001
Verifier code = D0

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Dmitri Denisov

EMAIL: denisovd@fnal.gov

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

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EMAIL: wmyao@lbl.gov

BOTTOM, CHARMED MESONS ($B = C = \pm 1$)

NODE=MXXX049

$B_c^+ = c\bar{b}$, $B_c^- = \bar{c}b$, similarly for B_c^*'s

NODE=MXXX049

$B_c^\pm$

NODE=S091

$I(J^P) = 0(0^-)$
I, J, P need confirmation.

Quantum numbers shown are quark-model predictions.

NODE=S091

B_c^+ BRANCHING RATIOS

NODE=S091225

$\Gamma(J/\psi(1S)\pi^+)/\Gamma_{total} \times B(\bar{b} \to B_c)$ — $\Gamma_2/\Gamma \times B$

NODE=S091R2
NODE=S091R2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
seen		AALTONEN	13	CDF	$p\bar{p}$ at 1.96 TeV
seen		[11] AAIJ	12AV	LHCB	pp at 7 TeV
seen		AALTONEN	08M	CDF	$p\bar{p}$ at 1.96 TeV
YOUR DATA seen		ABAZOV	08T	D0	$p\bar{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.4 \times 10^{-4}$	90	[12] ACKERSTAFF	98O	OPAL	$e^+e^- \to Z$
$<3.4 \times 10^{-4}$	90	[13] ABREU	97E	DLPH	$e^+e^- \to Z$
$<8.2 \times 10^{-5}$	90	[14] BARATE	97H	ALEP	$e^+e^- \to Z$
$<2.0 \times 10^{-5}$	95	[15] ABE	96R	CDF	$p\bar{p}$ 1.8 TeV

[11] AAIJ 12AV reports a measurement of $B(B_c^+ \to J/\psi\pi^+)/B(B^+ \to J/\psi K^+)\ f_c/f_u = (0.68 \pm 0.10 \pm 0.03 \pm 0.05)\%$ at $p_T(B) > 4$ GeV and $2.5 < \eta(B) < 4.5$. NODE=S091R2;LINKAGE=AA

[12] ACKERSTAFF 98O reports $B(Z \to B_c X)/B(Z \to q\bar{q}) \times B(B_c \to J/\psi(1S)\pi^+) < 1.06 \times 10^{-4}$ at 90%CL. We rescale to our PDG 98 values of $B(Z \to b\bar{b})$. NODE=S091R2;LINKAGE=D

[13] ABREU 97E value listed is for an assumed $\tau_{B_c} = 0.4$ ps and improves to 2.7×10^{-4} for $\tau_{B_c} = 1.4$ ps. NODE=S091R2;LINKAGE=A

[14] BARATE 97H reports $B(Z \to B_c X)/B(Z \to q\bar{q}) \cdot B(B_c \to J/\psi(1S)\pi) < 3.6 \times 10^{-5}$ at 90%CL. We rescale to our PDG 96 values of $B(Z \to b\bar{b})$. NODE=S091R2;LINKAGE=B

[15] ABE 96R reports $B(b \to B_c X)/B(b \to B^+ X) \cdot B(B_c^+ \to J/\psi(1S)\pi^+)/B(B^+ \to J/\psi(1S)K^+) < 0.053$ at 95%CL for $\tau_{B_c} = 0.8$ ps. It changes from 0.15 to 0.04 for 0.17 ps$< \tau_{B_c} <$ 1.6 ps. We rescale to our PDG 96 values of $B(b \to B^+) = 0.378 \pm 0.022$ and $B(B^+ \to J/\psi(1S)K^+) = 0.00101 \pm 0.00014$. NODE=S091R2;LINKAGE=C

$B_c^\pm$ REFERENCES

NODE=S091

AALTONEN	13	PR D87 011101	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54798
AAIJ	12AV	PRL 109 232001	R. Aaij *et al.*	(LHCb Colalb.)	REFID=54764
AALTONEN	08M	PRL 100 182002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52252
YOUR PAPER ABAZOV	08T	PRL 101 012001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52398
ACKERSTAFF	98O	PL B420 157	K. Ackerstaff *et al.*	(OPAL Collab.)	REFID=46029
PDG	98	EPJ C3 1	C. Caso *et al.*		REFID=45838
ABREU	97E	PL B398 207	P. Abreu *et al.*	(DELPHI Collab.)	REFID=45322
BARATE	97H	PL B402 213	R. Barate *et al.*	(ALEPH Collab.)	REFID=45480
ABE	96R	PRL 77 5176	F. Abe *et al.*	(CDF Collab.)	REFID=45159
PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495

Reference = ABAZOV 12U; PR D85 112003
Verifier code = D0

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EMAIL: denisovd@fnal.gov

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FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 MEAN LIFE

NODE=S042T

See $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE section for data on B-hadron mean life averaged over species of bottom particles.

NODE=S042T

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements and asymmetric lifetime errors.

NODE=S042T

→ UNCHECKED ←

	VALUE (10^{-12} s)	EVTS	DOCUMENT ID		TECN	COMMENT
	1.519±0.007 OUR EVALUATION					
	Average is meaningless.		[(1.518 ± 0.007) × 10^{-12} s OUR 2012 AVERAGE]			
	$1.509 \pm 0.012 \pm 0.018$		[1] AAD	13U	ATLS	pp at 7 TeV
YOUR DATA	$1.508 \pm 0.025 \pm 0.043$		[2] ABAZOV	12U	D0	$p\overline{p}$ at 1.96 TeV
	$1.507 \pm 0.010 \pm 0.008$		[3] AALTONEN	11	CDF	$p\overline{p}$ at 1.96 TeV
	$1.414 \pm 0.018 \pm 0.034$		[4] ABAZOV	09E	D0	$p\overline{p}$ at 1.96 TeV
	$1.504 \pm 0.013^{+0.018}_{-0.013}$		[5] AUBERT	06G	BABR	$e^+e^- \to \Upsilon(4S)$
	$1.534 \pm 0.008 \pm 0.010$		[6] ABE	05B	BELL	$e^+e^- \to \Upsilon(4S)$
	$1.531 \pm 0.021 \pm 0.031$		[7] ABDALLAH	04E	DLPH	$e^+e^- \to Z$
	$1.523^{+0.024}_{-0.023} \pm 0.022$		[8] AUBERT	03C	BABR	$e^+e^- \to \Upsilon(4S)$
	$1.533 \pm 0.034 \pm 0.038$		[9] AUBERT	03H	BABR	$e^+e^- \to \Upsilon(4S)$
	$1.497 \pm 0.073 \pm 0.032$		[10] ACOSTA	02C	CDF	$p\overline{p}$ at 1.8 TeV
	$1.529 \pm 0.012 \pm 0.029$		[11] AUBERT	02H	BABR	$e^+e^- \to \Upsilon(4S)$
	$1.546 \pm 0.032 \pm 0.022$		[12] AUBERT	01F	BABR	$e^+e^- \to \Upsilon(4S)$
	$1.541 \pm 0.028 \pm 0.023$		[11] ABBIENDI,G	00B	OPAL	$e^+e^- \to Z$
	$1.518 \pm 0.053 \pm 0.034$		[13] BARATE	00R	ALEP	$e^+e^- \to Z$
	$1.523 \pm 0.057 \pm 0.053$		[14] ABBIENDI	99J	OPAL	$e^+e^- \to Z$
	$1.474 \pm 0.039^{+0.052}_{-0.051}$		[13] ABE	98Q	CDF	$p\overline{p}$ at 1.8 TeV
	$1.52 \pm 0.06 \pm 0.04$		[14] ACCIARRI	98S	L3	$e^+e^- \to Z$
	$1.64 \pm 0.08 \pm 0.08$		[14] ABE	97J	SLD	$e^+e^- \to Z$
	$1.532 \pm 0.041 \pm 0.040$		[15] ABREU	97F	DLPH	$e^+e^- \to Z$
	$1.25 \; {}^{+0.15}_{-0.13} \pm 0.05$	121	[10] BUSKULIC	96J	ALEP	$e^+e^- \to Z$
	$1.49 \; {}^{+0.17}_{-0.15} \; {}^{+0.08}_{-0.06}$		[16] BUSKULIC	96J	ALEP	$e^+e^- \to Z$
	$1.61 \; {}^{+0.14}_{-0.13} \pm 0.08$		[13,17] ABREU	95Q	DLPH	$e^+e^- \to Z$
	$1.63 \pm 0.14 \pm 0.13$		[18] ADAM	95	DLPH	$e^+e^- \to Z$
	$1.53 \pm 0.12 \pm 0.08$		[13,19] AKERS	95T	OPAL	$e^+e^- \to Z$

OCCUR=3

OCCUR=4

• • • We do not use the following data for averages, fits, limits, etc. • • •

$1.501^{+0.078}_{-0.074}\pm0.050$		[2] ABAZOV	07S	D0	Repl. by ABAZOV 12U	
$1.524\pm0.030\pm0.016$		[2] ABULENCIA	07A	CDF	Repl. by AALTONEN 11	
$1.473^{+0.052}_{-0.050}\pm0.023$		[4] ABAZOV	05B	D0	Repl. by ABAZOV 05W	
$1.40\ ^{+0.11}_{-0.10}\ \pm0.03$		[2] ABAZOV	05C	D0	Repl. by ABAZOV 07S	
$1.530\pm0.043\pm0.023$		[4] ABAZOV	05W	D0	Repl. by ABAZOV 09E	
$1.54\ \pm0.05\ \pm0.02$		[20] ACOSTA	05	CDF	Repl. by AALTONEN 11	
$1.554\pm0.030\pm0.019$		[12] ABE	02H	BELL	Repl. by ABE 05B	
$1.58\ \pm0.09\ \pm0.02$		[10] ABE	98B	CDF	Repl. by ACOSTA 02C	
$1.54\ \pm0.08\ \pm0.06$		[13] ABE	96C	CDF	Repl. by ABE 98Q	
$1.55\ \pm0.06\ \pm0.03$		[21] BUSKULIC	96J	ALEP	$e^+e^- \rightarrow Z$	
$1.61\ \pm0.07\ \pm0.04$		[13] BUSKULIC	96J	ALEP	Repl. by BARATE 00R	OCCUR=2
$1.62\ \pm0.12$		[22] ADAM	95	DLPH	$e^+e^- \rightarrow Z$	OCCUR=2
$1.57\ \pm0.18\ \pm0.08$	121	[10] ABE	94D	CDF	Repl. by ABE 98B	
$1.17\ ^{+0.29}_{-0.23}\ \pm0.16$	96	[13] ABREU	93D	DLPH	Sup. by ABREU 95Q	
$1.55\ \pm0.25\ \pm0.18$	76	[18] ABREU	93G	DLPH	Sup. by ADAM 95	
$1.51\ ^{+0.24}_{-0.23}\ ^{+0.12}_{-0.14}$	78	[13] ACTON	93C	OPAL	Sup. by AKERS 95T	
$1.52\ ^{+0.20}_{-0.18}\ ^{+0.07}_{-0.13}$	77	[13] BUSKULIC	93D	ALEP	Sup. by BUSKULIC 96J	
$1.20\ ^{+0.52}_{-0.36}\ ^{+0.16}_{-0.14}$	15	[23] WAGNER	90	MRK2	E^{ee}_{cm}= 29 GeV	
$0.82\ ^{+0.57}_{-0.37}\ \pm0.27$		[24] AVERILL	89	HRS	E^{ee}_{cm}= 29 GeV	

[1] Measured with $B^0_d \rightarrow J/\psi(\mu^+\mu^-)\ K^0_S(\pi^+\pi^-)$ decays. NODE=S042T;LINKAGE=AD

[2] Measured mean life using $B^0 \rightarrow J/\psi K^0_S$ decays. NODE=S042T;LINKAGE=AO

[3] Measured mean life using fully reconstructed decays ($J/\psi K^{(*)}$). NODE=S042T;LINKAGE=AA

[4] Measured mean life using $B^0 \rightarrow J/\psi K^{*0}$ decays. NODE=S042T;LINKAGE=AZ

[5] Measured using a simultaneous fit of the B^0 lifetime and $\overline{B}^0 B^0$ oscillation frequency Δm_d in the partially reconstructed $B^0 \rightarrow D^{*-}\ell\nu$ decays. NODE=S042T;LINKAGE=AU

[6] Measurement performed using a combined fit of *CP*-violation, mixing and lifetimes. NODE=S042T;LINKAGE=AE

[7] Measurement performed using an inclusive reconstruction and *B* flavor identification technique. NODE=S042T;LINKAGE=AB

[8] AUBERT 03C uses a sample of approximately 14,000 exclusively reconstructed $B^0 \rightarrow D^*(2010)^-\ell\nu$ and simultaneously measures the lifetime and oscillation frequency. NODE=S042T;LINKAGE=C3

[9] Measurement performed with decays $B^0 \rightarrow D^{*-}\pi^+$ and $B^0 \rightarrow D^{*-}\rho^+$ using a partial reconstruction technique. NODE=S042T;LINKAGE=BH

[10] Measured mean life using fully reconstructed decays. NODE=S042T;LINKAGE=CD

[11] Data analyzed using partially reconstructed $\overline{B}^0 \rightarrow D^{*+}\ell^-\overline{\nu}$ decays. NODE=S042T;LINKAGE=C2

[12] Events are selected in which one *B* meson is fully reconstructed while the second *B* meson is reconstructed inclusively. NODE=S042T;LINKAGE=FT

[13] Data analyzed using $D/D^*\ell$X event vertices. NODE=S042T;LINKAGE=C

[14] Data analyzed using charge of secondary vertex. NODE=S042T;LINKAGE=M

[15] Data analyzed using inclusive $D/D^*\ell X$. NODE=S042T;LINKAGE=L

[16] Measured mean life using partially reconstructed $D^{*-}\pi^+$X vertices. NODE=S042T;LINKAGE=I

[17] ABREU 95Q assumes B($B^0 \rightarrow D^{**-}\ell^+\nu_\ell$) = 3.2 ± 1.7%. NODE=S042T;LINKAGE=CQ

[18] Data analyzed using vertex-charge technique to tag *B* charge. NODE=S042T;LINKAGE=F

[19] AKERS 95T assumes B($B^0 \rightarrow D_s{}^{(*)}D^{0\,(*)}$) = 5.0 ± 0.9% to find B^+/B^0 yield. NODE=S042T;LINKAGE=H

[20] Measured using the time-dependent angular analysis of $B^0_d \rightarrow J/\psi K^{*0}$ decays. NODE=S042T;LINKAGE=AC

[21] Combined result of $D/D^*\ell$x analysis, fully reconstructed *B* analysis, and partially reconstructed $D^{*-}\pi^+$X analysis. NODE=S042T;LINKAGE=J

[22] Combined ABREU 95Q and ADAM 95 result. NODE=S042T;LINKAGE=K

[23] WAGNER 90 tagged B^0 mesons by their decays into $D^{*-}e^+\nu$ and $D^{*-}\mu^+\nu$ where the D^{*-} is tagged by its decay into $\pi^-\overline{D}^0$. NODE=S042T;LINKAGE=BB

[24] AVERILL 89 is an estimate of the B^0 mean lifetime assuming that $B^0 \rightarrow D^{*+}$ + X always. NODE=S042T;LINKAGE=A

B^0 REFERENCES

NODE=S042

	AAD	13U	PR D87 032002	G. Aad *et al.*	(ATLAS Collab.)	REFID=54939
YOUR PAPER	ABAZOV	12U	PR D85 112003	V.M. Abazov *et al.*	(D0 Collab.)	REFID=54350
	AALTONEN	11	PRL 106 121804	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53674
	ABAZOV	09E	PRL 102 032001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52650
	ABAZOV	07S	PRL 99 142001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52008
	ABULENCIA	07A	PRL 98 122001	A. Abulencia *et al.*	(FNAL CDF Collab.)	REFID=51662
	AUBERT	06G	PR D73 012004	B. Aubert *et al.*	(BABAR Collab.)	REFID=51087
	ABAZOV	05B	PRL 94 042001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50492
	ABAZOV	05C	PRL 94 102001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50511

ABAZOV	05W	PRL 95 171801	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50929
ABE	05B	PR D71 072003	K. Abe *et al.*	(BELLE Collab.)	REFID=50517
Also		PR D71 079903 (errat.)	K. Abe *et al.*	(BELLE Collab.)	REFID=50555
ACOSTA	05	PRL 94 101803	D. Acosta *et al.*	(CDF Collab.)	REFID=50519
ABDALLAH	04E	EPJ C33 307	J. Abdallah *et al.*	(DELPHI Collab.)	REFID=49917
AUBERT	03C	PR D67 072002	B. Aubert *et al.*	(BaBar Collab.)	REFID=49210
AUBERT	03H	PR D67 091101	B. Aubert *et al.*	(BaBar Collab.)	REFID=49430
ABE	02H	PRL 88 171801	K. Abe *et al.*	(BELLE Collab.)	REFID=48633
ACOSTA	02C	PR D65 092009	D. Acosta *et al.*	(CDF Collab.)	REFID=48794
AUBERT	02H	PRL 89 011802	B. Aubert *et al.*	(BaBar Collab.)	REFID=48639
Also		PRL 89 169903 (errat)	B. Aubert *et al.*	(BaBar Collab.)	REFID=48983
AUBERT	01F	PRL 87 201803	B. Aubert *et al.*	(BaBar Collab.)	REFID=48432
ABBIENDI,G	00B	PL B493 266	G. Abbiendi *et al.*	(OPAL Collab.)	REFID=47835
BARATE	00R	PL B492 275	R. Barate *et al.*	(ALEPH Collab.)	REFID=47827
ABBIENDI	99J	EPJ C12 609	G. Abbiendi *et al.*	(OPAL Collab.)	REFID=46738
ABE	98B	PR D57 5382	F. Abe *et al.*	(CDF Collab.)	REFID=45880
ABE	98Q	PR D58 092002	F. Abe *et al.*	(CDF Collab.)	REFID=46475
ACCIARRI	98S	PL B438 417	M. Acciarri *et al.*	(L3 Collab.)	REFID=46503
ABE	97J	PRL 79 590	K. Abe *et al.*	(SLD Collab.)	REFID=45413
ABREU	97F	ZPHY C74 19	P. Abreu *et al.*	(DELPHI Collab.)	REFID=45412
Also		ZPHY C75 579 (erratum)	P. Abreu *et al.*	(DELPHI Collab.)	REFID=45614
ABE	96C	PRL 76 4462	F. Abe *et al.*	(CDF Collab.)	REFID=44700
BUSKULIC	96J	ZPHY C71 31	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=44824
ABREU	95Q	ZPHY C68 13	P. Abreu *et al.*	(DELPHI Collab.)	REFID=44460
ADAM	95	ZPHY C68 363	W. Adam *et al.*	(DELPHI Collab.)	REFID=44465
AKERS	95T	ZPHY C67 379	R. Akers *et al.*	(OPAL Collab.)	REFID=44379
ABE	94D	PRL 72 3456	F. Abe *et al.*	(CDF Collab.)	REFID=43761
ABREU	93D	ZPHY C57 181	P. Abreu *et al.*	(DELPHI Collab.)	REFID=43267
ABREU	93G	PL B312 253	P. Abreu *et al.*	(DELPHI Collab.)	REFID=43443
ACTON	93C	PL B307 247	P.D. Acton *et al.*	(OPAL Collab.)	REFID=43352
BUSKULIC	93D	PL B307 194	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=43349
Also		PL B325 537 (erratum)	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=43945
WAGNER	90	PRL 64 1095	S.R. Wagner *et al.*	(Mark II Collab.)	REFID=41096
AVERILL	89	PR D39 123	D.A. Averill *et al.*	(HRS Collab.)	REFID=40691

BOTTOM BARYONS
($B = -1$)

NODE=BXXX045

$\Lambda_b^0 = u\,d\,b$, $\Xi_b^0 = u\,s\,b$, $\Xi_b^- = d\,s\,b$, $\Omega_b^- = s\,s\,b$

NODE=BXXX045

NODE=S040

Λ_b^0

$I(J^P) = 0(\frac{1}{2}^+)$ Status: ***

In the quark model, a Λ_b^0 is an isospin-0 $u\,d\,b$ state. The lowest Λ_b^0 ought to have $J^P = 1/2^+$. None of I, J, or P have actually been measured.

NODE=S040

Λ_b^0 MEAN LIFE

NODE=S040T

See b-baryon Admixture section for data on b-baryon mean life average over species of b-baryon particles.

NODE=S040T

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements and asymmetric lifetime errors.

NODE=S040T

NEW;→ UNCHECKED ←

	VALUE (10^{-12} s)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
	1.429±0.024 OUR EVALUATION					
	[(1.425 ± 0.032) × 10^{-12} s OUR 2012 EVALUATION]					
	1.449±0.036±0.017		[9] AAD	13U	ATLS	pp at 7 TeV
YOUR DATA	1.303±0.075±0.035		[9] ABAZOV	12U	D0	$p\overline{p}$ at 1.96 TeV
	1.537±0.045±0.014		[9] AALTONEN	11	CDF	$p\overline{p}$ at 1.96 TeV
	1.401±0.046±0.035		[10] AALTONEN	10B	CDF	$p\overline{p}$ at 1.96 TeV
	$1.290^{+0.119}_{-0.110}{}^{+0.087}_{-0.091}$		[11] ABAZOV	07U	D0	$p\overline{p}$ at 1.96 TeV
	$1.11\ ^{+0.19}_{-0.18}\ \pm0.05$		[12] ABREU	99W	DLPH	$e^+e^- \to Z$
	$1.29\ ^{+0.24}_{-0.22}\ \pm0.06$		[12] ACKERSTAFF	98G	OPAL	$e^+e^- \to Z$
	1.21 ±0.11		[12] BARATE	98D	ALEP	$e^+e^- \to Z$
	1.32 ±0.15 ±0.07		[13] ABE	96M	CDF	$p\overline{p}$ at 1.8 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$1.218^{+0.130}_{-0.115}\pm0.042$	[9] ABAZOV	07S	D0	Repl. by ABAZOV 12U	
$1.593^{+0.083}_{-0.078}\pm0.033$	[9] ABULENCIA	07A	CDF	Repl. by AALTONEN 11	
$1.22\ ^{+0.22}_{-0.18}\ \pm0.04$	[9] ABAZOV	05C	D0	Repl. by ABAZOV 07S	
$1.19\ ^{+0.21}_{-0.18}\ ^{+0.07}_{-0.08}$	ABREU	96D	DLPH	Repl. by ABREU 99W	OCCUR=3
$1.14\ ^{+0.22}_{-0.19}\ \pm0.07$	69 AKERS	95K	OPAL	Repl. by ACKERSTAFF 98G	
$1.02\ ^{+0.23}_{-0.18}\ \pm0.06$	44 BUSKULIC	95L	ALEP	Repl. by BARATE 98D	OCCUR=2

[9] Measured mean life using fully reconstructed $\Lambda_b^0 \rightarrow J/\psi\Lambda$ decays. NODE=S040T;LINKAGE=AB

[10] Measured mean life using fully reconstructed $\Lambda_b^0 \rightarrow \Lambda_c^+\pi^-$ decays. NODE=S040T;LINKAGE=AA

[11] Measured using semileptonic decays $\Lambda_b^0 \rightarrow \Lambda_c^+\mu\nu X$ and $\Lambda_c^+ \rightarrow K_S^0 p$. NODE=S040T;LINKAGE=AZ

[12] Measured using $\Lambda_c\ell^-$ and $\Lambda\ell^+\ell^-$. NODE=S040T;LINKAGE=KK

[13] Excess $\Lambda_c\ell^-$, decay lengths. NODE=S040T;LINKAGE=AE

$\tau_{\Lambda_b^0}/\tau_{B^0}$ MEAN LIFE RATIO

NODE=S040211

$\tau_{\Lambda_b^0}/\tau_{B^0}$ (direct measurements)

NODE=S040TR

VALUE	DOCUMENT ID		TECN	COMMENT
0.975±0.034 OUR AVERAGE Error includes scale factor of 1.7. See the ideogram below. [1.00 ± 0.06 OUR 2012 AVERAGE Scale factor = 2.0]				NEW
$0.960\pm0.025\pm0.016$	[14] AAD	13U	ATLS	pp at 7 TeV
YOUR DATA $0.864\pm0.052\pm0.033$	[15,16] ABAZOV	12U	D0	$p\bar{p}$ at 1.96 TeV
$1.020\pm0.030\pm0.008$	[15] AALTONEN	11	CDF	$p\bar{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.811^{+0.096}_{-0.087}\pm0.034$	[15,16] ABAZOV	07S	D0	Repl. by ABAZOV 12U
1.041 ± 0.057	[17] ABULENCIA	07A	CDF	Repl. by AALTONEN 11
$0.87\ ^{+0.17}_{-0.14}\ \pm0.03$	[17] ABAZOV	05C	D0	Repl. by ABAZOV 07S

[14] Measured with $\Lambda_b^0 \rightarrow J/\psi(\mu^+\mu^-)\ \Lambda^0(p\pi^-)$ decays. NODE=S040TR;LINKAGE=AD

[15] Uses fully reconstructed $\Lambda_b \rightarrow J/\psi\Lambda$ decays. NODE=S040TR;LINKAGE=ZO

[16] Uses $B^0 \rightarrow J/\psi K_S^0$ decays for denominator. NODE=S040TR;LINKAGE=ZV

[17] Measured mean life ratio using fully reconstructed decays. NODE=S040TR;LINKAGE=AB

Λ_b^0 REFERENCES

NODE=S040

	AAD	13U	PR D87 032002	G. Aad *et al.* (ATLAS Collab.)	REFID=54939
YOUR PAPER	ABAZOV	12U	PR D85 112003	V.M. Abazov *et al.* (D0 Collab.)	REFID=54350
	AALTONEN	11	PRL 106 121804	T. Aaltonen *et al.* (CDF Collab.)	REFID=53674
	AALTONEN	10B	PRL 104 102002	T. Aaltonen *et al.* (CDF Collab.)	REFID=53241
	ABAZOV	07S	PRL 99 142001	V.M. Abazov *et al.* (D0 Collab.)	REFID=52008
	ABAZOV	07U	PRL 99 182001	V.M. Abazov *et al.* (D0 Collab.)	REFID=52043
	ABULENCIA	07A	PRL 98 122001	A. Abulencia *et al.* (FNAL CDF Collab.)	REFID=51662
	ABAZOV	05C	PRL 94 102001	V.M. Abazov *et al.* (D0 Collab.)	REFID=50511
	ABREU	99W	EPJ C10 185	P. Abreu *et al.* (DELPHI Collab.)	REFID=47301
	ACKERSTAFF	98G	PL B426 161	K. Ackerstaff *et al.* (OPAL Collab.)	REFID=45875
	BARATE	98D	EPJ C2 197	R. Barate *et al.* (ALEPH Collab.)	REFID=45878
	ABE	96M	PRL 77 1439	F. Abe *et al.* (CDF Collab.)	REFID=44810
	ABREU	96D	ZPHY C71 199	P. Abreu *et al.* (DELPHI Collab.)	REFID=44691
	AKERS	95K	PL B353 402	R. Akers *et al.* (OPAL Collab.)	REFID=44324
	BUSKULIC	95L	PL B357 685	D. Buskulic *et al.* (ALEPH Collab.)	REFID=44468

Reference = ABAZOV 12AC; PR D86 072009
Verifier code = D0

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Dmitri Denisov

EMAIL: denisovd@fnal.gov

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

CP VIOLATION PARAMETERS

NODE=S042229

Re(ϵ_{B^0})/(1+|ϵ_{B^0}|^2)

NODE=S042EPS

CP impurity in B^0_d system. It is obtained from either $a_{\ell\ell}$, the charge asymmetry in like-sign dilepton events or a_{cp}, the time-dependent asymmetry of inclusive B^0 and $\overline{B}^0$ decays.

NODE=S042EPS

The second "OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements. It assumes there is no *CP* violation in B_s mixing.

The first "OUR EVALUATION", also provided by the HFAG, uses the measurements from B-factories only.

NODE=S042EPS

	VALUE (units 10^{-3})	*DOCUMENT ID*		*TECN*	*COMMENT*	
	− 0.2± 0.7 OUR EVALUATION	first eval			$[(-0.8 \pm 0.8) \times 10^{-3}$ OUR 2012 EVALUATION]	NEW;→ UNCHECKED ←
	− 0.2± 0.7 OUR EVALUATION	second eval			$[(-0.8 \pm 0.8) \times 10^{-3}$ OUR 2012 EVALUATION]	NEW;→ UNCHECKED ←
	0.6± 0.7 OUR AVERAGE				$[(0.0 \pm 0.9) \times 10^{-3}$ OUR 2012 AVERAGE]	NEW
YOUR DATA	1.7± 1.1±0.4	[1] ABAZOV	12AC	D0	$p\overline{p}$ at 1.96 TeV	
	− 0.3± 1.3	[2] ABAZOV	11U	D0	$p\overline{p}$ at 1.96 TeV	
	0.4± 1.3±0.9	[3] AUBERT	06T	BABR	$e^+e^- \to \Upsilon(4S)$	
	− 0.3± 2.0±2.1	[4] NAKANO	06	BELL	$e^+e^- \to \Upsilon(4S)$	
	1.2± 2.9±3.6	[5] AUBERT	02K	BABR	$e^+e^- \to \Upsilon(4S)$	
	− 3.2± 6.5	[6] BARATE	01D	ALEP	$e^+e^- \to Z$	
	3.5±10.3±1.5	[7] JAFFE	01	CLE2	$e^+e^- \to \Upsilon(4S)$	
	1.2±13.8±3.2	[8] ABBIENDI	99J	OPAL	$e^+e^- \to Z$	
	2 ± 7 ±3	[9] ACKERSTAFF	97U	OPAL	$e^+e^- \to Z$	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	− 2.3± 1.1±0.8	[10] ABAZOV	06S	D0	Repl. by ABAZOV 11U	
	−14.7± 6.7±5.7	[11] AUBERT,B	04C	BABR	Repl. by AUBERT 06T	
	4 ±18 ±3	[12] BEHRENS	00B	CLE2	Repl. by JAFFE 01	
	< 45	[13] BARTELT	93	CLE2	$e^+e^- \to \Upsilon(4S)$	

[1] ABAZOV 12AC uses $B^0 \to D^-\mu^+X$ and $B^0 \to D^*(2010)^-\mu^+X$ decays without initial state flavor tagging which yields measurement of $A^d_{SL} = (6.8 \pm 4.5 \pm 1.4) \times 10^{-3}$. NODE=S042EPS;LINKAGE=AV

[2] ABAZOV 11U uses the dimuon charge asymmetry with different impact parameters from which it reports $A^d_{SL} = (-1.2 \pm 5.2) \times 10^{-3}$. NODE=S042EPS;LINKAGE=AO

[3] AUBERT 06T reports $|q/p|-1=(-0.8\pm2.7\pm1.9)\times10^{-3}$. We convert to $(1-|q/p|^2)/4$. NODE=S042EPS;LINKAGE=AE

[4] Uses the charge asymmetry in like-sign dilepton events and reports $|q/p| = 1.0005 \pm 0.0040 \pm 0.0043$. NODE=S042EPS;LINKAGE=NA

[5] AUBERT 02K uses the charge asymmetry in like-sign dilepton events. NODE=S042EPS;LINKAGE=KA

[6] BARATE 01D measured by investigating time-dependent asymmetries in semileptonic and fully inclusive B^0_d decays. NODE=S042EPS;LINKAGE=DB

[7] JAFFE 01 finds $a_{\ell\ell} = 0.013 \pm 0.050 \pm 0.005$ and combines with the previous BEHRENS 00B independent measurement. NODE=S042EPS;LINKAGE=JP

[8] Data analyzed using the time-dependent asymmetry of inclusive B^0 decay. The production flavor of B^0 mesons is determined using both the jet charge and the charge of secondary vertex in the opposite hemisphere. NODE=S042EPS;LINKAGE=C

[9] ACKERSTAFF 97U assumes CPT and is based on measuring the charge asymmetry in a sample of B^0 decays defined by lepton and $Q_{\rm hem}$ tags. If CPT is not invoked, $\mathrm{Re}(\epsilon_B) = -0.006 \pm 0.010 \pm 0.006$ is found. The indirect CPT violation parameter is determined to $\mathrm{Im}(\delta B) = -0.020 \pm 0.016 \pm 0.006$. NODE=S042EPS;LINKAGE=B

[10] Uses the dimuon charge asymmetry. NODE=S042EPS;LINKAGE=AZ

[11] AUBERT 04C reports $|q/p| = 1.029 \pm 0.013 \pm 0.011$ and we converted it to (1- $|q/p|^2$)/4. NODE=S042EPS;LINKAGE=AB

[12] BEHRENS 00B uses high-momentum lepton tags and partially reconstructed $\overline{B}^0 \to D^{*+}\pi^-$, ρ^- decays to determine the flavor of the B meson. NODE=S042EPS;LINKAGE=KS

[13] BARTELT 93 finds $a_{\ell\ell} = 0.031 \pm 0.096 \pm 0.032$ which corresponds to $|a_{\ell\ell}| < 0.18$, which yields the above $|\mathrm{Re}(\epsilon_{B^0})/(1+|\epsilon_{B^0}|^2|$. NODE=S042EPS;LINKAGE=A

B^0 REFERENCES

NODE=S042

YOUR PAPER	ABAZOV	12AC	PR D86 072009	V.M. Abazov *et al.*	(D0 Collab.)	REFID=54605
	ABAZOV	11U	PR D84 052007	V.M. Abazov *et al.*	(D0 Collab.)	REFID=53796
	ABAZOV	06S	PR D74 092001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=51499
	AUBERT	06T	PRL 96 251802	B. Aubert *et al.*	(BABAR Collab.)	REFID=51240
	NAKANO	06	PR D73 112002	E. Nakano *et al.*	(BELLE Collab.)	REFID=51281
	AUBERT	04C	PRL 92 111801	B. Aubert *et al.*	(BaBar Collab.)	REFID=49670
	AUBERT,B	04C	PR D70 012007	B. Aubert *et al.*	(BABAR Collab.)	REFID=50046
	Also		PRL 92 181801	B. Aubert *et al.*	(BABAR Collab.)	REFID=49927
	AUBERT	02K	PRL 88 231801	B. Aubert *et al.*	(BaBar Collab.)	REFID=48708
	BARATE	01D	EPJ C20 431	R. Barate *et al.*	(ALEPH Collab.)	REFID=48076
	JAFFE	01	PRL 86 5000	D. Jaffe *et al.*	(CLEO Collab.)	REFID=48139
	BEHRENS	00B	PL B490 36	B.H. Behrens *et al.*	(CLEO Collab.)	REFID=47776
	ABBIENDI	99J	EPJ C12 609	G. Abbiendi *et al.*	(OPAL Collab.)	REFID=46738
	ACKERSTAFF	97U	ZPHY C76 401	K. Ackerstaff *et al.*	(OPAL Collab.)	REFID=45786
	BARTELT	93	PRL 71 1680	J.E. Bartelt *et al.*	(CLEO Collab.)	REFID=43507

Reference = ABAZOV 12AF; PR D86 092011
Verifier code = D0

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Dmitri Denisov

EMAIL: denisovd@fnal.gov

June 4, 2013

Dear Colleague,

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM, STRANGE MESONS ($B = \pm 1$, $S = \mp 1$)

$B_s^0 = s\overline{b}$, $\overline{B}_s^0 = \overline{s}\,b$, similarly for B_s^*'s

NODE=MXXX046

NODE=MXXX046

NODE=S086

B_s^0

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

B_s^0 BRANCHING RATIOS

NODE=S086230

$\Gamma(\psi(2S)f_2'(1525))/\Gamma(J/\psi(1S)\phi)$ — Γ_{33}/Γ_{21}

NODE=S086R08

NODE=S086R08

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.21±0.07±0.01**	[1,2] ABAZOV	12AF	D0	$p\overline{p}$ at 1.96 TeV

[1] ABAZOV 12AF reports $[\Gamma(B_s^0 \to \psi(2S)f_2'(1525))/\Gamma(B_s^0 \to J/\psi(1S)\phi)] \times B(f_2'(1525) \to K^+K^-) / B(\phi(1020) \to K^+K^-) = 0.19 \pm 0.05 \pm 0.04$ which we divide and multiply by our best values $B(f_2'(1525) \to K^+K^-) = \frac{1}{2}(88.7 \pm 2.2) \times 10^{-2}$, $B(\phi(1020) \to K^+K^-) = (48.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=S086R08;LINKAGE=AB

[2] ABAZOV 12AF fits the invariant masses of the K^+K^- pair in the range $1.35 < M(K^+K^-) < 2$ GeV.

NODE=S086R08;LINKAGE=AZ

B_s^0 REFERENCES

NODE=S086

YOUR PAPER ABAZOV 12AF PR D86 092011 V.M. Abazov *et al.* (D0 Collab.)

REFID=54702

Reference = ABAZOV 13; PRL 110 011801
Verifier code = D0

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PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Dmitri Denisov

EMAIL: denisovd@fnal.gov

June 4, 2013

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BOTTOM, STRANGE MESONS ($B = \pm 1$, $S = \mp 1$)

NODE=MXXX046

$B_s^0 = s\overline{b}$, $\overline{B}_s^0 = \overline{s}\,b$, similarly for B_s^*'s

NODE=MXXX046

B_s^0

NODE=S086

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

CP VIOLATION PARAMETERS in B_s^0

NODE=S086240

$\mathrm{Re}(\epsilon_{B_s^0}) / (1 + |\epsilon_{B_s^0}|^2)$

NODE=S086EPS

CP impurity in B_s^0 system.

NODE=S086EPS

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/scaling procedure takes into account correlation between the measurements. The value has been obtained from a 2D fit of the B_d and B_s asymmetries, which includes the B_s measurements listed below and the B factory average for the B_d.

NODE=S086EPS

	VALUE (units 10^{-3})	*DOCUMENT ID*		*TECN*	*COMMENT*
	−4.3±1.4 OUR EVALUATION				
	$[(-2.6 \pm 1.6) \times 10^{-3}$ OUR 2012 EVALUATION]				
	−2.4±1.3 OUR AVERAGE				
	$[(-2.2 \pm 2.0) \times 10^{-3}$ OUR 2012 AVERAGE Scale factor = 1.1]				
YOUR DATA	−2.8±1.9±0.4	[1] ABAZOV	13	D0	$p\overline{p}$ at 1.96 TeV
	−4.5±2.7	[2] ABAZOV	11U	D0	$p\overline{p}$ at 1.96 TeV
	−0.4±2.3±0.4	[3] ABAZOV	10E	D0	$p\overline{p}$ at 1.96 TeV
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	−3.6±1.9	[4] ABAZOV	10H	D0	Repl. by ABAZOV 11U
	6.1±4.8±0.9	[5] ABAZOV	07A	D0	Repl. by ABAZOV 10E

NEW;→ UNCHECKED ←

NEW

[1] ABAZOV 13 reports a measurement of time-integrated flavor-specific asymmetry in mixed semileptonic $B_s^0 \to \mu^+ D_s^- X$ decays $A_s^{SL} = (-1.12 \pm 0.74 \pm 0.17)\%$ which is approximately equal to $4 \times \mathrm{Re}(\epsilon_{B_s^0}) / (1 + |\epsilon_{B_s^0}|^2)$.

NODE=S086EPS;LINKAGE=AV

[2] ABAZOV 11U uses the dimuon charge asymmetry with different impact parameters from which it reports $A_{SL}^s = (-18.1 \pm 10.6) \times 10^{-3}$.

NODE=S086EPS;LINKAGE=AO

[3] ABAZOV 10E reports a measurement of flavor-specific asymmetry in $B_{(s)}^0 \to \mu^+ D_{(s)}^{*-} X$ decays with a decay-time analysis including initial-state flavor tagging, $A_{SL}^s = (-1.7 \pm 9.1^{+1.4}_{-1.5}) \times 10^{-3}$ which is approximately equal to $4 \times \mathrm{Re}(\epsilon_{B_s^0}) / (1 + |\epsilon_{B_s^0}|^2)$.

NODE=S086EPS;LINKAGE=AA

[4] ABAZOV 10H reports a measurement of like-sign dimuon charge asymmetry of $A_{SL}^b = (-9.57 \pm 2.51 \pm 1.46) \times 10^{-3}$ in semileptonic b-hadron decays. Using the measured production ratio of B_d^0 and B_s^0, and the asymmetry of B_d^0 $A_{SL}^d = (-4.7 \pm 4.6) \times 10^{-3}$ measured from B-factories, they obtain the asymmetry for B_s^0.

NODE=S086EPS;LINKAGE=AZ

[5] The first direct measurement of the time integrated flavor untagged charge asymmetry in semileptonic B_s^0 decays is reported as $2 \times A_{SL}^s(\text{untagged}) = A_{SL}^s = (2.45 \pm 1.93 \pm 0.35) \times 10^{-2}$.

NODE=S086EPS;LINKAGE=AB

B_s^0 REFERENCES

NODE=S086

YOUR PAPER	ABAZOV	13	PRL 110 011801	V.M. Abazov *et al.*	(D0 Collab.)	REFID=54799
	ABAZOV	11U	PR D84 052007	V.M. Abazov *et al.*	(D0 Collab.)	REFID=53796
	ABAZOV	10E	PR D82 012003	V.M. Abazov *et al.*	(D0 Collab.)	REFID=53317
	ABAZOV	10H	PR D82 032001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=53366
	ABAZOV	07A	PRL 98 151801	V.M. Abazov *et al.*	(D0 Collab.)	REFID=51673

Reference = AAIJ 12L; EPJ C72 2118
Verifier code = LHCB

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Tim Gershon

EMAIL: T.J.Gershon@warwick.ac.uk

June 4, 2013

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BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(\psi(2S)K^+)/\Gamma(J/\psi(1S)K^+)$ **$\Gamma_{231}/\Gamma_{208}$**

NODE=S041B46

VALUE	DOCUMENT ID		TECN	COMMENT
0.599±0.022 OUR AVERAGE				
[0.60 ± 0.07 OUR 2012 AVERAGE]				
YOUR DATA 0.599±0.018±0.015	[1,2] AAIJ	12L	LHCB	pp at 7 TeV
0.63 ±0.05 ±0.08	ABAZOV	09Y	D0	$p\overline{p}$ at 1.96 TeV
0.558±0.082±0.056	ABE	98O	CDF	$p\overline{p}$ 1.8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.64 ±0.06 ±0.07	[3] AUBERT	02	BABR	$e^+e^- \to \Upsilon(4S)$

NODE=S041B46

NODE=S041B46

NEW

[1] AAIJ 12L reports 0.594 ± 0.006 ± 0.016 ± 0.015 from a measurement of $[\Gamma(B^+ \to \psi(2S)K^+)/\Gamma(B^+ \to J/\psi(1S)K^+)] \times [B(J/\psi(1S) \to e^+e^-)] / [B(\psi(2S) \to e^+e^-)]$ assuming $B(J/\psi(1S) \to e^+e^-) = (5.94 \pm 0.06) \times 10^{-2}$, $B(\psi(2S) \to e^+e^-) = (7.72 \pm 0.17) \times 10^{-3}$, which we rescale to our best values $B(J/\psi(1S) \to e^+e^-) = (5.94 \pm 0.06) \times 10^{-2}$, $B(\psi(2S) \to e^+e^-) = (7.78 \pm 0.17) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=S041B46;LINKAGE=AA

[2] Assumes $B(J/\psi \to \mu^+\mu^-) / B(\psi(2S) \to \mu^+\mu^-) = B(J/\psi \to e^+e^-) / B(\psi(2S) \to e^+e^-) = 7.69 \pm 0.19$.

NODE=S041B46;LINKAGE=AI

[3] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041B46;LINKAGE=EP

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER	AAIJ	12L	EPJ C72 2118	R. Aaij *et al.*	(LHCb Collab.)
	ABAZOV	09Y	PR D79 111102	V.M. Abazov *et al.*	(D0 Collab.)
	AUBERT	02	PR D65 032001	B. Aubert *et al.*	(BaBar Collab.)
	ABE	98O	PR D58 072001	F. Abe *et al.*	(CDF Collab.)

REFID=54136
REFID=52939
REFID=48514
REFID=46156

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(\psi(2S)K^*(892)^0)/\Gamma(J/\psi(1S)K^*(892)^0)$ — $\Gamma_{211}/\Gamma_{169}$

NODE=S042T97
NODE=S042T97

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.480±0.018±0.012**	[1,2] AAIJ	12L	LHCB	pp at 7 TeV

[1] AAIJ 12L reports 0.476 ± 0.014 ± 0.010 ± 0.012 from a measurement of $[\Gamma(B^0 \to \psi(2S)K^*(892)^0)/\Gamma(B^0 \to J/\psi(1S)K^*(892)^0)] \times [B(J/\psi(1S) \to e^+e^-)] / [B(\psi(2S) \to e^+e^-)]$ assuming $B(J/\psi(1S) \to e^+e^-) = (5.94 \pm 0.06) \times 10^{-2}$, $B(\psi(2S) \to e^+e^-) = (7.72 \pm 0.17) \times 10^{-3}$, which we rescale to our best values $B(J/\psi(1S) \to e^+e^-) = (5.94 \pm 0.06) \times 10^{-2}$, $B(\psi(2S) \to e^+e^-) = (7.78 \pm 0.17) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best values. NODE=S042T97;LINKAGE=AA

[2] Assumes $B(J/\psi \to \mu^+\mu^-) / B(\psi(2S) \to \mu^+\mu^-) = B(J/\psi \to e^+e^-) / B(\psi(2S) \to e^+e^-) = 7.69 \pm 0.19$. NODE=S042T97;LINKAGE=AI

B^0 REFERENCES

NODE=S042

YOUR PAPER	AAIJ	12L	EPJ C72 2118	R. Aaij *et al.*	(LHCb Collab.)

REFID=54136

BOTTOM, STRANGE MESONS ($B = \pm1$, $S = \mp1$)

NODE=MXXX046

$B^0_s = s\overline{b}$, $\overline{B}^0_s = \overline{s}b$, similarly for B^*_s's

NODE=MXXX046

NODE=S086

B^0_s

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions. NODE=S086

B^0_s BRANCHING RATIOS

NODE=S086230

$\Gamma(\psi(2S)\phi)/\Gamma(J/\psi(1S)\phi)$ — Γ_{34}/Γ_{21}

NODE=S086R37
NODE=S086R37
NEW

	VALUE	DOCUMENT ID		TECN	COMMENT
	0.497±0.034 OUR AVERAGE				
	[0.53 ± 0.10 OUR 2012 AVERAGE]				
YOUR DATA	0.493±0.034±0.012	[1,2] AAIJ	12L	LHCB	pp at 7 TeV
	0.53 ±0.10 ±0.09	ABAZOV	09Y	D0	$p\overline{p}$ at 1.96 TeV
	0.52 ±0.13 ±0.07	ABULENCIA	06N	CDF	$p\overline{p}$ at 1.96 TeV

[1] AAIJ 12L reports 0.489 ± 0.026 ± 0.021 ± 0.012 from a measurement of $[\Gamma(B^0_s \to \psi(2S)\phi)/\Gamma(B^0_s \to J/\psi(1S)\phi)] \times [B(J/\psi(1S) \to e^+e^-)] / [B(\psi(2S) \to e^+e^-)]$ assuming $B(J/\psi(1S) \to e^+e^-) = (5.94 \pm 0.06) \times 10^{-2}$, $B(\psi(2S) \to e^+e^-) = (7.72 \pm 0.17) \times 10^{-3}$, which we rescale to our best values $B(J/\psi(1S) \to e^+e^-) = (5.94 \pm 0.06) \times 10^{-2}$, $B(\psi(2S) \to e^+e^-) = (7.78 \pm 0.17) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best values. NODE=S086R37;LINKAGE=AA

[2] Assumes $B(J/\psi \to \mu^+\mu^-) / B(\psi(2S) \to \mu^+\mu^-) = B(J/\psi \to e^+e^-) / B(\psi(2S) \to e^+e^-) = 7.69 \pm 0.19$. NODE=S086R37;LINKAGE=AI

B^0_s REFERENCES

NODE=S086

YOUR PAPER	AAIJ	12L	EPJ C72 2118	R. Aaij *et al.*	(LHCb Collab.)
	ABAZOV	09Y	PR D79 111102	V.M. Abazov *et al.*	(D0 Collab.)
	ABULENCIA	06N	PRL 96 231801	A. Abulencia *et al.*	(CDF Collab.)

REFID=54136
REFID=52939
REFID=51236

Reference = AAIJ 12M; PL B712 203
Verifier code = LHCB

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NODE=MXXX045

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(\overline{D}^0 K^+)/\Gamma(\overline{D}^0 \pi^+)$ — Γ_{48}/Γ_{44}

NODE=S041B07
NODE=S041B07

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
7.68±0.35 OUR AVERAGE Error includes scale factor of 2.0. See the ideogram below. [(7.6 ± 0.6) × 10^{-2} OUR 2012 AVERAGE Scale factor = 2.3]				NEW
YOUR DATA 7.74±0.12±0.19	AAIJ	12M	LHCB	pp at 7 TeV
6.77±0.23±0.30	HORII	08	BELL	$e^+e^- \to \Upsilon(4S)$
8.31±0.35±0.20	AUBERT	04N	BABR	$e^+e^- \to \Upsilon(4S)$
$9.9\ ^{+1.4}_{-1.2}\ ^{+0.7}_{-0.6}$	BORNHEIM	03	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
9.4 ±0.9 ±0.7	ABE	03D	BELL	Repl. by SWAIN 03
7.7 ±0.5 ±0.6	SWAIN	03	BELL	Repl. by HORII 08
7.9 ±0.9 ±0.6	ABE	01I	BELL	Repl. by ABE 03D
5.5 ±1.4 ±0.5	ATHANAS	98	CLE2	Repl. by BORNHEIM 03

$\Gamma(D_{CP(+1)} K^+)/\Gamma(\overline{D}^0 K^+)$ — Γ_{49}/Γ_{48}

NODE=S041C18
NODE=S041C18

VALUE	DOCUMENT ID		TECN	COMMENT
0.518±0.029 OUR AVERAGE Error includes scale factor of 1.6. [0.60 ± 0.05 OUR 2012 AVERAGE]				NEW
YOUR DATA 0.504±0.019±0.006	[1] AAIJ	12M	LHCB	pp at 7 TeV
0.65 ±0.12 ±0.06	[2] AALTONEN	10A	CDF	$p\overline{p}$ at 1.96 TeV
0.590±0.045±0.025	[3] DEL-AMO-SA..	10G	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.53 ±0.05 ±0.025	AUBERT	08AA	BABR	Repl. by DEL-AMO-SANCHEZ 10G
0.45 ±0.06 ±0.02	AUBERT	06J	BABR	Repl. by AUBERT 08AA

[1] AAIJ 12M reports $R_{CP+} = 1.007 \pm 0.038 \pm 0.012$ which we have divided by 2.

NODE=S041C18;LINKAGE=AI

[2] Reports $R_{CP+} = 2\ (\mathrm{B}(B^- \to D_{CP(+1)} K^-) + \mathrm{B}(B^+ \to D_{CP(+1)} K^+))\ /\ (\mathrm{B}(B^- \to D^0 K^-) + \mathrm{B}(B^+ \to \overline{D}^0 K^+)) = 1.30 \pm 0.24 \pm 0.12$ that we have divided by 2.

NODE=S041C18;LINKAGE=AA

[3] Reports $R_{CP+} = 1.18 \pm 0.09 \pm 0.05$ that we have divided by 2.

NODE=S041C18;LINKAGE=DE

$\Gamma([K^-\pi^+]_D K^+)/\Gamma([K^+\pi^-]_D K^+)$ — Γ_{51}/Γ_{52}

NODE=S041Q12
NODE=S041Q12

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
15.3±1.7 OUR AVERAGE [(15.6 ± 3.3) × 10^{-3} OUR 2012 AVERAGE]					NEW
YOUR DATA 15.2±2.0±0.4		AAIJ	12M	LHCB	pp at 7 TeV
22.0±8.6±2.6		[1] AALTONEN	11AJ	CDF	$p\overline{p}$ at 1.96 TeV
$16.3^{+4.4}_{-4.1}{}^{+0.7}_{-1.3}$		HORII	11	BELL	$e^+e^- \to \Upsilon(4S)$
11 ±6 ±2		DEL-AMO-SA..	10H	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$7.8^{+6.2}_{-5.7}{}^{+2.0}_{-2.8}$		HORII	08	BELL	Repl. by HORII 11
<29	90	[2] AUBERT	05G	BABR	Repl. by DEL-AMO-SANCHEZ 10H
<44	90	[3] SAIGO	05	BELL	$e^+e^- \to \Upsilon(4S)$
<26	90	[4] AUBERT,B	04L	BABR	Repl. by AUBERT 05G

[1] AALTONEN 11AJ also measures the ratio separately for B^+ ($R^+(K)$) and B^- ($R^-(K)$) and obtains: $R^+(K) = (42.6 \pm 13.7 \pm 2.8) \times 10^{-3}$, $R^-(K) = (3.8 \pm 10.3 \pm 2.7) \times 10^{-3}$. NODE=S041Q12;LINKAGE=AA

[2] AUBERT 05G extract a constraint on the magnitude of the ratio of amplitudes $|A(B^+ \to D^0 K^+) / A(B^+ \to \overline{D}^0 K^+)| < 0.23$ at 90% CL (Bayesian). Similar measurements from $B^+ \to D^{*0} K^+$ are also reported. NODE=S041Q12;LINKAGE=AB

[3] SAIGO 05 extract a constraint on the magnitude of the ratio of amplitudes $|A(B^+ \to D^0 K^+) / A(B^+ \to \overline{D}^0 K^+)| < 0.27$ at 90% CL. NODE=S041Q12;LINKAGE=SA

[4] AUBERT,B 04L extract a constraint on the magnitude of the ratio of amplitudes $|A(B^+ \to D^0 K^+)/A(B^+ \to \overline{D}^0 K^+)| < 0.22$ at 90% CL. NODE=S041Q12;LINKAGE=AU

$\Gamma([K^-\pi^+]_D\pi^+)/\Gamma([K^+\pi^-]_D\pi^+)$ Γ_{57}/Γ_{58}

NODE=S041Q49
NODE=S041Q49

	VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
	3.75±0.26 OUR AVERAGE Error includes scale factor of 1.3. See the ideogram below. [$(3.21 \pm 0.32) \times 10^{-3}$ OUR 2012 AVERAGE]				
YOUR DATA	$4.10 \pm 0.25 \pm 0.05$	AAIJ	12M	LHCB	pp at 7 TeV
	$2.8 \pm 0.7 \pm 0.4$	[1] AALTONEN	11AJ	CDF	$p\overline{p}$ at 1.96 TeV
	$3.28^{+0.38}_{-0.36}{}^{+0.12}_{-0.18}$	HORII	11	BELL	$e^+e^- \to \Upsilon(4S)$
	$3.3 \pm 0.6 \pm 0.4$	DEL-AMO-SA..	10H	BABR	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	$3.40^{+0.55}_{-0.53}{}^{+0.15}_{-0.22}$	HORII	08	BELL	Repl. by HORII 11
	$3.5 ^{+1.0}_{-0.9} \pm 0.2$	SAIGO	05	BELL	Repl. by HORII 08

NEW

[1] AALTONEN 11AJ also measures the ratio separately for B^+ ($R^+(\pi)$) and B^- ($R^-(\pi)$) and obtains: $R^+(\pi) = (2.4 \pm 1.0 \pm 0.4) \times 10^{-3}$, $R^-(K) = (3.1 \pm 1.1 \pm 0.4) \times 10^{-3}$. NODE=S041Q49;LINKAGE=AA

CP VIOLATION

NODE=S041220

A_{CP} is defined as NODE=S041220

$$\frac{B(B^- \to \overline{f}) - B(B^+ \to f)}{B(B^- \to \overline{f}) + B(B^+ \to f)},$$

the *CP*-violation charge asymmetry of exclusive B^- and B^+ decay.

$A_{CP}(B^+ \to D_{CP(+1)} K^+)$

NODE=S041AY3
NODE=S041AY3

	VALUE	DOCUMENT ID		TECN	COMMENT
	0.170±0.033 OUR AVERAGE Error includes scale factor of 1.2. [0.24 ± 0.06 OUR 2012 AVERAGE Scale factor = 1.1]				
YOUR DATA	$0.145 \pm 0.032 \pm 0.010$	[1] AAIJ	12M	LHCB	pp at 7 TeV
	$0.39 \pm 0.17 \pm 0.04$	AALTONEN	10A	CDF	$p\overline{p}$ at 1.96 TeV
	$0.25 \pm 0.06 \pm 0.02$	[2] DEL-AMO-SA..	10G	BABR	$e^+e^- \to \Upsilon(4S)$
	$0.06 \pm 0.14 \pm 0.05$	ABE	06	BELL	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	$0.27 \pm 0.09 \pm 0.04$	AUBERT	08AA	BABR	Repl. by DEL-AMO-SANCHEZ 10G
	$0.35 \pm 0.13 \pm 0.04$	AUBERT	06J	BABR	Repl. by AUBERT 08AA
	$0.07 \pm 0.17 \pm 0.06$	AUBERT	04N	BABR	Repl. by AUBERT 06J
	$0.29 \pm 0.26 \pm 0.05$	[3] ABE	03D	BELL	Repl. by SWAIN 03
	$0.06 \pm 0.19 \pm 0.04$	[4] SWAIN	03	BELL	Repl. by ABE 06

NEW

[1] AAIJ 12M reports an evidence of direct *CP* violation in $B^\pm \to DK^\pm$ decays with a total significance of 5.8 σ. NODE=S041AY3;LINKAGE=AI

[2] Reports the first evidence for direct *CP* violation in $B \to DK$ decays with 3.6 standard deviations. NODE=S041AY3;LINKAGE=DE

[3] Corresponds to 90% confidence range $-0.14 < A_{CP} < 0.73$. NODE=S041AY3;LINKAGE=A

[4] Corresponds to 90% confidence range $-0.26 < A_{CP} < 0.38$. NODE=S041AY3;LINKAGE=SW

$A_{ADS}(B^+ \to DK^+)$

NODE=S041AA1

$$A_{ADS}(B^+ \to DK^+) = \frac{(R_K^- - R_K^+)}{(R_K^- + R_K^+)} \text{ where}$$

NODE=S041AA1

$R_K^- = \Gamma(B^- \to [K^+\pi^-]_D K^-) / \Gamma(B^- \to [K^-\pi^+]_D K^-)$ and

$R_K^+ = \Gamma(B^+ \to [K^-\pi^+]_D K^+) / \Gamma(B^+ \to [K^+\pi^-]_D K^+)$

NODE=S041AA1

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**−0.52±0.15±0.02**	AAIJ	12M	LHCB	pp at 7 TeV

$A_{ADS}(B^+ \to D\pi^+)$

NODE=S041AA2

$A_{ADS}(B^+ \to D\pi^+) = \frac{(R_\pi^- - R_\pi^+)}{(R_\pi^- + R_\pi^+)}$ where

NODE=S041AA2

$R_\pi^- = \Gamma(B^- \to [K^+\pi^-]_D\pi^-) / \Gamma(B^- \to [K^-\pi^+]_D\pi^-)$ and

$R_\pi^+ = \Gamma(B^+ \to [K^-\pi^+]_D\pi^+) / \Gamma(B^+ \to [K^+\pi^-]_D\pi^+)$

NODE=S041AA2

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.143±0.062±0.011**	AAIJ	12M	LHCB	pp at 7 TeV

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER	AAIJ	12M	PL B712 203	R. Aaij *et al.*	(LHCb Collab.)	REFID=54173
	Also		PL B713 351 (errat)	R. Aaij *et al.*	(LHCb Collab.)	REFID=54174
	AALTONEN	11AJ	PR D84 091504	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53889
	HORII	11	PRL 106 231803	Y. Horii *et al.*	(BELLE Collab.)	REFID=16649
	AALTONEN	10A	PR D81 031105	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53239
	DEL-AMO-SA...	10G	PR D82 072004	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53455
	DEL-AMO-SA...	10H	PR D82 072006	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53456
	AUBERT	08AA	PR D77 111102	B. Aubert *et al.*	(BABAR Collab.)	REFID=52353
	HORII	08	PR D78 071901	Y. Horii *et al.*	(BELLE Collab.)	REFID=52533
	ABE	06	PR D73 051106	K. Abe *et al.*	(BELLE Collab.)	REFID=51095
	AUBERT	06J	PR D73 051105	B. Aubert *et al.*	(BABAR Collab.)	REFID=51091
	AUBERT	05G	PR D72 032004	B. Aubert *et al.*	(BABAR Collab.)	REFID=50572
	SAIGO	05	PRL 94 091601	M. Saigo *et al.*	(BELLE Collab.)	REFID=50579
	AUBERT	04N	PRL 92 202002	B. Aubert *et al.*	(BABAR Collab.)	REFID=49929
	AUBERT,B	04L	PRL 93 131804	B. Aubert *et al.*	(BABAR Collab.)	REFID=50087
	ABE	03D	PRL 90 131803	K. Abe *et al.*	(BELLE Collab.)	REFID=49220
	BORNHEIM	03	PR D68 052002	A. Bornheim *et al.*	(CLEO Collab.)	REFID=49546
	SWAIN	03	PR D68 051101	S.K. Swain *et al.*	(BELLE Collab.)	REFID=49545
	ABE	01I	PRL 87 111801	K. Abe *et al.*	(BELLE Collab.)	REFID=48248
	ATHANAS	98	PRL 80 5493	M. Athanas *et al.*	(CLEO Collab.)	REFID=46113

Reference = AAIJ 12O; PL B713 172
Verifier code = LHCB

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PLEASE REPLY WITHIN ONE WEEK

Tim Gershon

EMAIL: T.J.Gershon@warwick.ac.uk

June 4, 2013

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM, STRANGE MESONS ($B = \pm 1$, $S = \mp 1$)

NODE=MXXX046

$B_s^0 = s\overline{b}$, $\overline{B}_s^0 = \overline{s}\,b$, similarly for B_s^*'s

NODE=MXXX046

NODE=S086

B_s^0

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

B_s^0 BRANCHING RATIOS

NODE=S086230

$\Gamma(J/\psi(1S)K_S^0)/\Gamma_{total}$ — Γ_{24}/Γ

NODE=S086R46
NODE=S086R46

	VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
	2.1 ±0.6 OUR AVERAGE Error includes scale factor of 2.1. $[(3.6 \pm 0.8) \times 10^{-5}$ OUR 2012 AVERAGE]				
YOUR DATA	1.89±0.24±0.14	[1] AAIJ	12O	LHCB	pp at 7 TeV
	3.7 ±0.7 ±0.3	[2] AALTONEN	11A	CDF	$p\overline{p}$ at 1.96 TeV

NEW

[1] AAIJ 12O reports $(1.83 \pm 0.21 \pm 0.10 \pm 0.14 \pm 0.07) \times 10^{-5}$ from a measurement of $[\Gamma(B_s^0 \to J/\psi(1S)K_S^0)/\Gamma_{total}]$ / $[B(B^0 \to J/\psi(1S)K^0)] \times [\Gamma(\overline{b} \to B_s^0)/\Gamma(\overline{b} \to B^0)]$ assuming $B(B^0 \to J/\psi(1S)K^0) = (8.71 \pm 0.32) \times 10^{-4}$, $\Gamma(\overline{b} \to B_s^0)/\Gamma(\overline{b} \to B^0) = 0.267^{+0.021}_{-0.02}$, which we rescale to our best values $B(B^0 \to J/\psi(1S)K^0) = (8.73 \pm 0.32) \times 10^{-4}$, $\Gamma(\overline{b} \to B_s^0)/\Gamma(\overline{b} \to B^0) = 0.259 \pm 0.016$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=S086R46;LINKAGE=AI

[2] AALTONEN 11A reports $[\Gamma(B_s^0 \to J/\psi(1S)K_S^0)/\Gamma_{total}] \times [B(\overline{b} \to B_s^0)]$ / $[B(\overline{b} \to B^0)]$ / $[B(B^0 \to J/\psi(1S)K^0)] = 0.0109 \pm 0.0019 \pm 0.0011$ which we multiply or divide by our best values $B(\overline{b} \to B_s^0) = (10.4 \pm 0.6) \times 10^{-2}$, $B(\overline{b} \to B^0) = (40.2 \pm 0.7) \times 10^{-2}$, $B(B^0 \to J/\psi(1S)K^0) = (8.73 \pm 0.32) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=S086R46;LINKAGE=AA

B_s^0 REFERENCES

NODE=S086

YOUR PAPER	AAIJ	12O	PL B713 172	R. Aaij *et al.*	(LHCb Collab.)
	AALTONEN	11A	PR D83 052012	T. Aaltonen *et al.*	(CDF Collab.)

REFID=54188
REFID=53675

Reference = AAIJ 12P; PL B713 369
Verifier code = LHCB

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EMAIL: wmyao@lbl.gov

BOTTOM, STRANGE MESONS ($B = \pm 1$, $S = \mp 1$)

NODE=MXXX046

$B_s^0 = s\overline{b}$, $\overline{B}_s^0 = \overline{s}\,b$, similarly for B_s^*'s

NODE=MXXX046

NODE=S086

B_s^0

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

POLARIZATION IN B_s^0 DECAY

NODE=S086233

Γ_L/Γ in $B_s^0 \to \phi\phi$

NODE=S086P05

VALUE	DOCUMENT ID		TECN	COMMENT
0.361±0.022 OUR AVERAGE [0.35 ± 0.05 OUR 2012 AVERAGE]				
YOUR DATA 0.365±0.022±0.012	AAIJ	12P	LHCB	pp at 7 TeV
0.348±0.041±0.021	AALTONEN	11AN	CDF	$p\overline{p}$ at 1.96 TeV

NODE=S086P05

NEW

$\Gamma_\perp/\Gamma$ in $B_s^0 \to \phi\phi$

NODE=S086P06

VALUE	DOCUMENT ID		TECN	COMMENT
0.306±0.030 OUR AVERAGE Error includes scale factor of 1.3. [0.36 ± 0.05 OUR 2012 AVERAGE]				
YOUR DATA 0.291±0.024±0.010	AAIJ	12P	LHCB	pp at 7 TeV
0.365±0.044±0.027	AALTONEN	11AN	CDF	$p\overline{p}$ at 1.96 TeV

NODE=S086P06

NEW

$\phi_\parallel$ in $B_s^0 \to \phi\phi$

NODE=S086P07

VALUE (rad)	DOCUMENT ID		TECN	COMMENT
2.59±0.15 OUR AVERAGE [2.7 ± 0.4 rad OUR 2012 AVERAGE]				
YOUR DATA 2.57±0.15±0.06	[1] AAIJ	12P	LHCB	pp at 7 TeV
$2.71^{+0.31}_{-0.36}\pm0.22$	[2] AALTONEN	11AN	CDF	$p\overline{p}$ at 1.96 TeV

NODE=S086P07

NEW

[1] AAIJ 12P quotes $\cos\phi_\parallel = -0.844 \pm 0.068 \pm 0.029$ which we convert to $\phi_\parallel$, taking the smaller solution.

NODE=S086P07;LINKAGE=AI

[2] AALTONEN 11AN quotes $\cos\phi_\parallel = -0.91^{+0.15}_{-0.13} \pm 0.09$ which we convert to $\phi_\parallel$ taking the smaller solution.

NODE=S086P07;LINKAGE=AA

B_s^0 REFERENCES

NODE=S086

YOUR PAPER	AAIJ	12P	PL B713 369	R. Aaij *et al.*	(LHCb Collab.)
	AALTONEN	11AN	PRL 107 261802	T. Aaltonen *et al.*	(CDF Collab.)

REFID=54189

REFID=53946

Reference = AAIJ 12Q; PL B713 378
Verifier code = LHCB

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BOTTOM, STRANGE MESONS ($B = \pm 1$, $S = \mp 1$)

NODE=MXXX046

$B_s^0 = s\overline{b}$, $\overline{B}_s^0 = \overline{s}\,b$, similarly for B_s^*'s

NODE=MXXX046

B_s^0

NODE=S086

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

CP VIOLATION PARAMETERS in B_s^0

NODE=S086240

CP Violation phase β_s

NODE=S086PHS

$-2\beta_s$ is the weak phase difference between B_s^0 mixing amplitude and the $B_s^0 \to J/\psi\phi$ decay amplitude. The Standard Model value of β_s is arg$(-\frac{V_{ts}V_{tb}^*}{V_{cs}V_{cb}^*})$.

NODE=S086PHS

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/scaling procedure takes into account correlation between the measurements.

NODE=S086PHS

VALUE (units 10^{-2})	*DOCUMENT ID*	*TECN*	*COMMENT*
4^{+10}_{-13} OUR EVALUATION			
$[0.08^{+0.05}_{-0.07}$ OUR 2012 EVALUATION]			
-1 ± 6 OUR AVERAGE			
$[0.02 \pm 0.11$ OUR 2012 AVERAGE Scale factor $= 1.3]$			
$-11.0 \pm 20.5 \pm 5.0$	[1] AAD	12CV ATLS	pp at 7 TeV
$-8 \pm 9 \pm 3$	[2] AAIJ	12D LHCB	pp at 7 TeV
YOUR DATA $0.95^{+8.70}_{-8.65}{}^{+0.15}_{-0.20}$	[3] AAIJ	12Q LHCB	pp at 7 TeV
	[4] AALTONEN	12AJ CDF	$p\overline{p}$ at 1.96 TeV
28^{+18}_{-19}	[5,6,7] ABAZOV	12D D0	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$22 \pm 22 \pm 1$	[8] AAIJ	12B LHCB	Repl. by AAIJ 12Q
	[9] AALTONEN	12D CDF	Repl. by AALTONEN 12AJ
	[10] AALTONEN	08G CDF	Repl. by AALTONEN 12D
$28^{+12}_{-15}{}^{+4}_{-1}$	[6,11] ABAZOV	08AM D0	Repl. by ABAZOV 12D
$39.5 \pm 28.0^{+0.5}_{-7.0}$	[7,12] ABAZOV	07 D0	Repl. by ABAZOV 07N
35^{+20}_{-24}	[7,13] ABAZOV	07N D0	Repl. by ABAZOV 08AM

NEW;→ UNCHECKED ←

NEW

[1] AAD 12CV reports $\phi_s = -2\,\beta_s = 0.22 \pm 0.41 \pm 0.10$ rad. that was measured using a time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.

NODE=S086PHS;LINKAGE=AD

[2] Reports $\phi_s = -2\,\beta_s = 0.15 \pm 0.18 \pm 0.06$ that was measured using a time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.

NODE=S086PHS;LINKAGE=AJ

[3] Reports $\phi_s = -2\,\beta_s = -0.019^{+0.173}_{-0.174}{}^{+0.004}_{-0.003}$ radians which was measured using a time-dependent fit to $B_s^0 \to J/\psi\pi^+\pi^-$ decays, with the $\pi^+\pi^-$ mass within 775–1550 MeV. Searches for, but finds no evidence, for direct *CP* violation in $B_s^0 \to J/\psi\pi\pi$ decays.

NODE=S086PHS;LINKAGE=IA

[4] AALTONEN 12AJ reports $-\pi/2 < \beta_s < -1.51$ or $-0.06 < \beta_s < 0.30$, or $1.26 < \beta_s < \pi/2$ at 68% CL. Measured using the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.

NODE=S086PHS;LINKAGE=AL

[5] The error includes both statistical and systematic uncertainties.

NODE=S086PHS;LINKAGE=CE

[6] Measured using fully reconstructed $B_s \to J/\psi\phi$ decays.

NODE=S086PHS;LINKAGE=OV

[7] Reports ϕ_s which equals to $-2\beta_s$.

NODE=S086PHS;LINKAGE=RP

[8] Reports $\phi_s = -2\,\beta_s = -0.44 \pm 0.44 \pm 0.02$ that was measured using a time-dependent fit to $B_s^0 \to J/\psi f_0(980)$ decays.

NODE=S086PHS;LINKAGE=AI

[9] Reports $0.02 < \phi_s < 0.52$ or $1.08 < \phi_s < 1.55$ at 68% C.L. confidence regions in the two-dimensional space of ϕ_s and $\Delta\Gamma_{B_s^0}$ from $B_s^0 \to J/\psi\phi$ decays.

NODE=S086PHS;LINKAGE=AT

[10] Reports $0.32 < 2\beta_s < 2.82$ at 68% C.L. and confidence regions in the two-dimensional space of $2\beta_s$ and $\Delta\Gamma$ from the first measurement of $B^0_s \rightarrow J/\psi\phi$ decays using flavor tagging. The probability of a deviation from SM prediction as large as the level of observed data is 15%. NODE=S086PHS;LINKAGE=AA

[11] Reports $\phi_s = -2\,\beta_s$ and obtains 90% CL interval $-0.03 < \beta_s < 0.60$. NODE=S086PHS;LINKAGE=ZV

[12] The first direct measurement of the *CP*-violating mixing phase is reported from the time-dependent analysis of flavor untagged $B^0_s \rightarrow J/\psi\phi$ decays. NODE=S086PHS;LINKAGE=AZ

[13] Combines D0 collaboration measurements of time-dependent angular distributions in $B^0_s \rightarrow J/\psi\phi$ and charge asymmetry in semileptonic decays. There is a 4-fold ambiguity in the solution. NODE=S086PHS;LINKAGE=ZO

B^0_s REFERENCES

NODE=S086

	AAD	12CV	JHEP 1212 072	G. Aad *et al.* (ATLAS Colalb.)	REFID=54785
	AAIJ	12B	PL B707 497	R. Aaij *et al.* (LHCb Collab.)	REFID=54034
	AAIJ	12D	PRL 108 101803	R. Aaij *et al.* (LHCb Collab.)	REFID=54036
YOUR PAPER	AAIJ	12Q	PL B713 378	R. Aaij *et al.* (LHCb Collab.)	REFID=54190
	AALTONEN	12AJ	PRL 109 171802	T. Aaltonen *et al.* (CDF Collab.)	REFID=54598
	AALTONEN	12D	PR D85 072002	T. Aaltonen *et al.* (CDF Collab.)	REFID=54070
	ABAZOV	12D	PR D85 032006	V.M. Abazov *et al.* (D0 Collab.)	REFID=54062
	AALTONEN	08G	PRL 100 161802	T. Aaltonen *et al.* (CDF Collab.)	REFID=52228
	ABAZOV	08AM	PRL 101 241801	V.M. Abazov *et al.* (D0 Collab.)	REFID=52604
	ABAZOV	07	PRL 98 121801	V.M. Abazov *et al.* (D0 Collab.)	REFID=51664
	ABAZOV	07N	PR D76 057101	V.M. Abazov *et al.* (D0 Collab.)	REFID=51936

Reference = AAIJ 12R; PL B716 393
Verifier code = LHCB

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PLEASE REPLY WITHIN ONE WEEK

Tim Gershon

EMAIL: T.J.Gershon@warwick.ac.uk

June 4, 2013

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM, STRANGE MESONS ($B = \pm 1$, $S = \mp 1$)

NODE=MXXX046

$B_s^0 = s\overline{b}$, $\overline{B}_s^0 = \overline{s}\,b$, similarly for B_s^*'s

NODE=MXXX046

B_s^0

NODE=S086

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

B_{sL}^0 MEAN LIFE

NODE=S086TSL

B_{sL}^0 is the light mass state of two B_s^0 CP eigenstates.

NODE=S086TSL

"OUR EVALUATION" has been obtained by the Heavy Flavor Averaging Group (HFAG) using the constraint of the flavor-specific lifetime average in a way similar to $\Delta\Gamma_{B_s^0}/\Gamma_{B_s^0}$.

NODE=S086TSL

VALUE (10^{-12} s)	DOCUMENT ID		TECN	COMMENT
1.428±0.013 OUR EVALUATION				NEW;→ UNCHECKED ←
[(1.393 ± 0.019) × 10^{-12} s OUR 2012 EVALUATION]				
1.45 ±0.04 OUR AVERAGE				NEW
[(1.44 ± 0.10) × 10^{-12} s OUR 2012 AVERAGE]				
1.440±0.096±0.009	[1] AAIJ	12	LHCB	pp at 7 TeV
YOUR DATA 1.455±0.046±0.006	[1] AAIJ	12R	LHCB	pp at 7 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
	[2] AALTONEN	12D	CDF	$p\overline{p}$ at 1.96 TeV
$1.437^{+0.054}_{-0.047}$	[3,4] AALTONEN	08J	CDF	Repl. by AALTONEN 12D
$1.24\ ^{+0.14}_{-0.11}\ ^{+0.01}_{-0.02}$	[4] ABAZOV	05W	D0	Repl. by ABAZOV 08AM
$1.05\ ^{+0.16}_{-0.13}\ \pm 0.02$	[4] ACOSTA	05	CDF	Repl. by AALTONEN 08J
1.27 ±0.33 ±0.08	[5] BARATE	00K	ALEP	$e^+e^- \to Z$

[1] Measured using decays $B_s^0 \to K^+K^-$. NODE=S086TSL;LINKAGE=AI

[2] Uses the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays and assuming CP-violating angle $\beta_s(B^0 \to J/\psi\phi) = 0.02$. NODE=S086TSL;LINKAGE=AT

[3] Obtained from $\Delta\Gamma_s$ and Γ_s fit with a correlation of 0.6. NODE=S086TSL;LINKAGE=AA

[4] Measured using the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays. NODE=S086TSL;LINKAGE=AC

[5] Uses $\phi\phi$ correlations from $B_s^0 \to D_s^{(*)+} D_s^{(*)-}$. NODE=S086TSL;LINKAGE=BA

B_s^0 REFERENCES

NODE=S086

	AAIJ	12	PL B707 349	R. Aaij *et al.*	(LHCb Collab.)	REFID=53982
YOUR PAPER	AAIJ	12R	PL B716 393	R. Aaij *et al.*	(LHCb Collab.)	REFID=54191
	AALTONEN	12D	PR D85 072002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54070
	AALTONEN	08J	PRL 100 121803	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52234
	ABAZOV	08AM	PRL 101 241801	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52604
	ABAZOV	05W	PRL 95 171801	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50929
	ACOSTA	05	PRL 94 101803	D. Acosta *et al.*	(CDF Collab.)	REFID=50519
	BARATE	00K	PL B486 286	R. Barate *et al.*	(ALEPH Collab.)	REFID=47721

Reference = AAIJ 12S; PRL 108 151801
Verifier code = LHCB

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$B_s^0 = s\overline{b}$, $\overline{B}_s^0 = \overline{s}\,b$, similarly for B_s^*'s

NODE=MXXX046

NODE=MXXX046

NODE=S086

B_s^0

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

B_s^0 BRANCHING RATIOS

NODE=S086230

$\Gamma(J/\psi(1S)f_2'(1525))/\Gamma(J/\psi(1S)\phi)$ — Γ_{32}/Γ_{21}

NODE=S086R09
NODE=S086R09

	VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**26.4±3.5±0.7**	[1] AAIJ	12S	LHCB	pp at 7 TeV

[1] AAIJ 12S reports $[(26.4 \pm 2.7 \pm 2.4) \times 10^{-2}$ from a measurement of $\Gamma(B_s^0 \to J/\psi(1S)f_2'(1525))/\Gamma(B_s^0 \to J/\psi(1S)\phi)] \times B(f_2'(1525) \to K^+K^-)$ / $B(\phi(1020) \to K^+K^-)$ assuming $B(f_2'(1525) \to K^+K^-) = (44.4 \pm 1.1) \times 10^{-2}$, $B(\phi(1020) \to K^+K^-) = (48.9 \pm 0.5) \times 10^{-2}$, which we rescale to our best values $B(f_2'(1525) \to K^+K^-) = \frac{1}{2}(88.7 \pm 2.2) \times 10^{-2}$, $B(\phi(1020) \to K^+K^-) = (48.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=S086R09;LINKAGE=AB

B_s^0 REFERENCES

NODE=S086

YOUR PAPER AAIJ 12S PRL 108 151801 R. Aaij *et al.* (LHCb Collab.)

REFID=54213

Reference = AAIJ 12T; PRL 108 161801
Verifier code = LHCB

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BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(\overline{D}^0 K^+\pi^+\pi^-)/\Gamma(\overline{D}^0\pi^+\pi^+\pi^-)$ **Γ_{71}/Γ_{74}**

NODE=S041T93
NODE=S041T93

	VALUE (units 10^{-2})	*DOCUMENT ID*		*TECN*	*COMMENT*
YOUR DATA	**9.4±1.3±0.9**	AAIJ	12T	LHCB	pp at 7 TeV

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER	AAIJ	12T	PRL 108 161801	R. Aaij *et al.*	(LHCb Collab.)

REFID=54214
NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(D^- K^+\pi^+\pi^-)/\Gamma(D^-\pi^+\pi^+\pi^-)$ **Γ_{37}/Γ_{43}**

NODE=S042T98
NODE=S042T98

	VALUE (units 10^{-2})	*DOCUMENT ID*		*TECN*	*COMMENT*
YOUR DATA	**5.9±1.1±0.5**	AAIJ	12T	LHCB	pp at 7 TeV

B^0 REFERENCES

NODE=S042

YOUR PAPER	AAIJ	12T	PRL 108 161801	R. Aaij *et al.*	(LHCb Collab.)

REFID=54214

Reference = AAIJ 12U; PRL 108 181806
Verifier code = LHCB

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NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

PARTIAL BRANCHING FRACTIONS IN $B^0 \to K^{(*)0}\ell^+\ell^-$

NODE=S042240

B($B^0 \to K^{*0}\ell^+\ell^-$) ($q^2 < 2.0$ GeV^2/c^4)

NODE=S042PB1
NODE=S042PB1

	VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
	1.36±0.30 OUR AVERAGE Error includes scale factor of 1.4. [$(1.8 \pm 0.4) \times 10^{-7}$ OUR 2012 AVERAGE]				
YOUR DATA	1.16±0.23±0.11	AAIJ	12U	LHCB	pp at 7 TeV
	1.80±0.36±0.11	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

NEW

B($B^0 \to K^{*0}\ell^+\ell^-$) ($2.0 < q^2 < 4.3$ GeV^2/c^4)

NODE=S042PB2
NODE=S042PB2

	VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
	0.80±0.17 OUR AVERAGE [$(0.84 \pm 0.29) \times 10^{-7}$ OUR 2012 AVERAGE]				
YOUR DATA	0.78±0.21±0.05	AAIJ	12U	LHCB	pp at 7 TeV
	0.84±0.28±0.06	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

NEW

B($B^0 \to K^{*0}\ell^+\ell^-$) ($4.3 < q^2 < 8.68$ GeV^2/c^4)

NODE=S042PB3
NODE=S042PB3

	VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
	2.4 ±0.6 OUR AVERAGE Error includes scale factor of 2.1. [$(1.7 \pm 0.5) \times 10^{-7}$ OUR 2012 AVERAGE]				
YOUR DATA	3.02±0.35±0.22	AAIJ	12U	LHCB	pp at 7 TeV
	1.73±0.43±0.15	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

NEW

B($B^0 \to K^{*0}\ell^+\ell^-$) ($10.09 < q^2 < 12.86$ GeV^2/c^4)

NODE=S042PB4
NODE=S042PB4

	VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
	1.62±0.24 OUR AVERAGE [$(1.8 \pm 0.4) \times 10^{-7}$ OUR 2012 AVERAGE]				
YOUR DATA	1.52±0.25±0.19	AAIJ	12U	LHCB	pp at 7 TeV
	1.77±0.36±0.12	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

NEW

B($B^0 \to K^{*0}\ell^+\ell^-$) ($14.18 < q^2 < 16.0$ GeV^2/c^4)

NODE=S042PB5
NODE=S042PB5

	VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
	1.22±0.17 OUR AVERAGE [$(1.34 \pm 0.27) \times 10^{-7}$ OUR 2012 AVERAGE]				
YOUR DATA	1.15±0.20±0.09	AAIJ	12U	LHCB	pp at 7 TeV
	1.34±0.26±0.08	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

NEW

B($B^0 \to K^{*0}\ell^+\ell^-$) ($16.0 < q^2$ GeV^2/c^4)

NODE=S042PB6
NODE=S042PB6

	VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
	1.22±0.26 OUR AVERAGE Error includes scale factor of 1.4. [$(0.97 \pm 0.27) \times 10^{-7}$ OUR 2012 AVERAGE]				
YOUR DATA	1.50±0.24±0.15	AAIJ	12U	LHCB	pp at 7 TeV
	0.97±0.26±0.07	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

NEW

$B(B^0 \to K^{*0}\ell^+\ell^-)$ $(1.0 < q^2 < 6.0\ \mathrm{GeV}^2/c^4)$

NODE=S042PB7
NODE=S042PB7

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
1.84±0.33 OUR AVERAGE Error includes scale factor of 1.3. [$(1.4 \pm 0.4) \times 10^{-7}$ OUR 2012 AVERAGE]				
YOUR DATA 2.10±0.30±0.15	AAIJ	12U	LHCB	pp at 7 TeV
1.42±0.41±0.12	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

NEW

B^0 REFERENCES

NODE=S042

YOUR PAPER AAIJ	12U	PRL 108 181806	R. Aaij *et al.*	(LHCb Collab.)	REFID=54215
AALTONEN	11AI	PRL 107 201802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53836

$B^\pm/B^0$ ADMIXTURE

NODE=S049

POLARIZATION IN B DECAY

NODE=S049224

In decays involving two vector mesons, one can distinguish among the states in which meson polarizations are both longitudinal (L) or both are transverse and parallel ($\|$) or perpendicular ($\perp$) to each other with the parameters Γ_L/Γ, $\Gamma_\perp/\Gamma$, and the relative phases $\phi_\|$ and $\phi_\perp$. See the definitions in the note on "Polarization in B Decays" review in the B^0 Particle Listings.

NODE=S049224

$F_L(B \to K^*\ell^+\ell^-)$ $(q^2 < 2.0\ \mathrm{GeV}^2/c^2)$

NODE=S049FL3
NODE=S049FL3

VALUE	DOCUMENT ID		TECN	COMMENT
$0.159^{+0.110}_{-0.023}$ OUR AVERAGE Error includes scale factor of 1.2. [0.35 ± 0.17 OUR 2012 AVERAGE]				
YOUR DATA $0.00\ ^{+0.13}_{-0.00}\ \pm0.02$	AAIJ	12U	LHCB	pp at 7 TeV
$0.30\ \pm0.16\ \pm0.02$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.29\ ^{+0.21}_{-0.18}\ \pm0.02$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.53\ ^{+0.32}_{-0.34}\ \pm0.07$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

NEW

$F_L(B \to K^*\ell^+\ell^-)$ $(2.0 < q^2 < 4.3\ \mathrm{GeV}^2/c^2)$

NODE=S049FL4
NODE=S049FL4

VALUE	DOCUMENT ID		TECN	COMMENT
0.68±0.12 OUR AVERAGE [0.60 ± 0.20 OUR 2012 AVERAGE]				
YOUR DATA 0.77±0.15±0.03	AAIJ	12U	LHCB	pp at 7 TeV
$0.37^{+0.25}_{-0.24}\pm0.10$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
0.71±0.24±0.05	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.40^{+0.32}_{-0.33}\pm0.08$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

NEW

$F_L(B \to K^*\ell^+\ell^-)$ $(4.3 < q^2 < 8.6\ \mathrm{GeV}^2/c^2)$

NODE=S049FL5
NODE=S049FL5

VALUE	DOCUMENT ID		TECN	COMMENT
0.61±0.06 OUR AVERAGE [$0.74^{+0.15}_{-0.17}$ OUR 2012 AVERAGE]				
YOUR DATA $0.60^{+0.06}_{-0.07}\pm0.01$	AAIJ	12U	LHCB	pp at 7 TeV
$0.68^{+0.15}_{-0.17}\pm0.09$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.64^{+0.23}_{-0.24}\pm0.07$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.82^{+0.19}_{-0.23}\pm0.07$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

NEW

$F_L(B \to K^*\ell^+\ell^-)$ $(10.09 < q^2 < 12.86\ \mathrm{GeV}^2/c^2)$

NODE=S049FL6
NODE=S049FL6

VALUE	DOCUMENT ID		TECN	COMMENT
0.38±0.08 OUR AVERAGE [0.23 ± 0.12 OUR 2012 AVERAGE]				
YOUR DATA 0.41±0.11±0.03	AAIJ	12U	LHCB	pp at 7 TeV

NEW

$0.47 \pm 0.14 \pm 0.03$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.17^{+0.17}_{-0.15} \pm 0.03$	WEI	09A	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.31^{+0.19}_{-0.18} \pm 0.02$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

$F_L(B \rightarrow K^* \ell^+ \ell^-)$ ($14.18 < q^2 < 16.0$ GeV^2/c^2)

NODE=S049FL7
NODE=S049FL7

VALUE	DOCUMENT ID	TECN	COMMENT
0.30±0.10 OUR AVERAGE Error includes scale factor of 1.2. [0.34 ± 0.31 OUR 2012 AVERAGE Scale factor = 2.1]			NEW
YOUR DATA $0.37 \pm 0.09 \pm 0.05$	AAIJ	12U	LHCB pp at 7 TeV
$0.29^{+0.14}_{-0.13} \pm 0.05$	AALTONEN	12I	CDF $p\overline{p}$ at 1.96 TeV
$-0.15^{+0.27}_{-0.23} \pm 0.07$	WEI	09A	BELL $e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.55^{+0.17}_{-0.18} \pm 0.02$	AALTONEN	11L	CDF Repl. by AALTONEN 12I

$F_L(B \rightarrow K^* \ell^+ \ell^-)$ ($q^2 > 16.0$ GeV^2/c^4)

NODE=S049FL8
NODE=S049FL8

VALUE	DOCUMENT ID	TECN	COMMENT
$0.22^{+0.08}_{-0.07}$ OUR AVERAGE [$0.11^{+0.12}_{-0.10}$ OUR 2012 AVERAGE]			NEW
YOUR DATA $0.26^{+0.10}_{-0.08} \pm 0.03$	AAIJ	12U	LHCB pp at 7 TeV
$0.20^{+0.19}_{-0.17} \pm 0.05$	AALTONEN	12I	CDF $p\overline{p}$ at 1.96 TeV
$0.12^{+0.15}_{-0.13} \pm 0.02$	WEI	09A	BELL $e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.09^{+0.18}_{-0.14} \pm 0.03$	AALTONEN	11L	CDF Repl. by AALTONEN 12I

$F_L(B \rightarrow K^* \ell^+ \ell^-)$ ($1.0 < q^2 < 6.0$ GeV^2/c^4)

NODE=S049FL9
NODE=S049FL9

VALUE	DOCUMENT ID	TECN	COMMENT
0.59±0.09 OUR AVERAGE [0.60 ± 0.18 OUR 2012 AVERAGE]			NEW
YOUR DATA $0.55 \pm 0.10 \pm 0.03$	AAIJ	12U	LHCB pp at 7 TeV
$0.69^{+0.19}_{-0.21} \pm 0.08$	AALTONEN	12I	CDF $p\overline{p}$ at 1.96 TeV
$0.67 \pm 0.23 \pm 0.05$	WEI	09A	BELL $e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.50^{+0.27}_{-0.30} \pm 0.03$	AALTONEN	11L	CDF Repl. by AALTONEN 12I

LEPTON FORWARD-BACKWARD ASYMMETRY IN $B \rightarrow K^{(*)} \ell^+ \ell^-$ DECAY

NODE=S049220

The forward-backward angular asymmetry of the lepton pair in $B \rightarrow K^{(*)} \ell^+ \ell^-$ decay is defined as

NODE=S049220

$$A_{FB}(s) = \frac{N(cos\theta>0) - N(cos\theta<0)}{N(cos\theta>0) + N(cos\theta<0)},$$

where $s = q^2/m_B^2$, and θ is the angle of the lepton with respect to the flight direction of the B meson, measured in the dilepton rest frame. In addition, the fraction of longitudinal polarization F_L of the K^* and F_S, the relative contribution from scalar and pseudoscalar penguin amplitudes in $B \rightarrow K \ell^+ \ell^-$, can be measured from the angular distribution of its decay products.

$A_{FB}(B \rightarrow K^* \ell^+ \ell^-)$ ($q^2 < 2.0$ GeV^2/c^4)

NODE=S049FB5
NODE=S049FB5

VALUE	DOCUMENT ID	TECN	COMMENT
−0.07±0.20 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below. [$0.45^{+0.26}_{-0.30}$ OUR 2012 AVERAGE]			NEW
YOUR DATA $-0.15 \pm 0.20 \pm 0.06$	AAIJ	12U	LHCB pp at 7 TeV

$-0.35^{+0.26}_{-0.23}\pm0.10$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.47^{+0.26}_{-0.32}\pm0.03$	WEI	09A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.13^{+1.65}_{-0.75}\pm0.25$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

$A_{FB}(B \rightarrow K^*\ell^+\ell^-)$ ($2.0 < q^2 < 4.3$ GeV^2/c^4)

NODE=S049FB6
NODE=S049FB6

VALUE	DOCUMENT ID	TECN	COMMENT
$0.10^{+0.14}_{-0.16}$ OUR AVERAGE			
[0.14 ± 0.27 OUR 2012 AVERAGE]			
YOUR DATA $0.05^{+0.16}_{-0.20}\pm0.04$	AAIJ	12U	LHCB pp at 7 TeV
$0.29^{+0.32}_{-0.35}\pm0.15$	AALTONEN	12I	CDF $p\overline{p}$ at 1.96 TeV
$0.11^{+0.31}_{-0.36}\pm0.07$	WEI	09A	BELL $e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.19^{+0.40}_{-0.41}\pm0.14$	AALTONEN	11L	CDF Repl. by AALTONEN 12I

NEW

$A_{FB}(B \rightarrow K^*\ell^+\ell^-)$ ($1.0 < q^2 < 6.0$ GeV^2/c^4)

NODE=S049FBE
NODE=S049FBE

VALUE	DOCUMENT ID	TECN	COMMENT
0.07 ± 0.12 OUR AVERAGE			
[0.32 ± 0.23 OUR 2012 AVERAGE]			
YOUR DATA $-0.06^{+0.13}_{-0.14}\pm0.07$	AAIJ	12U	LHCB pp at 7 TeV
$0.29^{+0.20}_{-0.23}\pm0.07$	AALTONEN	12I	CDF $p\overline{p}$ at 1.96 TeV
$0.26^{+0.27}_{-0.30}\pm0.07$	WEI	09A	BELL $e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.43^{+0.36}_{-0.37}\pm0.06$	AALTONEN	11L	CDF Repl. by AALTONEN 12I

NEW

$A_{FB}(B \rightarrow K^*\ell^+\ell^-)$ ($4.3 < q^2 < 8.6$ GeV^2/c^4)

NODE=S049FB7
NODE=S049FB7

VALUE	DOCUMENT ID	TECN	COMMENT
$0.26^{+0.06}_{-0.07}$ OUR AVERAGE			
[0.24 ± 0.24 OUR 2012 AVERAGE Scale factor = 1.3]			
YOUR DATA $0.27^{+0.06}_{-0.08}\pm0.02$	AAIJ	12U	LHCB pp at 7 TeV
$0.01\pm0.20\pm0.09$	AALTONEN	12I	CDF $p\overline{p}$ at 1.96 TeV
$0.45^{+0.15}_{-0.21}\pm0.15$	WEI	09A	BELL $e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$-0.06^{+0.30}_{-0.28}\pm0.05$	AALTONEN	11L	CDF Repl. by AALTONEN 12I

NEW

$A_{FB}(B \rightarrow K^*\ell^+\ell^-)$ ($10.09 < q^2 < 12.86$ GeV^2/c^4)

NODE=S049FBB
NODE=S049FBB

VALUE	DOCUMENT ID	TECN	COMMENT
$0.33^{+0.08}_{-0.10}$ OUR AVERAGE			
[0.53 ± 0.15 OUR 2012 AVERAGE]			
YOUR DATA $0.27^{+0.11}_{-0.13}\pm0.02$	AAIJ	12U	LHCB pp at 7 TeV
$0.38^{+0.16}_{-0.19}\pm0.09$	AALTONEN	12I	CDF $p\overline{p}$ at 1.96 TeV
$0.43^{+0.18}_{-0.20}\pm0.03$	WEI	09A	BELL $e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.66^{+0.23}_{-0.20}\pm0.07$	AALTONEN	11L	CDF Repl. by AALTONEN 12I

NEW

$A_{FB}(B \rightarrow K^*\ell^+\ell^-)$ ($14.18 < q^2 < 16.0$ GeV^2/c^4)

NODE=S049FBC
NODE=S049FBC

VALUE	DOCUMENT ID	TECN	COMMENT
$0.49^{+0.06}_{-0.08}$ OUR AVERAGE			
[$0.53^{+0.13}_{-0.15}$ OUR 2012 AVERAGE]			
YOUR DATA $0.47^{+0.06}_{-0.08}\pm0.03$	AAIJ	12U	LHCB pp at 7 TeV

NEW

$0.44^{+0.18}_{-0.21}\pm0.10$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.70^{+0.16}_{-0.22}\pm0.10$	WEI	09A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.42\pm0.16\pm0.09$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

$A_{FB}(B \rightarrow K^* \ell^+ \ell^-)$ (q^2 > 16.0 GeV^2/c^4)

NODE=S049FBD
NODE=S049FBD

VALUE	DOCUMENT ID	TECN	COMMENT
$0.39^{+0.15}_{-0.19}$ OUR AVERAGE Error includes scale factor of 1.9. See the ideogram below.			
[$0.67^{+0.10}_{-0.14}$ OUR 2012 AVERAGE]			
YOUR DATA $0.16^{+0.11}_{-0.13}\pm0.06$	AAIJ	12U	LHCB pp at 7 TeV
$0.65^{+0.17}_{-0.18}\pm0.16$	AALTONEN	12I	CDF $p\overline{p}$ at 1.96 TeV
$0.66^{+0.11}_{-0.16}\pm0.04$	WEI	09A	BELL $e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.70^{+0.16}_{-0.25}\pm0.10$	AALTONEN	11L	CDF Repl. by AALTONEN 12I

NEW

$B^\pm/B^0$ ADMIXTURE REFERENCES

NODE=S049

YOUR PAPER

AAIJ	12U	PRL 108 181806	R. Aaij *et al.*	(LHCb Collab.)	REFID=54215
AALTONEN	12I	PRL 108 081807	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54206
AALTONEN	11L	PRL 106 161801	T. Aaltonen *et al.*	(CDF Collab.)	REFID=16443
WEI	09A	PRL 103 171801	J.-T. Wei *et al.*	(BELLE Collab.)	REFID=53061
Also		EPAPS Supplement EPAPS_appendix.pdf		(BELLE Collab.)	REFID=53240;ERROR=6

Reference = AAIJ 12V; PRL 108 201601
Verifier code = LHCB

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PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Tim Gershon

EMAIL: T.J.Gershon@warwick.ac.uk

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

CP VIOLATION PARAMETERS

NODE=S042229

A_{CP} ($B^0 \to K^+\pi^-$)

NODE=S042ACP

	VALUE	DOCUMENT ID		TECN	COMMENT
	-0.087 ± 0.008 OUR AVERAGE				
	[-0.097 ± 0.012 OUR 2012 AVERAGE]				
	$-0.069 \pm 0.014 \pm 0.007$	DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
	$-0.107 \pm 0.016 {}^{+0.006}_{-0.004}$	LEES	13D	BABAR	$e^+e^- \to \Upsilon(4S)$
YOUR DATA	$-0.088 \pm 0.011 \pm 0.008$	AAIJ	12V	LHCB	pp at 7 TeV
	$-0.086 \pm 0.023 \pm 0.009$	AALTONEN	11N	CDF	$p\overline{p}$ at 1.96 TeV
	-0.04 ± 0.16	[1] CHEN	00	CLE2	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	$-0.094 \pm 0.018 \pm 0.008$	LIN	08	BELL	Repl. by DUH 13
	$-0.107 \pm 0.018 {}^{+0.007}_{-0.004}$	AUBERT	07AF	BABR	Repl. by LEES 13D
	$-0.013 \pm 0.078 \pm 0.012$	ABULENCIA,A	06D	CDF	Repl. by AALTONEN 11N
	$-0.088 \pm 0.035 \pm 0.013$	[2] CHAO	05A	BELL	Repl. by CHAO 04B
	$-0.133 \pm 0.030 \pm 0.009$	[3] AUBERT,B	04K	BABR	Repl. by AUBERT 07AF
	$-0.101 \pm 0.025 \pm 0.005$	[4] CHAO	04B	BELL	Repl. by LIN 08
	$-0.07 \pm 0.08 \pm 0.02$	[5] AUBERT	02D	BABR	Repl. by AUBERT 02Q
	$-0.102 \pm 0.050 \pm 0.016$	[6] AUBERT	02Q	BABR	Repl. by AUBERT,B 04K
	$-0.06 \pm 0.09 {}^{+0.01}_{-0.02}$	[7] CASEY	02	BELL	Repl. by CHAO 04B
	$0.044 {}^{+0.186}_{-0.167} {}^{+0.018}_{-0.021}$	[8] ABE	01K	BELL	Repl. by CASEY 02
	$-0.19 \pm 0.10 \pm 0.03$	[9] AUBERT	01E	BABR	Repl. by AUBERT 02Q

NEW

[1] Corresponds to 90% confidence range $-0.30 < A_{CP} < 0.22$. NODE=S042ACP;LINKAGE=AA

[2] Corresponds to a 90% CL interval of $-0.15 < A_{CP} < -0.03$. NODE=S042ACP;LINKAGE=CO

[3] Based on a total signal yield of $N(K^-\pi^+) + N(K^+\pi^-) = 1606 \pm 51$ events. NODE=S042ACP;LINKAGE=AU

[4] CHAO 04B reports significance of 3.9 standard deviation for deviation of A_{CP} from zero. NODE=S042ACP;LINKAGE=CH

[5] Corresponds to 90% confidence range $-0.21 < A_{CP} < 0.07$. NODE=S042ACP;LINKAGE=AD

[6] Corresponds to 90% confidence range $-0.188 < A_{CP} < -0.016$. NODE=S042ACP;LINKAGE=BR

[7] Corresponds to 90% confidence range $-0.21 < A_{CP} < +0.09$. NODE=S042ACP;LINKAGE=CA

[8] Corresponds to 90% confidence range $-0.25 < A_{CP} < 0.37$. NODE=S042ACP;LINKAGE=AX

[9] Corresponds to 90% confidence range $-0.35 < A_{CP} < -0.03$. NODE=S042ACP;LINKAGE=L3

B^0 REFERENCES

NODE=S042

DUH	13	PR D87 031103	Y. T. Duh *et al.*	(Belle)	REFID=54957
LEES	13D	PR D87 052009	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54958
YOUR PAPER AAIJ	12V	PRL 108 201601	R. Aaij *et al.*	(LHCb Collab.)	REFID=54216
AALTONEN	11N	PRL 106 181802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=16447
LIN	08	NAT 452 332	S.-W. Lin *et al.*	(BELLE Collab.)	REFID=52509
AUBERT	07AF	PRL 99 021603	B. Aubert *et al.*	(BABAR Collab.)	REFID=51861
ABULENCIA,A	06D	PRL 97 211802	A. Abulencia *et al.*	(CDF Collab.)	REFID=51490
CHAO	05A	PR D71 031502	Y. Chao *et al.*	(BELLE Collab.)	REFID=50619

AUBERT,B	04K	PRL 93 131801	B. Aubert *et al.*	(BABAR Collab.)	REFID=50084
CHAO	04B	PRL 93 191802	Y. Chao *et al.*	(BELLE Collab.)	REFID=50272
AUBERT	02D	PR D65 051502	B. Aubert *et al.*	(BaBar Collab.)	REFID=48635
AUBERT	02Q	PRL 89 281802	B. Aubert *et al.*	(BaBar Collab.)	REFID=49243
CASEY	02	PR D66 092002	B.C.K. Casey *et al.*	(BELLE Collab.)	REFID=49071
ABE	01K	PR D64 071101	K. Abe *et al.*	(BELLE Collab.)	REFID=48367
AUBERT	01E	PRL 87 151802	B. Aubert *et al.*	(BaBar Collab.)	REFID=48378
CHEN	00	PRL 85 525	S. Chen *et al.*	(CLEO Collab.)	REFID=47669

BOTTOM, STRANGE MESONS ($B = \pm 1$, $S = \mp 1$)

NODE=MXXX046

$B^0_s = s\overline{b}$, $\overline{B}^0_s = \overline{s}\,b$, similarly for B^*_s's

NODE=MXXX046

NODE=S086

B^0_s

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

CP VIOLATION PARAMETERS in B^0_s

NODE=S086240

$A_{CP}(B_s \to \pi^+ K^-)$

NODE=S086CP1

A_{CP} is defined as

NODE=S086CP1

$$\frac{B(\overline{B}^0_s \to f) - B(B^0_s \to \overline{f})}{B(\overline{B}^0_s \to f) + B(B^0_s \to \overline{f})},$$

the *CP*-violation asymmetry of exclusive B^0_s and $\overline{B}^0_s$ decay.

NODE=S086CP1

	VALUE	DOCUMENT ID		TECN	COMMENT
	0.29±0.07 OUR AVERAGE				
	[0.39 ± 0.17 OUR 2012 AVERAGE]				
YOUR DATA	0.27±0.08±0.02	AAIJ	12V	LHCB	pp at 7 TeV
	0.39±0.15±0.08	AALTONEN	11N	CDF	$p\overline{p}$ at 1.96 TeV

NEW

B^0_s REFERENCES

NODE=S086

YOUR PAPER	AAIJ	12V	PRL 108 201601	R. Aaij *et al.*	(LHCb Collab.)	REFID=54216
	AALTONEN	11N	PRL 106 181802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=16447

Reference = AAIJ 12W; PRL 108 231801
Verifier code = LHCB

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June 4, 2013

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(\mu^+\mu^-)/\Gamma_{total}$ — Γ_{455}/Γ

NODE=S042R7

Test for ΔB=1 weak neutral current. Allowed by higher-order electroweak interactions.

NODE=S042R7

NODE=S042R7

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<8.0 \times 10^{-10}$ (CL = 90%)		[$<1.4 \times 10^{-9}$ (CL = 90%) OUR 2012 BEST LIMIT]			
$<0.80 \times 10^{-9}$	90	[1] AAIJ	13B	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.6 \times 10^{-9}$	90	[1] AAIJ	12A	LHCB	Repl. by AAIJ 12W
YOUR DATA $<0.81 \times 10^{-9}$	90	[2] AAIJ	12W	LHCB	Repl. by AAIJ 13B
$<1.4 \times 10^{-9}$	90	[2] CHATRCHYAN	12A	CMS	pp at 7 TeV
$<1.2 \times 10^{-8}$	90	[3] AAIJ	11B	LHCB	Repl. by AAIJ 12A
$<5.0 \times 10^{-9}$	90	[2] AALTONEN	11AG	CDF	$p\overline{p}$ at 1.96 TeV
$<3.7 \times 10^{-9}$	90	[2] CHATRCHYAN	11T	CMS	Repl. by CHATRCHYAN 12A
$<1.5 \times 10^{-8}$	90	[4] AALTONEN	08I	CDF	Repl. by AALTONEN 11AG
$<5.2 \times 10^{-8}$	90	[5] AUBERT	08P	BABR	$e^+e^- \to \Upsilon(4S)$
$<3.9 \times 10^{-8}$	90	[6] ABULENCIA	05	CDF	Repl. by AALTONEN 08I
$<8.3 \times 10^{-8}$	90	[5] AUBERT	05W	BABR	$e^+e^- \to \Upsilon(4S)$
$<1.5 \times 10^{-7}$	90	[7] ACOSTA	04D	CDF	$p\overline{p}$ at 1.96 TeV
$<1.6 \times 10^{-7}$	90	[5] CHANG	03	BELL	$e^+e^- \to \Upsilon(4S)$
$<6.1 \times 10^{-7}$	90	[5] BERGFELD	00B	CLE2	$e^+e^- \to \Upsilon(4S)$
$<4.0 \times 10^{-5}$	90	ABBOTT	98B	D0	$p\overline{p}$ 1.8 TeV
$<6.8 \times 10^{-7}$	90	[8] ABE	98	CDF	$p\overline{p}$ at 1.8 TeV
$<1.0 \times 10^{-5}$	90	[9] ACCIARRI	97B	L3	$e^+e^- \to Z$
$<1.6 \times 10^{-6}$	90	[10] ABE	96L	CDF	Repl. by ABE 98
$<5.9 \times 10^{-6}$	90	AMMAR	94	CLE2	$e^+e^- \to \Upsilon(4S)$
$<8.3 \times 10^{-6}$	90	[11] ALBAJAR	91C	UA1	$E^{p\overline{p}}_{cm}$= 630 GeV
$<1.2 \times 10^{-5}$	90	[12] ALBAJAR	91C	UA1	$E^{p\overline{p}}_{cm}$= 630 GeV
$<4.3 \times 10^{-5}$	90	[13] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$
$<4.5 \times 10^{-5}$	90	[14] ALBRECHT	87D	ARG	$e^+e^- \to \Upsilon(4S)$
$<7.7 \times 10^{-5}$	90	[15] AVERY	87	CLEO	$e^+e^- \to \Upsilon(4S)$
$<2 \times 10^{-4}$	90	GILES	84	CLEO	Repl. by AVERY 87

OCCUR=2

[1] Uses B($B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+$) = $(6.01 \pm 0.21) \times 10^{-5}$ and B($B^0 \to K^+\pi^-$) = $(1.94 \pm 0.06) \times 10^{-5}$ for normalization. NODE=S042R7;LINKAGE=AJ

[2] Uses B($B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+$) = $(6.01 \pm 0.21) \times 10^{-5}$. NODE=S042R7;LINKAGE=AT

[3] Uses B production ratio f($\overline{b} \to B^+$)/f($\overline{b} \to B^0_s$) = 3.71 ± 0.47 and three normalization modes. NODE=S042R7;LINKAGE=AI

[4] Uses B($B^+ \to J/\psi K^+$) B($J/\psi \to \mu^+\mu^-$) = $(5.94 \pm 0.21) \times 10^{-5}$. NODE=S042R7;LINKAGE=AA

[5] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042R7;LINKAGE=EP

[6] Uses B($B^+ \to J/\psi K^+$) B($J/\psi \to \mu^+\mu^-$) = $(5.88 \pm 0.26) \times 10^{-5}$. NODE=S042R7;LINKAGE=AL

[7] Assumes production cross-section $\sigma(B_s)/\sigma(B^+) = 0.100/0.391$ and the CDF measured value of $\sigma(B^+) = 3.6 \pm 0.6$ μb. NODE=S042R7;LINKAGE=AC

[8] ABE 98 assumes production of $\sigma(B^0) = \sigma(B^+)$ and $\sigma(B_s)/\sigma(B^0) = 1/3$. They normalize to their measured $\sigma(B^0, p_T(B) > 6, |y| < 1.0) = 2.39 \pm 0.32 \pm 0.44\,\mu$b. NODE=S042R7;LINKAGE=C

[9] ACCIARRI 97B assume PDG 96 production fractions for B^+, B^0, B_s, and Λ_b. NODE=S042R7;LINKAGE=BQ

[10] ABE 96L assumes equal B^0 and B^+ production. They normalize to their measured $\sigma(B^+, p_T(B) > 6$ GeV/c, $|y| < 1) = 2.39 \pm 0.54\,\mu$b. NODE=S042R7;LINKAGE=PA

[11] B^0 and B^0_s are not separated. NODE=S042R7;LINKAGE=A

[12] Obtained from unseparated B^0 and B^0_s measurement by assuming a B^0:B^0_s ratio 2:1. NODE=S042R7;LINKAGE=B

[13] AVERY 89B reports $< 5 \times 10^{-3}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%. NODE=S042R7;LINKAGE=A1

[14] ALBRECHT 87D reports $< 5 \times 10^{-5}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%. NODE=S042R7;LINKAGE=W

[15] AVERY 87 reports $< 9 \times 10^{-5}$ assuming the $\Upsilon(4S)$ decays 40% to $B^0\overline{B}^0$. We rescale to 50%. NODE=S042R7;LINKAGE=Y

B^0 REFERENCES

NODE=S042

	AAIJ	13B	PRL 110 021801	R. Aaij *et al.*	(LHCb Collab.)	REFID=54767
	AAIJ	12A	PL B708 55	R. Aaij *et al.*	(LHCb Collab.)	REFID=54033
YOUR PAPER	AAIJ	12W	PRL 108 231801	R. Aaij *et al.*	(LHCb Collab.)	REFID=54217
	CHATRCHYAN	12A	JHEP 1204 033	S. Chatrchyan *et al.*	(CMS Collab.)	REFID=54060
	AAIJ	11B	PL B699 330	R. Aaij *et al.*	(LHCb Collab.)	REFID=16667
	AALTONEN	11AG	PRL 107 191801	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53834
	Also		PRL 107 239903 (errat)	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54005
	CHATRCHYAN	11T	PRL 107 191802	S. Chatrchyan *et al.*	(CMS Collab.)	REFID=53839
	AALTONEN	08I	PRL 100 101802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52233
	AUBERT	08P	PR D77 032007	B. Aubert *et al.*	(BABAR Collab.)	REFID=52225
	ABULENCIA	05	PRL 95 221805	A. Abulencia *et al.*	(CDF Collab.)	REFID=50950
	Also		PRL 95 249905 (errat)	A. Abulencia *et al.*	(CDF Collab.)	REFID=51015
	AUBERT	05W	PRL 94 221803	B. Aubert *et al.*	(BABAR Collab.)	REFID=50658
	ACOSTA	04D	PRL 93 032001	D. Acosta *et al.*	(CDF Collab.)	REFID=49995
	CHANG	03	PR D68 111101	M.-C. Chang *et al.*	(BELLE Collab.)	REFID=49640
	BERGFELD	00B	PR D62 091102	T. Bergfeld *et al.*	(CLEO Collab.)	REFID=47814
	ABBOTT	98B	PL B423 419	B. Abbott *et al.*	(D0 Collab.)	REFID=45868
	ABE	98	PR D57 R3811	F. Abe *et al.*	(CDF Collab.)	REFID=45879
	ACCIARRI	97B	PL B391 474	M. Acciarri *et al.*	(L3 Collab.)	REFID=45248
	ABE	96L	PRL 76 4675	F. Abe *et al.*	(CDF Collab.)	REFID=44807
	PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495
	AMMAR	94	PR D49 5701	R. Ammar *et al.*	(CLEO Collab.)	REFID=43736
	ALBAJAR	91C	PL B262 163	C. Albajar *et al.*	(UA1 Collab.)	REFID=41551
	AVERY	89B	PL B223 470	P. Avery *et al.*	(CLEO Collab.)	REFID=40820
	ALBRECHT	87D	PL B199 451	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=40325
	AVERY	87	PL B183 429	P. Avery *et al.*	(CLEO Collab.)	REFID=40387
	GILES	84	PR D30 2279	R. Giles *et al.*	(CLEO Collab.)	REFID=11570

BOTTOM, STRANGE MESONS
($B = \pm 1$, $S = \mp 1$)

NODE=MXXX046

$B^0_s = s\overline{b}$, $\overline{B}^0_s = \overline{s}\,b$, similarly for B^*_s's

NODE=MXXX046

NODE=S086

B^0_s

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

B^0_s BRANCHING RATIOS

NODE=S086230

$\Gamma(\mu^+\mu^-)/\Gamma_{total}$ — Γ_{51}/Γ

NODE=S086R14

Test for $\Delta B = 1$ weak neutral current.

NODE=S086R14

NODE=S086R14

VALUE (units 10^{-9})	CL%	DOCUMENT ID		TECN	COMMENT
$\mathbf{3.2^{+1.4}_{-1.2}{}^{+0.5}_{-0.3}}$		[1] AAIJ	13B	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<$ 19	90	[2] AAD	12AE	ATLS	pp at 7 TeV
$<$ 12	90	[3] AAIJ	12A	LHCB	Repl. by AAIJ 12W
YOUR DATA $<$ 3.8	90	[4] AAIJ	12W	LHCB	Repl. by AAIJ 13B
$<$ 6.4	90	[5] CHATRCHYAN	12A	CMS	pp at 7 TeV
$<$ 43	90	[6] AAIJ	11B	LHCB	Repl. by AAIJ 12A
$<$ 35	90	[7] AALTONEN	11AG	CDF	$p\overline{p}$ at 1.96 TeV
$<$ 16	90	[8] CHATRCHYAN	11T	CMS	Repl. by CHATRCHYAN 12A
$<$ 42	90	[9] ABAZOV	10S	D0	$p\overline{p}$ at 1.96 TeV

< 47	90	[9] AALTONEN	08I	CDF	Repl. by AALTONEN 11AG
< 94	90	[10] ABAZOV	07Q	D0	Repl. by ABAZOV 10S
< 410	90	[11] ABAZOV	05E	D0	$p\overline{p}$ at 1.96 TeV
< 150	90	[12] ABULENCIA	05	CDF	$p\overline{p}$ at 1.96 TeV
< 580	90	[13] ACOSTA	04D	CDF	$p\overline{p}$ at 1.96 TeV
< 2000	90	[14] ABE	98	CDF	$p\overline{p}$ at 1.8 TeV
<38000	90	[15] ACCIARRI	97B	L3	$e^+e^- \rightarrow Z$
< 8400	90	[16] ABE	96L	CDF	Repl. by ABE 98

[1] Uses B production ratio f($\overline{b} \rightarrow B^0_s$)/f$\overline{b} \rightarrow B^0_d$ = 0.256 ± 0.020 and two normalization modes: B($B^+ \rightarrow J/\psi K^+ \rightarrow \mu^+\mu^- K^+$) = (6.01 ± 0.21) × 10^{-5} and B($B^0 \rightarrow K^+\pi^-$) = (1.94 ± 0.06) × 10^{-5}. NODE=S086R14;LINKAGE=A

[2] Uses B production ratio f($\overline{b} \rightarrow B^+$)/f($\overline{b} \rightarrow B^0_s$) = 3.75±0.29 and B($B^+ \rightarrow J/\psi K^+ \rightarrow \mu^+\mu^- K^+$) = (6.0 ± 0.2) × 10^{-5}. NODE=S086R14;LINKAGE=AD

[3] Uses B production ratio f($\overline{b} \rightarrow B^0_s$)/f($\overline{b} \rightarrow B^0_d$) = $0.267^{+0.021}_{-0.020}$ and three normalization modes B($B^+ \rightarrow J/\psi K^+ \rightarrow \mu^+\mu^- K^+$) = (6.01 ± 0.21) × 10^{-5}, B($B^0 \rightarrow K^+\pi^-$) = (1.94 ± 0.06) × 10^{-5}, and B($B^0_s \rightarrow J/\psi\phi \rightarrow \mu^+\mu^- K^+K^-$) = (3.4 ± 0.9) × 10^{-5}. NODE=S086R14;LINKAGE=AJ

[4] Uses B production ratio f($\overline{b} \rightarrow B^0_s$)/f($\overline{b} \rightarrow B^0_d$) = $0.267^{+0.021}_{-0.020}$ and three normalization modes of $B^+ \rightarrow J/\psi K^+$, $B^0 \rightarrow K^+\pi^-$, and $B^0_s \rightarrow J/\psi\phi$. NODE=S086R14;LINKAGE=IJ

[5] Uses f_s/f_u = 0.267±0.021 and B($B^+ \rightarrow J/\psi K^+ \rightarrow \mu^+\mu^- K^+$) = (6.0±0.2)×$10^{-5}$. NODE=S086R14;LINKAGE=CA

[6] Uses B production ratio f($\overline{b} \rightarrow B^+$)/f($\overline{b} \rightarrow B^0_s$) = 3.71 ± 0.47 and three normalization modes. NODE=S086R14;LINKAGE=AI

[7] Uses B production ratio f($\overline{b} \rightarrow B^+$)/f($\overline{b} \rightarrow B^0_s$) = 3.55±0.47 and B($B^+ \rightarrow J/\psi K^+ \rightarrow \mu^+\mu^- K^+$) = (6.01 ± 0.21) × 10^{-5}. NODE=S086R14;LINKAGE=AT

[8] Uses B production ratio f($\overline{b} \rightarrow B^+$)/f($\overline{b} \rightarrow B^0_s$) = 3.55±0.42 and B($B^+ \rightarrow J/\psi K^+ \rightarrow \mu^+\mu^- K^+$) = (6.0 ± 0.2) × 10^{-5}. NODE=S086R14;LINKAGE=CH

[9] Uses B production ratio f($\overline{b} \rightarrow B^+$)/f($\overline{b} \rightarrow B^0_s$) = 3.86 ± 0.59, and the number of $B^+ \rightarrow J/\psi K^+$ decays. NODE=S086R14;LINKAGE=AA

[10] Uses B production ratio f($\overline{b} \rightarrow B^+$)/f($\overline{b} \rightarrow B^0_s$) = 3.86 ± 0.54 and the number of $B^+ \rightarrow J/\psi K^+$ decays. NODE=S086R14;LINKAGE=ZO

[11] Assumes production cross-section $\sigma(B_s)/\sigma(B^+)$ = 0.270 ± 0.034. NODE=S086R14;LINKAGE=AB

[12] Assumes production cross section $\sigma(B^+)/\sigma(B_s)$ = 3.71±0.41 and B($B^+ \rightarrow J/\psi K^+ \rightarrow \mu^+\mu^- K^+$) = (5.88 ± 0.26) × 10^{-5}. NODE=S086R14;LINKAGE=AL

[13] Assumes production cross-section $\sigma(B_s)/\sigma(B^+)$ = 0.100/0.391 and the CDF measured value of $\sigma(B^+)$ = 3.6 ± 0.6 μb. NODE=S086R14;LINKAGE=AC

[14] ABE 98 assumes production of $\sigma(B^0) = \sigma(B^+)$ and $\sigma(B_s)/\sigma(B^0)$ = 1/3. They normalize to their measured $\sigma(B^0, p_T(B) > 6, |y| < 1.0)$ = 2.39 ± 0.32 ± 0.44 μb. NODE=S086R14;LINKAGE=C

[15] ACCIARRI 97B assume PDG 96 production fractions for B^+, B^0, B_s, and Λ_b. NODE=S086R14;LINKAGE=BQ

[16] ABE 96L assumes B^+/B_s production ratio 3/1. They normalize to their measured $\sigma(B^+, p_T(B) > 6$ GeV/c, $|y| < 1)$ = 2.39 ± 0.54 μb. NODE=S086R14;LINKAGE=PA

B^0_s REFERENCES

NODE=S086

AAIJ	13B	PRL 110 021801	R. Aaij *et al.*	(LHCb Collab.)	REFID=54767
AAD	12AE	PL B713 387	G. Aad *et al.*	(ATLAS Collab.)	REFID=54194
AAIJ	12A	PL B708 55	R. Aaij *et al.*	(LHCb Collab.)	REFID=54033
YOUR PAPER AAIJ	12W	PRL 108 231801	R. Aaij *et al.*	(LHCb Collab.)	REFID=54217
CHATRCHYAN	12A	JHEP 1204 033	S. Chatrchyan *et al.*	(CMS Collab.)	REFID=54060
AAIJ	11B	PL B699 330	R. Aaij *et al.*	(LHCb Collab.)	REFID=16667
AALTONEN	11AG	PRL 107 191801	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53834
Also		PRL 107 239903 (errat)	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54005
CHATRCHYAN	11T	PRL 107 191802	S. Chatrchyan *et al.*	(CMS Collab.)	REFID=53839
ABAZOV	10S	PL B693 539	V.M. Abazov *et al.*	(D0 Collab.)	REFID=53481
AALTONEN	08I	PRL 100 101802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52233
ABAZOV	07Q	PR D76 092001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52002
ABAZOV	05E	PRL 94 071802	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50575
ABULENCIA	05	PRL 95 221805	A. Abulencia *et al.*	(CDF Collab.)	REFID=50950
Also		PRL 95 249905 (errat)	A. Abulencia *et al.*	(CDF Collab.)	REFID=51015
ACOSTA	04D	PRL 93 032001	D. Acosta *et al.*	(CDF Collab.)	REFID=49995
ABE	98	PR D57 R3811	F. Abe *et al.*	(CDF Collab.)	REFID=45879
ACCIARRI	97B	PL B391 474	M. Acciarri *et al.*	(L3 Collab.)	REFID=45248
ABE	96L	PRL 76 4675	F. Abe *et al.*	(CDF Collab.)	REFID=44807
PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495

Reference = AAIJ 12Y; PRL 108 251802
Verifier code = LHCB

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PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Tim Gershon

EMAIL: T.J.Gershon@warwick.ac.uk

June 4, 2013

Dear Colleague,

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM, CHARMED MESONS ($B = C = \pm 1$)

NODE=MXXX049

$B_c^+ = c\overline{b}$, $B_c^- = \overline{c}\,b$, similarly for B_c^*'s

NODE=MXXX049

NODE=S091

$B_c^\pm$

$I(J^P) = 0(0^-)$
I, J, P need confirmation.

Quantum numbers shown are quark-model predictions.

NODE=S091

B_c^+ BRANCHING RATIOS

NODE=S091225

$\Gamma(J/\psi(1S)\pi^+\pi^+\pi^-)/\Gamma_{total} \times B(\overline{b} \to B_c)$ — $\Gamma_3/\Gamma \times B$

NODE=S091R3
NODE=S091R3

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	seen		AAIJ	12Y	LHCB	pp at 7 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	$<5.7 \times 10^{-4}$	90	[16] ABREU	97E	DLPH	$e^+e^- \to Z$

[16] ABREU 97E value listed is independent of 0.4 ps$< \tau_{B_c} <$ 1.4 ps.

NODE=S091R3;LINKAGE=A

$\Gamma(J/\psi(1S)\pi^+\pi^+\pi^-)/\Gamma(J/\psi(1S)\pi^+)$ — Γ_3/Γ_2

NODE=S091R01
NODE=S091R01

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**2.41±0.30±0.33**	AAIJ	12Y	LHCB	pp at 7 TeV

$B_c^\pm$ REFERENCES

NODE=S091

YOUR PAPER	AAIJ	12Y	PRL 108 251802	R. Aaij *et al.*	(LHCb Collab.)
	ABREU	97E	PL B398 207	P. Abreu *et al.*	(DELPHI Collab.)

REFID=54219
REFID=45322

Reference = AAIJ 12AA; PR D85 091103
Verifier code = LHCB

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EMAIL: T.J.Gershon@warwick.ac.uk

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(X(4140)K^+, X \to J/\psi(1S)\phi)/\Gamma(J/\psi(1S)\phi K^+)$ **$\Gamma_{217}/\Gamma_{216}$**

NODE=S041T94
NODE=S041T94

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<0.07**	90	[1] AAIJ	12AA	LHCB	pp at 7 TeV

[1] Branching fractions are normalized to 382 ± 22 events of $B^+ \to J/\psi\phi K^+$.

NODE=S041T94;LINKAGE=AA

$\Gamma(X(4274)K^+, X \to J/\psi(1S)\phi)/\Gamma(J/\psi(1S)\phi K^+)$ **$\Gamma_{218}/\Gamma_{216}$**

NODE=S041T95
NODE=S041T95

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<0.08**	90	[1] AAIJ	12AA	LHCB	pp at 7 TeV

[1] Branching fractions are normalized to 382 ± 22 events of $B^+ \to J/\psi\phi K^+$.

NODE=S041T95;LINKAGE=AA

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER AAIJ 12AA PR D85 091103 R. Aaij *et al.* (LHCb Collab.)

REFID=54263

Reference = AAIJ 12AC; PR D85 091105
Verifier code = LHCB

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Tim Gershon

EMAIL: T.J.Gershon@warwick.ac.uk

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FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(J/\psi(1S)\pi^+)/\Gamma(J/\psi(1S)K^+)$ — $\Gamma_{222}/\Gamma_{208}$

NODE=S041S97

NODE=S041S97

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
4.0 ±0.4 OUR AVERAGE Error includes scale factor of 3.2. [0.052 ± 0.004 OUR 2012 AVERAGE]					
YOUR DATA 3.83±0.11±0.07		AAIJ	12AC	LHCB	pp at 7 TeV
4.86±0.82±0.15		ABULENCIA	09	CDF	$p\overline{p}$ at 1.96 TeV
5.37±0.45±0.11		AUBERT	04P	BABR	$e^+e^- \to \Upsilon(4S)$
$5.0\ ^{+1.9}_{-1.7}\ \pm0.1$		ABE	96R	CDF	$p\overline{p}$ 1.8 TeV
5.2 ±2.4		BISHAI	96	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3.91±0.78±0.19		AUBERT	02F	BABR	Repl. by AUBERT 04P
4.3 ±2.3	5	[1] ALEXANDER	95	CLE2	Sup. by BISHAI 96

[1] Assumes equal production of B^+B^- and $B^0\overline{B}^0$ on $\Upsilon(4S)$.

NODE=S041S97;LINKAGE=A

$\Gamma(\psi(2S)\pi^+)/\Gamma(\psi(2S)K^+)$ — $\Gamma_{230}/\Gamma_{231}$

NODE=S041C09

NODE=S041C09

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
3.97±0.29 OUR AVERAGE [(4.0 ± 0.4) × 10^{-2} OUR 2012 AVERAGE]				
YOUR DATA 3.95±0.40±0.12	AAIJ	12AC	LHCB	pp at 7 TeV
3.99±0.36±0.17	BHARDWAJ	08	BELL	$e^+e^- \to \Upsilon(4S)$

NEW

CP VIOLATION

NODE=S041220

A_{CP} is defined as

NODE=S041220

$$\frac{B(B^- \to \overline{f}) - B(B^+ \to f)}{B(B^- \to \overline{f}) + B(B^+ \to f)},$$

the CP-violation charge asymmetry of exclusive B^- and B^+ decay.

$A_{CP}(B^+ \to J/\psi(1S)\pi^+)$

NODE=S041AX9

NODE=S041AX9

VALUE	DOCUMENT ID		TECN	COMMENT
0.007±0.033 OUR AVERAGE Error includes scale factor of 1.3. See the ideogram below. [0.01 ± 0.07 OUR 2012 AVERAGE Scale factor = 1.3]				
YOUR DATA 0.005±0.027±0.011	[1] AAIJ	12AC	LHCB	pp at 7 TeV
−0.09 ±0.08 ±0.03	[2] ABAZOV	08O	D0	$p\overline{p}$ at 1.96 TeV
0.123±0.085±0.004	AUBERT	04P	BABR	$e^+e^- \to \Upsilon(4S)$
−0.023±0.164±0.015	ABE	03B	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.01 ±0.22 ±0.01	AUBERT	02F	BABR	Repl. by AUBERT 04P

NEW

[1] Uses $A_{CP}(B^+ \to J/\psi K^+) = 0.001 \pm 0.007$ to extract production asymmetry.

NODE=S041AX9;LINKAGE=AA

[2] Uses $J/\psi \to \mu^+\mu^-$ decay.

NODE=S041AX9;LINKAGE=AZ

$A_{CP}(B^+ \to \psi(2S)\pi^+)$

NODE=S041AZ2

VALUE	DOCUMENT ID		TECN	COMMENT
0.03 ±0.06 OUR AVERAGE [0.02 ± 0.09 OUR 2012 AVERAGE]				
YOUR DATA 0.048±0.090±0.011	[1] AAIJ	12AC	LHCB	pp at 7 TeV
0.022±0.085±0.016	BHARDWAJ	08	BELL	$e^+e^- \to \Upsilon(4S)$

NODE=S041AZ2
NEW

[1] Uses $A_{CP}(B^+ \to J/\psi K^+) = 0.001 \pm 0.007$ to extract production asymmetry.

NODE=S041AZ2;LINKAGE=AA

$A_{CP}(B^+ \to \psi(2S)K^+)$

NODE=S041AX2

VALUE	DOCUMENT ID		TECN	COMMENT
0.008±0.021 OUR AVERAGE Error includes scale factor of 1.6. See the ideogram below. [−0.025 ± 0.024 OUR 2012 AVERAGE]				
YOUR DATA 0.024±0.014±0.008	[1] AAIJ	12AC	LHCB	pp at 7 TeV
0.052±0.059±0.020	AUBERT	05J	BABR	$e^+e^- \to \Upsilon(4S)$
−0.042±0.020±0.017	ABE	03B	BELL	$e^+e^- \to \Upsilon(4S)$
0.02 ±0.091±0.01	[2] BONVICINI	00	CLE2	$e^+e^- \to \Upsilon(4S)$

NODE=S041AX2
NEW

[1] Uses $A_{CP}(B^+ \to J/\psi K^+) = 0.001 \pm 0.007$ to extract production asymmetry.

NODE=S041AX2;LINKAGE=AA

[2] A +0.3% correction is applied due to a slightly higher reconstruction efficiency for the positive kaons.

NODE=S041AX2;LINKAGE=A

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER

AAIJ	12AC	PR D85 091105	R. Aaij *et al.*	(LHCb Collab.)	REFID=54372
ABULENCIA	09	PR D79 112003	A. Abulencia *et al.*	(CDF Collab.)	REFID=52950
ABAZOV	08O	PRL 100 211802	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52393
BHARDWAJ	08	PR D78 051104	V. Bhardwaj *et al.*	(BELLE Collab.)	REFID=52425
AUBERT	05J	PRL 94 141801	B. Aubert *et al.*	(BABAR Collab.)	REFID=50590
AUBERT	04P	PRL 92 241802	B. Aubert *et al.*	(BABAR Collab.)	REFID=49931
ABE	03B	PR D67 032003	K. Abe *et al.*	(BELLE Collab.)	REFID=49205
AUBERT	02F	PR D65 091101	B. Aubert *et al.*	(BaBar Collab.)	REFID=48637
BONVICINI	00	PRL 84 5940	G. Bonvicini *et al.*	(CLEO Collab.)	REFID=47650
ABE	96R	PRL 77 5176	F. Abe *et al.*	(CDF Collab.)	REFID=45159
BISHAI	96	PL B369 186	M. Bishai *et al.*	(CLEO Collab.)	REFID=44832
ALEXANDER	95	PL B341 435	J. Alexander *et al.*	(CLEO Collab.)	REFID=44113
Also		PL B347 469 (erratum)	J. Alexander *et al.*	(CLEO Collab.)	REFID=44211

Reference = AAIJ 12AD; PR D85 112004
Verifier code = LHCB

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Thank you for helping us make the Review accurate and useful.

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Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(\pi^-\mu^+\mu^+)/\Gamma_{total}$ — Γ_{489}/Γ

NODE=S041R60

Test of total lepton number conservation.

NODE=S041R60

NODE=S041R60

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
	$< 1.3 \times 10^{-8}$ (CL = 95%)		[$<4.4 \times 10^{-8}$ (CL = 90%) OUR 2012 BEST LIMIT]			
YOUR DATA	**$< 1.3 \times 10^{-8}$**	95	[1] AAIJ	12AD	LHCB	pp at 7 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	$< 4.4 \times 10^{-8}$	90	AAIJ	12C	LHCB	pp at 7 TeV
	$<10.7 \times 10^{-8}$	90	[2] LEES	12J	BABR	$e^+e^- \to \Upsilon(4S)$
	$< 1.4 \times 10^{-6}$	90	[2] EDWARDS	02B	CLE2	$e^+e^- \to \Upsilon(4S)$
	$< 9.1 \times 10^{-3}$	90	[3] WEIR	90B	MRK2	e^+e^- 29 GeV

[1] Uses $B^+ \to J/\psi K^+$, $J/\psi \to \mu^+\mu^-$ mode for normalization. Obtains neutrino-mass-dependent upper limits in the range 0.4–1.0 $\times 10^{-8}$.

NODE=S041R60;LINKAGE=AA

[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041R60;LINKAGE=EP

[3] WEIR 90B assumes B^+ production cross section from LUND.

NODE=S041R60;LINKAGE=A

$\Gamma(D^-\mu^+\mu^+)/\Gamma_{total}$ — Γ_{502}/Γ

NODE=S041BL3

NODE=S041BL3

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
	$<6.9 \times 10^{-7}$ (CL = 95%)		[$<1.1 \times 10^{-6}$ (CL = 90%) OUR 2012 BEST LIMIT]			
YOUR DATA	**$<6.9 \times 10^{-7}$**	95	[1] AAIJ	12AD	LHCB	pp at 7 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	$<1.1 \times 10^{-6}$	90	[2] SEON	11	BELL	$e^+e^- \to \Upsilon(4S)$

[1] Uses $B^+ \to \psi(2S)K^+$, $\psi(2S) \to J/\psi\pi^+\pi^-$ mode for normalization.

NODE=S041BL3;LINKAGE=AA

[2] Assumes equal production of B^0 and B^+ from Upsilon(4S) decays. Uses $D^- \to K^+\pi^-\pi^-$ mode and 3-body phase-space hypothesis for the signal decays.

NODE=S041BL3;LINKAGE=EP

$\Gamma(D^{*-}\mu^+\mu^+)/\Gamma_{total}$ — Γ_{503}/Γ

NODE=S041BL4

NODE=S041BL4

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$<2.4 \times 10^{-6}$**	95	[1] AAIJ	12AD	LHCB	pp at 7 TeV

[1] Uses $B^+ \to \psi(2S)K^+$, $\psi(2S) \to J/\psi\pi^+\pi^-$ mode for normalization.

NODE=S041BL4;LINKAGE=AA

$\Gamma(D_s^-\mu^+\mu^+)/\Gamma_{total}$ — Γ_{504}/Γ

NODE=S041BL5

NODE=S041BL5

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$<5.8 \times 10^{-7}$**	95	[1] AAIJ	12AD	LHCB	pp at 7 TeV

[1] Uses $B^+ \to \psi(2S)K^+$, $\psi(2S) \to J/\psi\pi^+\pi^-$ mode for normalization. Obtains neutrino-mass-dependent upper limits in the range 1.5–8.0 $\times 10^{-7}$.

NODE=S041BL5;LINKAGE=AA

$\Gamma(\overline{D}^0\pi^-\mu^+\mu^+)/\Gamma_{total}$ — Γ_{505}/Γ

NODE=S041BL6

NODE=S041BL6

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$<1.5 \times 10^{-6}$**	95	[1] AAIJ	12AD	LHCB	pp at 7 TeV

[1] Uses $B^+ \to \psi(2S)K^+$, $\psi(2S) \to J/\psi\pi^+\pi^-$ mode for normalization. Obtains neutrino-mass-dependent upper limits in the range 0.3–1.5 $\times 10^{-6}$.

NODE=S041BL6;LINKAGE=AA

$B^{\pm}$ REFERENCES

NODE=S041

YOUR PAPER	AAIJ	12AD	PR D85 112004	R. Aaij *et al.*	(LHCb Collab.)	REFID=54373
	AAIJ	12C	PRL 108 101601	R. Aaij *et al.*	(LHCb Collab.)	REFID=54035
	LEES	12J	PR D85 071103	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54377
	SEON	11	PR D84 071106	O. Seon *et al.*	(BELLE Collab.)	REFID=53812
	EDWARDS	02B	PR D65 111102	K.W. Edwards *et al.*	(CLEO Collab.)	REFID=48799
	WEIR	90B	PR D41 1384	A.J. Weir *et al.*	(Mark II Collab.)	REFID=41242

Reference = AAIJ 12AE; PR D85 112013
Verifier code = LHCB

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1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM, STRANGE MESONS ($B = \pm 1$, $S = \mp 1$)

NODE=MXXX046

$B_s^0 = s\overline{b}$, $\overline{B}_s^0 = \overline{s}\,b$, similarly for B_s^*'s

NODE=MXXX046

NODE=S086

B_s^0

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

B_s^0 BRANCHING RATIOS

NODE=S086230

$\Gamma(\phi\gamma)/\Gamma_{total}$ — Γ_{50}/Γ

NODE=S086R17
NODE=S086R17

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
36 ± 4 OUR AVERAGE					
$[(57^{+22}_{-19}) \times 10^{-6}$ OUR 2012 AVERAGE]					
$35.1 \pm 3.5 \pm 1.2$		[1] AAIJ	13	LHCB	pp at 7 TeV
$57^{+18}_{-15}{}^{+12}_{-11}$		[2] WICHT	08A	BELL	$e^+e^- \to \Upsilon(5S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA 39 ± 5		[3] AAIJ	12AE	LHCB	Replaced by AAIJ 13
<390	90	DRUTSKOY	07A	BELL	$e^+e^- \to \Upsilon(5S)$
<120	90	ACOSTA	02G	CDF	$p\overline{p}$ at 1.8 TeV
<700	90	[4] ADAM	96D	DLPH	$e^+e^- \to Z$

NEW

[1] AAIJ 13 reports $[\Gamma(B_s^0 \to \phi\gamma)/\Gamma_{total}]$ / $[B(B^0 \to K^*(892)^0\gamma)] = 0.81 \pm 0.04 \pm 0.07$ which we multiply by our best value $B(B^0 \to K^*(892)^0\gamma) = (4.33 \pm 0.15) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=S086R17;LINKAGE=AJ

[2] Assumes $\Upsilon(5S) \to B_s^*\overline{B}_s^* = (19.5^{+3.0}_{-2.3})\%$.

NODE=S086R17;LINKAGE=WI

[3] Measures $B(B^0 \to K^{*0}\gamma)/B(B_s \to \phi\gamma) = 1.12 \pm 0.08(\text{stat})^{+0.06}_{-0.04}(\text{sys})^{+0.09}_{-0.08}(f_s/f_d)$ and uses current world-average value of $B(B^0 \to K^{*0}\gamma) = (4.33 \pm 0.15) \times 10^{-5}$.

NODE=S086R17;LINKAGE=AI

[4] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$.

NODE=S086R17;LINKAGE=DQ

B_s^0 REFERENCES

NODE=S086

	AAIJ	13	NP B867 1	R. Aaij *et al.*	(LHCb Collab.)
YOUR PAPER	AAIJ	12AE	PR D85 112013	R. Aaij *et al.*	(LHCb Collab.)
	WICHT	08A	PRL 100 121801	J. Wicht *et al.*	(BELLE Collab.)
	DRUTSKOY	07A	PR D76 012002	A. Drutskoy *et al.*	(BELLE Collab.)
	ACOSTA	02G	PR D66 112002	D. Acosta *et al.*	(CDF Collab.)
	ADAM	96D	ZPHY C72 207	W. Adam *et al.*	(DELPHI Collab.)

REFID=54596
REFID=54374
REFID=52436
REFID=51852
REFID=49132
REFID=45276

Reference = AAIJ 12AG; JHEP 1206 115
Verifier code = LHCB

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$B_s^0 = s\overline{b}$, $\overline{B}_s^0 = \overline{s}\,b$, similarly for B_s^*'s

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B_s^0

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

B_s^0 BRANCHING RATIOS

NODE=S086230

$\Gamma(D_s^- \pi^+)/\Gamma_{total}$ — Γ_7/Γ

NODE=S086R3
NODE=S086R3

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
3.02±0.24 OUR AVERAGE					
[(3.3 ± 0.5) × 10^{-3} OUR 2012 AVERAGE]					
YOUR DATA $2.95 \pm 0.05^{+0.25}_{-0.28}$		[1] AAIJ	12AG	LHCB	pp at 7 TeV
3.6 ±0.5 ±0.5		[2] LOUVOT	09	BELL	$e^+e^- \to \Upsilon(5S)$
3.0 ±0.7 ±0.1		[3] ABULENCIA	07C	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
6.8 ±2.2 ±1.6		DRUTSKOY	07A	BELL	Repl. by LOUVOT 09
3.5 ±1.1 ±0.2		[4] ABULENCIA	06J	CDF	Repl. by ABULENCIA 07C
<130	6	[5] AKERS	94J	OPAL	$e^+e^- \to Z$
seen	1	BUSKULIC	93G	ALEP	$e^+e^- \to Z$

NEW

[1] AAIJ 12AG reports $(2.95 \pm 0.05 \pm 0.17^{+0.18}_{-0.22}) \times 10^{-3}$ where the last uncertainty comes from the semileptonic f_s/f_d measurement. We combined the systematics in quadrature. NODE=S086R3;LINKAGE=AI

[2] LOUVOT 09 reports $(3.67^{+0.35}_{-0.33}{}^{+0.65}_{-0.645}) \times 10^{-3}$ from a measurement of $[\Gamma(B_s^0 \to D_s^- \pi^+)/\Gamma_{total}] \times [B(\Upsilon(10860) \to B_s^{(*)}\overline{B}_s^{(*)})]$ assuming $B(\Upsilon(10860) \to B_s^{(*)}\overline{B}_s^{(*)}) = (19.5 \pm 2.6) \times 10^{-2}$, which we rescale to our best value $B(\Upsilon(10860) \to B_s^{(*)}\overline{B}_s^{(*)}) = (19.9 \pm 3.0) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=S086R3;LINKAGE=LO

[3] ABULENCIA 07C reports $[\Gamma(B_s^0 \to D_s^- \pi^+)/\Gamma_{total}]$ / $[B(B^0 \to D^- \pi^+)] = 1.13 \pm 0.08 \pm 0.23$ which we multiply by our best value $B(B^0 \to D^- \pi^+) = (2.68 \pm 0.13) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=S086R3;LINKAGE=AB

[4] ABULENCIA 06J reports $[\Gamma(B_s^0 \to D_s^- \pi^+)/\Gamma_{total}]$ / $[B(B^0 \to D^- \pi^+)] = 1.32 \pm 0.18 \pm 0.38$ which we multiply by our best value $B(B^0 \to D^- \pi^+) = (2.68 \pm 0.13) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=S086R3;LINKAGE=AL

[5] AKERS 94J sees ≤ 6 events and measures the limit on the product branching fraction $f(\overline{b} \to B_s^0) \cdot B(B_s^0 \to D_s^- \pi^+) < 1.3\%$ at CL = 90%. We divide by our current value $B(\overline{b} \to B_s^0) = 0.105$. NODE=S086R3;LINKAGE=A

$\Gamma(D_s^\mp K^\pm)/\Gamma(D_s^- \pi^+)$ — Γ_{11}/Γ_7

NODE=S086R38
NODE=S086R38

VALUE	DOCUMENT ID		TECN	COMMENT
0.066 ±0.008 OUR AVERAGE Error includes scale factor of 1.6. [0.097 ± 0.020 OUR 2012 AVERAGE]				
YOUR DATA 0.0646±0.0043±0.0025	AAIJ	12AG	LHCB	pp at 7 TeV
0.097 ±0.018 ±0.009	AALTONEN	09AQ	CDF	$p\overline{p}$ at 1.96 TeV

NEW

B_s^0 REFERENCES

NODE=S086

YOUR PAPER	AAIJ	12AG	JHEP 1206 115	R. Aaij *et al.*	(LHCb Collab.)	REFID=54471
	AALTONEN	09AQ	PRL 103 191802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53063
	LOUVOT	09	PRL 102 021801	R. Louvot *et al.*	(BELLE Collab.)	REFID=52646
	ABULENCIA	07C	PRL 98 061802	A. Abulencia *et al.*	(FNAL CDF Collab.)	REFID=51674
	DRUTSKOY	07A	PR D76 012002	A. Drutskoy *et al.*	(BELLE Collab.)	REFID=51852
	ABULENCIA	06J	PRL 96 191801	A. Abulencia *et al.*	(CDF Collab.)	REFID=51210
	AKERS	94J	PL B337 196	R. Akers *et al.*	(OPAL Collab.)	REFID=44014
	BUSKULIC	93G	PL B311 425	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=43439

Reference = AAIJ 12AH; JHEP 1207 133
Verifier code = LHCB

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PLEASE REPLY WITHIN ONE WEEK

Tim Gershon

EMAIL: T.J.Gershon@warwick.ac.uk

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(K^*(892)^+\mu^+\mu^-)/\Gamma_{total}$ — Γ_{465}/Γ

NODE=S041R82

Test for ΔB=1 weak neutral current. Allowed by higher-order electroweak interactions.

NODE=S041R82

NODE=S041R82

	VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
	11.6± 1.6 OUR AVERAGE					
	$[(11.6^{+3.1}_{-2.7}) \times 10^{-7}$ OUR 2012 AVERAGE]					
YOUR DATA	11.6 ± 1.9		AAIJ	12AH	LHCB	pp at 7 TeV
	$14.6^{+7.9}_{-7.5} \pm 1.2$		[1] AUBERT	09T	BABR	$e^+e^- \to \Upsilon(4S)$
	$11.1^{+3.2}_{-2.7} \pm 1.0$		[1] WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	$9.7^{+9.4}_{-6.9} \pm 1.4$		[1] AUBERT,B	06J	BABR	Repl. by AUBERT 09T
	$30.7^{+25.8}_{-17.8} \pm 4.2$		[1] AUBERT	03U	BABR	$e^+e^- \to \Upsilon(4S)$
	$6.5^{+6.9}_{-5.3} {}^{+1.5}_{-1.6}$		[2] ISHIKAWA	03	BELL	Repl. by WEI 09A
	< 39	90	[1] ABE	02	BELL	Repl. by ISHIKAWA 03
	< 170	90	[1] AUBERT	02L	BABR	$e^+e^- \to \Upsilon(4S)$
	<12000	90	[3] ALBRECHT	91E	ARG	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041R82;LINKAGE=EP

[2] Assumes equal production of B^0 and B^+ at $\Upsilon(4S)$. The second error is a total of systematic uncertainties including model dependence. The 90% C.L. upper limit is 2.2×10^{-6}.

NODE=S041R82;LINKAGE=IS

[3] ALBRECHT 91E reports $< 1.1 \times 10^{-3}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

NODE=S041R82;LINKAGE=B2

PARTIAL BRANCHING FRACTIONS IN $B^+ \to K^{(*)+}\ell^+\ell^-$

NODE=S041240

B($B^+ \to K^{*+}\ell^+\ell^-$) ($q^2 < 2.0$ GeV^2/c^4)

NODE=S041PB1

NODE=S041PB1

	VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
	1.4 ±0.5 OUR AVERAGE				
	$[(1.3 \pm 1.0) \times 10^{-7}$ OUR 2012 AVERAGE]				
YOUR DATA	$1.37^{+0.60}_{-0.58}$	AAIJ	12AH	LHCB	pp at 7 TeV
	$1.30 \pm 0.98 \pm 0.14$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

NEW

B($B^+ \to K^{*+}\ell^+\ell^-$) ($2.0 < q^2 < 4.3$ GeV^2/c^4)

NODE=S041PB2

NODE=S041PB2

	VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
	1.1 ±0.5 OUR AVERAGE				
	$[(1 \pm 1) \times 10^{-7}$ OUR 2012 AVERAGE]				
YOUR DATA	$1.24^{+0.60}_{-0.55}$	AAIJ	12AH	LHCB	pp at 7 TeV
	$0.71 \pm 1.00 \pm 0.15$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

NEW

$B(B^+ \to K^{*+}\ell^+\ell^-)$ $(4.3 < q^2 < 8.68\ \mathrm{GeV}^2/c^4)$

NODE=S041PB3
NODE=S041PB3

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
$2.4\ ^{+0.8}_{-0.7}$ OUR AVERAGE			
$[(1.7 \pm 1.7) \times 10^{-7}$ OUR 2012 AVERAGE]			
YOUR DATA $2.50^{+0.88}_{-0.74}$	AAIJ	12AH LHCB	pp at 7 TeV
$1.71 \pm 1.58 \pm 0.49$	AALTONEN	11AI CDF	$p\overline{p}$ at 1.96 TeV

NEW

$B(B^+ \to K^{*+}\ell^+\ell^-)$ $(10.09 < q^2 < 12.86\ \mathrm{GeV}^2/c^4)$

NODE=S041PB4
NODE=S041PB4

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
2.1 ± 0.6 OUR AVERAGE			
$[(2.0 \pm 1.0) \times 10^{-7}$ OUR 2012 AVERAGE]			
YOUR DATA $2.13^{+0.72}_{-0.66}$	AAIJ	12AH LHCB	pp at 7 TeV
$1.97 \pm 0.99 \pm 0.22$	AALTONEN	11AI CDF	$p\overline{p}$ at 1.96 TeV

NEW

$B(B^+ \to K^{*+}\ell^+\ell^-)$ $(14.18 < q^2 < 16.0\ \mathrm{GeV}^2/c^4)$

NODE=S041PB5
NODE=S041PB5

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
$0.86^{+0.40}_{-0.32}$ OUR AVERAGE			
$[(0.5 \pm 0.6) \times 10^{-7}$ OUR 2012 AVERAGE]			
YOUR DATA $1.00^{+0.47}_{-0.38}$	AAIJ	12AH LHCB	pp at 7 TeV
$0.52 \pm 0.61 \pm 0.09$	AALTONEN	11AI CDF	$p\overline{p}$ at 1.96 TeV

NEW

$B(B^+ \to K^{*+}\ell^+\ell^-)$ $(q^2 > 16.0\ \mathrm{GeV}^2/c^4)$

NODE=S041PB6
NODE=S041PB6

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
1.3 ± 0.4 OUR AVERAGE			
$[(1.6 \pm 1.0) \times 10^{-7}$ OUR 2012 AVERAGE]			
YOUR DATA 1.25 ± 0.46	AAIJ	12AH LHCB	pp at 7 TeV
$1.57 \pm 0.96 \pm 0.17$	AALTONEN	11AI CDF	$p\overline{p}$ at 1.96 TeV

NEW

$B(B^+ \to K^{*+}\ell^+\ell^-)$ $(1.0 < q^2 < 6.0\ \mathrm{GeV}^2/c^4)$

NODE=S041PB7
NODE=S041PB7

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
2.8 ± 0.8 OUR AVERAGE			
$[(2.6 \pm 1.7) \times 10^{-7}$ OUR 2012 AVERAGE]			
YOUR DATA $2.90^{+0.90}_{-0.85}$	AAIJ	12AH LHCB	pp at 7 TeV
$2.57 \pm 1.61 \pm 0.40$	AALTONEN	11AI CDF	$p\overline{p}$ at 1.96 TeV

NEW

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER AAIJ	12AH	JHEP 1207 133	R. Aaij *et al.*	(LHCb Collab.)	REFID=54472
AALTONEN	11AI	PRL 107 201802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53836
AUBERT	09T	PRL 102 091803	B. Aubert *et al.*	(BABAR Collab.)	REFID=52829
Also		EPAPS Document No. E-PRLTAO-102-060910		(BABAR Collab.)	REFID=53060;ERROR=7
WEI	09A	PRL 103 171801	J.-T. Wei *et al.*	(BELLE Collab.)	REFID=53061
Also		EPAPS Supplement EPAPS_appendix.pdf		(BELLE Collab.)	REFID=53240;ERROR=8
AUBERT,B	06J	PR D73 092001	B. Aubert *et al.*	(BABAR Collab.)	REFID=51305
AUBERT	03U	PRL 91 221802	B. Aubert *et al.*	(BaBar Collab.)	REFID=49648
ISHIKAWA	03	PRL 91 261601	A. Ishikawa *et al.*	(BELLE Collab.)	REFID=49641
ABE	02	PRL 88 021801	K. Abe *et al.*	(BELLE Collab.)	REFID=48518
AUBERT	02L	PRL 88 241801	B. Aubert *et al.*	(BaBar Collab.)	REFID=48751
ALBRECHT	91E	PL B262 148	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=41549

NODE=S042

B^0

$$I(J^P) = \tfrac{1}{2}(0^-)$$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^{\pm}$ section.

NODE=S042220

$\Gamma(K^0\mu^+\mu^-)/\Gamma_{total}$ — Γ_{464}/Γ

NODE=S042R17

Test for ΔB=1 weak neutral current. Allowed by higher-order electroweak interactions.

NODE=S042R17

VALUE (units 10^{-7})	CL%	DOCUMENT ID	TECN	COMMENT
$3.5\ ^{+0.6}_{-0.5}$ OUR AVERAGE				
$[(4.5\ ^{+1.2}_{-1.0}) \times 10^{-7}$ OUR 2012 AVERAGE]				
YOUR DATA $3.1\ ^{+0.7}_{-0.6}$		AAIJ	12AH LHCB	pp at 7 TeV
$4.9\ ^{+2.9}_{-2.5} \pm 0.3$		[1] AUBERT	09T BABR	$e^+e^- \to \Upsilon(4S)$
$4.4\ ^{+1.3}_{-1.1} \pm 0.3$		[1] WEI	09A BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$5.9\ ^{+3.3}_{-2.6} \pm 0.7$		[1] AUBERT,B	06J BABR	Repl. by AUBERT 09T
$1.63\ ^{+0.82}_{-0.63} \pm 0.14$		[1] AUBERT	03U BABR	Repl. by AUBERT,B 06J
$5.6\ ^{+2.9}_{-2.3} \pm 0.5$		[2] ISHIKAWA	03 BELL	Repl. by WEI 09A
<33	90	[1] ABE	02 BELL	Repl. by ISHIKAWA 03
<36	90	AUBERT	02L BABR	$e^+e^- \to \Upsilon(4S)$
<66.4	90	[3] ANDERSON	01B CLE2	$e^+e^- \to \Upsilon(4S)$
<5200	90	ALBRECHT	91E ARG	$e^+e^- \to \Upsilon(4S)$
<3600	90	[4] AVERY	87 CLEO	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042R17;LINKAGE=EP

[2] Assumes equal production of B^0 and B^+ at $\Upsilon(4S)$. The second error is a total of systematic uncertainties including model dependence. NODE=S042R17;LINKAGE=IS

[3] The result is for di-lepton masses above 0.5 GeV. NODE=S042R17;LINKAGE=DL

[4] AVERY 87 reports $< 4.5 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 40% to $B^0\overline{B}^0$. We rescale to 50%. NODE=S042R17;LINKAGE=A3

PARTIAL BRANCHING FRACTIONS IN $B^0 \to K^{(*)0}\ell^+\ell^-$

NODE=S042240

$B(B^0 \to K^0\ell^+\ell^-)$ ($q^2 < 2.0$ GeV^2/c^4)

NODE=S042PB9

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
$0.24\ ^{+0.22}_{-0.20}$ OUR AVERAGE			
$[(0.3 \pm 0.4) \times 10^{-7}$ OUR 2012 AVERAGE]			
YOUR DATA $0.21\ ^{+0.27}_{-0.23}$	AAIJ	12AH LHCB	pp at 7 TeV
$0.31 \pm 0.37 \pm 0.02$	AALTONEN	11AI CDF	$p\overline{p}$ at 1.96 TeV

$B(B^0 \to K^0\ell^+\ell^-)$ ($2.0 < q^2 < 4.3$ GeV^2/c^4)

NODE=S042PBA

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
$0.24\ ^{+0.35}_{-0.30}$ OUR AVERAGE Error includes scale factor of 1.6. $[(0.9 \pm 0.5) \times 10^{-7}$ OUR 2012 AVERAGE]			
YOUR DATA $0.07\ ^{+0.25}_{-0.21}$	AAIJ	12AH LHCB	pp at 7 TeV
$0.93 \pm 0.49 \pm 0.07$	AALTONEN	11AI CDF	$p\overline{p}$ at 1.96 TeV

$B(B^0 \to K^0\ell^+\ell^-)$ ($4.3 < q^2 < 8.68$ GeV^2/c^4)

NODE=S042PBB

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
1.08 ± 0.27 OUR AVERAGE			
$[(0.7 \pm 0.5) \times 10^{-7}$ OUR 2012 AVERAGE]			
YOUR DATA 1.23 ± 0.31	AAIJ	12AH LHCB	pp at 7 TeV
$0.66 \pm 0.51 \pm 0.05$	AALTONEN	11AI CDF	$p\overline{p}$ at 1.96 TeV

$B(B^0 \to K^0\ell^+\ell^-)$ ($10.09 < q^2 < 12.86$ GeV^2/c^4)

NODE=S042PBC

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
0.27 ± 0.27 OUR AVERAGE Error includes scale factor of 1.8. $[(-0.03 \pm 0.22) \times 10^{-7}$ OUR 2012 AVERAGE]			
YOUR DATA $0.50\ ^{+0.22}_{-0.19}$	AAIJ	12AH LHCB	pp at 7 TeV
$-0.03 \pm 0.22 \pm 0.01$	AALTONEN	11AI CDF	$p\overline{p}$ at 1.96 TeV

$B(B^0 \to K^0 \ell^+ \ell^-)$ $(14.18 < q^2 < 16.0\ \mathrm{GeV}^2/c^4)$

NODE=S042PBD
NODE=S042PBD

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
$0.29^{+0.21}_{-0.15}$ OUR AVERAGE Error includes scale factor of 1.8. [$(0.73 \pm 0.27) \times 10^{-7}$ OUR 2012 AVERAGE]				NEW
YOUR DATA $0.20^{+0.13}_{-0.09}$	AAIJ	12AH	LHCB	pp at 7 TeV
$0.73 \pm 0.26 \pm 0.06$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

$B(B^0 \to K^0 \ell^+ \ell^-)$ $(q^2 > 16.0\ \mathrm{GeV}^2/c^4)$

NODE=S042PBE
NODE=S042PBE

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
$0.31^{+0.16}_{-0.12}$ OUR AVERAGE [$(0.21 \pm 0.24) \times 10^{-7}$ OUR 2012 AVERAGE]				NEW
YOUR DATA $0.35^{+0.21}_{-0.14}$	AAIJ	12AH	LHCB	pp at 7 TeV
$0.21 \pm 0.18 \pm 0.16$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

$B(B^0 \to K^0 \ell^+ \ell^-)$ $(1.0 < q^2 < 6.0\ \mathrm{GeV}^2/c^4)$

NODE=S042PBF
NODE=S042PBF

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
$0.75^{+0.40}_{-0.30}$ OUR AVERAGE [$(1.0 \pm 0.6) \times 10^{-7}$ OUR 2012 AVERAGE]				NEW
YOUR DATA $0.65^{+0.45}_{-0.35}$	AAIJ	12AH	LHCB	pp at 7 TeV
$0.98 \pm 0.61 \pm 0.08$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

B^0 REFERENCES

NODE=S042

YOUR PAPER AAIJ	12AH	JHEP 1207 133	R. Aaij *et al.*	(LHCb Collab.)	REFID=54472
AALTONEN	11AI	PRL 107 201802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53836
AUBERT	09T	PRL 102 091803	B. Aubert *et al.*	(BABAR Collab.)	REFID=52829
Also		EPAPS Document No. E-PRLTAO-102-060910		(BABAR Collab.)	REFID=53060;ERROR=9
WEI	09A	PRL 103 171801	J.-T. Wei *et al.*	(BELLE Collab.)	REFID=53061
Also		EPAPS Supplement EPAPS_appendix.pdf		(BELLE Collab.)	REFID=53240;ERROR=10
AUBERT,B	06J	PR D73 092001	B. Aubert *et al.*	(BABAR Collab.)	REFID=51305
AUBERT	03U	PRL 91 221802	B. Aubert *et al.*	(BaBar Collab.)	REFID=49648
ISHIKAWA	03	PRL 91 261601	A. Ishikawa *et al.*	(BELLE Collab.)	REFID=49641
ABE	02	PRL 88 021801	K. Abe *et al.*	(BELLE Collab.)	REFID=48518
AUBERT	02L	PRL 88 241801	B. Aubert *et al.*	(BaBar Collab.)	REFID=48751
ANDERSON	01B	PRL 87 181803	S. Anderson *et al.*	(CLEO Collab.)	REFID=48389
ALBRECHT	91E	PL B262 148	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=41549
AVERY	87	PL B183 429	P. Avery *et al.*	(CLEO Collab.)	REFID=40387

$B^\pm/B^0$ ADMIXTURE

NODE=S049

ISOSPIN ASYMMETRY

NODE=S049245

Δ_{0-} is defined as

NODE=S049245

$$\frac{\Gamma(B^0 \to f_d) - \Gamma(B^+ \to f_u)}{\Gamma(B^0 \to f) + \Gamma(B^+ \to f)},$$

the isospin asymmetry of inclusive neutral and charged B decay.

$\Delta_{0-}(B(B \to K \ell^+ \ell^-))$

NODE=S049IA3
NODE=S049IA3

VALUE	DOCUMENT ID		TECN	COMMENT
-0.37 ± 0.13 OUR AVERAGE [$-0.40^{+0.34}_{-0.30}$ OUR 2012 AVERAGE Scale factor = 1.9]				NEW
YOUR DATA $-0.35^{+0.23}_{-0.27}$	[1] AAIJ	12AH	LHCB	pp at 7 TeV
$-0.58^{+0.29}_{-0.37} \pm 0.02$	[2] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.31^{+0.17}_{-0.14} \pm 0.08$	[3] WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-1.43^{+0.56}_{-0.85} \pm 0.05$	[4,5] AUBERT	09T	BABR	Repl. by LEES 12S

[1] For $1 < q^2 < 6$ GeV^2/c^4.
[2] For $0.10 < q^2 < 8.12$ GeV^2/c^4. Measurements in other q^2 bins are also reported.
[3] For $q^2 < 8.68$ GeV^2/c^4.
[4] For $0.1 < m^2_{\ell^+\ell^-} < 7.02$ GeV^2/c^4.
[5] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S049IA3;LINKAGE=AA
NODE=S049IA3;LINKAGE=LE
NODE=S049IA3;LINKAGE=WE
NODE=S049IA3;LINKAGE=AU
NODE=S049IA3;LINKAGE=EP

Δ_{0-}(B($B \to K^* \ell^+ \ell^-$))

NODE=S049IA4
NODE=S049IA4
NEW

	VALUE	DOCUMENT ID		TECN	COMMENT
	−0.22±0.10 OUR AVERAGE				
	[−0.44 ± 0.13 OUR 2012 AVERAGE Scale factor = 1.1]				
YOUR DATA	−0.15±0.16	[1] AAIJ	12AH	LHCB	pp at 7 TeV
	$-0.25^{+0.20}_{-0.17}\pm0.03$	[2] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
	−0.29±0.16±0.09	[3] WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	$-0.56^{+0.17}_{-0.15}\pm0.03$	[4,5] AUBERT	09T	BABR	Repl. by LEES 12S

[1] For $1 < q^2 < 6$ GeV^2/c^4.
[2] For $0.10 < q^2 < 8.12$ GeV^2/c^4. Measurements in other q^2 bins are also reported.
[3] For $q^2 < 8.68$ GeV^2/c^4.
[4] For $0.1 < m^2_{\ell^+\ell^-} < 7.02$ GeV^2/c^4.
[5] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S049IA4;LINKAGE=AA
NODE=S049IA4;LINKAGE=LE
NODE=S049IA4;LINKAGE=WE
NODE=S049IA4;LINKAGE=AU
NODE=S049IA4;LINKAGE=EP

$B^\pm/B^0$ ADMIXTURE REFERENCES

NODE=S049

YOUR PAPER	AAIJ	12AH	JHEP 1207 133	R. Aaij *et al.*	(LHCb Collab.)	REFID=54472
	LEES	12S	PR D86 032012	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54386
	AUBERT	09T	PRL 102 091803	B. Aubert *et al.*	(BABAR Collab.)	REFID=52829
	Also		EPAPS Document No. E-PRLTAO-102-060910		(BABAR Collab.)	REFID=53060;ERROR=11
	WEI	09A	PRL 103 171801	J.-T. Wei *et al.*	(BELLE Collab.)	REFID=53061
	Also		EPAPS Supplement EPAPS_appendix.pdf		(BELLE Collab.)	REFID=53240;ERROR=12

Reference = AAIJ 12AL; PRL 109 172003
Verifier code = LHCB

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Tim Gershon

EMAIL: T.J.Gershon@warwick.ac.uk

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM BARYONS
($B = -1$)

$\Lambda_b^0 = u\,d\,b$, $\Xi_b^0 = u\,s\,b$, $\Xi_b^- = d\,s\,b$, $\Omega_b^- = s\,s\,b$

NODE=BXXX045

NODE=BXXX045

NODE=B162

$\Lambda_b(5912)^0$

$J^P = \frac{1}{2}^-$ Status: ***

Quantum numbers are based on quark model expectations.

NODE=B162

$\Lambda_b(5912)^0$ MASS

NODE=B162M

	VALUE (MeV)		DOCUMENT ID	TECN	COMMENT
YOUR DATA	**5912.0±0.1±0.6**	[1,2]	AAIJ 12AL	LHCB	pp at 7 TeV

NODE=B162M

[1] Observed in $\Lambda_b(5912)^0 \rightarrow \Lambda_b^0 \pi^+ \pi^-$ decays with 17.6 ± 4.8 candidates with a significance of 5.2 sigma.

NODE=B162M;LINKAGE=AA

[2] AAIJ 12AL measures $m(\Lambda_b(5912)^0) - m(\Lambda_b^0) = 292.60 \pm 0.12 \pm 0.04$ MeV. We have adjusted the measurement to our best value of $m(\Lambda_b^0) = 5619.4 \pm 0.6$ MeV. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=B162M;LINKAGE=AI

$\Lambda_b(5912)^0$ WIDTH

NODE=B162W

	VALUE (MeV)	CL%	DOCUMENT ID	TECN	COMMENT
YOUR DATA	**<0.66**	90	AAIJ 12AL	LHCB	pp at 7 TeV

NODE=B162W

$\Lambda_b(5912)^0$ BRANCHING RATIOS

NODE=B162220

$\Gamma(\Lambda_b^0 \pi^+ \pi^-)/\Gamma_{total}$ **Γ_1/Γ**

NODE=B162R01

	VALUE	DOCUMENT ID	TECN	COMMENT
YOUR DATA	**seen**	AAIJ 12AL	LHCB	pp at 7 TeV

NODE=B162R01

$\Lambda_b(5912)^0$ REFERENCES

NODE=B162

YOUR PAPER AAIJ 12AL PRL 109 172003 R. Aaij *et al.* (LHCb Collab.) REFID=54589

NODE=B163

$\Lambda_b(5920)^0$

$J^P = \frac{3}{2}^-$ Status: ***

Quantum numbers are based on quark model expectations.

NODE=B163

$\Lambda_b(5920)^0$ MASS

NODE=B163M

	VALUE (MeV)		DOCUMENT ID	TECN	COMMENT
YOUR DATA	**5919.8±0.1±0.6**	[1,2]	AAIJ 12AL	LHCB	pp at 7 TeV

NODE=B163M

[1] Observed in $\Lambda_b(5920)^0 \rightarrow \Lambda_b^0 \pi^+ \pi^-$ decays with 52.5 ± 8.1 candidates with a significance of 10.2 sigma.

NODE=B163M;LINKAGE=AA

[2] AAIJ 12AL measures $m(\Lambda_b(5920)^0) - m(\Lambda_b^0) = 300.40 \pm 0.08 \pm 0.04$ MeV. We have adjusted the measurement to our best value of $m(\Lambda_b^0) = 5619.4 \pm 0.6$ MeV. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=B163M;LINKAGE=AI

$\Lambda_b(5920)^0$ WIDTH

NODE=B163W

	VALUE (MeV)	CL%	DOCUMENT ID	TECN	COMMENT
YOUR DATA	**<0.63**	90	AAIJ 12AL	LHCB	pp at 7 TeV

NODE=B163W

$\Lambda_b(5920)^0$ BRANCHING RATIOS

NODE=B163220

$\Gamma(\Lambda_b^0\pi^+\pi^-)/\Gamma_{total}$ — Γ_1/Γ

NODE=B163R01
NODE=B163R01

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**seen**	AAIJ	12AL	LHCB	pp at 7 TeV

$\Lambda_b(5920)^0$ REFERENCES

NODE=B163

YOUR PAPER AAIJ 12AL PRL 109 172003 R. Aaij *et al.* (LHCb Collab.) REFID=54589

Reference = AAIJ 12AM; PRL 109 131801
Verifier code = LHCB

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(\overline{D}^0 K^+ K^-)/\Gamma(\overline{D}^0 \pi^+ \pi^-)$ **Γ_{42}/Γ_{40}**

NODE=S042T96

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.056±0.011±0.007**	AAIJ	12AM	LHCB	pp at 7 TeV

NODE=S042T96

B^0 REFERENCES

NODE=S042

YOUR PAPER	AAIJ	12AM PRL 109 131801	R. Aaij *et al.*	(LHCb Collab.)

REFID=54590

BOTTOM, STRANGE MESONS
($B = \pm 1$, $S = \mp 1$)

$B^0_s = s\overline{b}$, $\overline{B}^0_s = \overline{s}\,b$, similarly for B^*_s's

NODE=MXXX046

NODE=MXXX046

NODE=S086

B^0_s

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

B^0_s BRANCHING RATIOS

NODE=S086230

$\Gamma(\overline{D}^0 K^+ K^-)/\Gamma_{total}$ **Γ_{20}/Γ**

NODE=S086R03

	VALUE (units 10^{-5})		DOCUMENT ID		TECN	COMMENT
YOUR DATA	**4.2±1.6±1.1**	[1,2]	AAIJ	12AM	LHCB	pp at 7 TeV

NODE=S086R03

[1] AAIJ 12AM reports $[\Gamma(B^0_s \to \overline{D}^0 K^+ K^-)/\Gamma_{total}]$ / $[B(B^0 \to \overline{D}^0 K^+ K^-)] = 0.90 \pm 0.27 \pm 0.20$ which we multiply by our best value $B(B^0 \to \overline{D}^0 K^+ K^-) = (4.7 \pm 1.2) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=S086R03;LINKAGE=AA

[2] Uses $B(b \to B^0_s)/B(b \to B^0) = 0.267^{+0.023}_{-0.020}$ measured by the same authors.

NODE=S086R03;LINKAGE=AI

B^0_s REFERENCES

NODE=S086

YOUR PAPER	AAIJ	12AM PRL 109 131801	R. Aaij *et al.*	(LHCb Collab.)

REFID=54590

Reference = AAIJ 12AN; PRL 109 152002
Verifier code = LHCB

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PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM, STRANGE MESONS ($B = \pm 1$, $S = \mp 1$)

NODE=MXXX046

$B_s^0 = s\overline{b}$, $\overline{B}_s^0 = \overline{s}\,b$, similarly for B_s^*'s

NODE=MXXX046

B_s^0

NODE=S086

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

B_{sH}^0 MEAN LIFE

NODE=S086TSH

B_{sH}^0 is the heavy mass state of two B_s^0 CP eigenstates.

NODE=S086TSH

"OUR EVALUATION" has been obtained by the Heavy Flavor Averaging Group (HFAG) using the constraint of the flavor-specific lifetime average in a way similar to $\Delta\Gamma_{B_s^0}/\Gamma_{B_s^0}$.

NODE=S086TSH

	VALUE (10^{-12} s)	DOCUMENT ID		TECN	COMMENT
	1.615±0.021 OUR EVALUATION				
	[(1.618 ± 0.024) × 10^{-12} s OUR 2012 EVALUATION]				
	1.70 ±0.04 OUR AVERAGE				
	[(1.70 ± 0.12) × 10^{-12} s OUR 2012 AVERAGE]				
YOUR DATA	$1.700 \pm 0.040 \pm 0.026$	[1] AAIJ	12AN	LHCB	pp at 7 TeV
	$1.70\ ^{+0.12}_{-0.11}\ \pm 0.03$	[1] AALTONEN	11AB	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
		[2] AALTONEN	12D	CDF	$p\overline{p}$ at 1.96 TeV
	$1.613^{+0.123}_{-0.113}$	[3,4] AALTONEN	08J	CDF	Repl. by AALTONEN 12D
	$1.58\ ^{+0.39}_{-0.42}\ ^{+0.01}_{-0.02}$	[4] ABAZOV	05W	D0	Repl. by ABAZOV 08AM
	$2.07\ ^{+0.58}_{-0.46}\ \pm 0.03$	[4] ACOSTA	05	CDF	Repl. by AALTONEN 08J

NODE=S086TSH

NEW;→ UNCHECKED ←

NEW

[1] Measured using a pure CP-odd final state $J/\psi f_0(980)$.

NODE=S086TSH;LINKAGE=AL

[2] Uses the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays assuming CP-violating angle $\beta_s(B^0 \to J/\psi\phi) = 0.02$.

NODE=S086TSH;LINKAGE=AT

[3] Obtained from $\Delta\Gamma_s$ and Γ_s fit with a correlation of 0.6.

NODE=S086TSH;LINKAGE=AA

[4] Measured using the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.

NODE=S086TSH;LINKAGE=AC

B_s^0 REFERENCES

NODE=S086

YOUR PAPER	AAIJ	12AN	PRL 109 152002	R. Aaij *et al.*	(LHCb Collab.)	REFID=54591
	AALTONEN	12D	PR D85 072002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54070
	AALTONEN	11AB	PR D84 052012	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53799
	AALTONEN	08J	PRL 100 121803	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52234
	ABAZOV	08AM	PRL 101 241801	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52604
	ABAZOV	05W	PRL 95 171801	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50929
	ACOSTA	05	PRL 94 101803	D. Acosta *et al.*	(CDF Collab.)	REFID=50519

Reference = AAIJ 12AO; PR D86 052006
Verifier code = LHCB

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$B_s^0 = s\bar{b}$, $\overline{B}_s^0 = \bar{s}\,b$, similarly for B_s^*'s

NODE=MXXX046

NODE=S086

B_s^0

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

B_s^0 BRANCHING RATIOS

NODE=S086230

$\Gamma(J/\psi(1S)\pi^+\pi^-)/\Gamma(J/\psi(1S)\phi)$ — Γ_{27}/Γ_{21}

NODE=S086R04
NODE=S086R04

	VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**19.8±0.5±0.5**	[1] AAIJ	12AO	LHCB	pp at 7 TeV

[1] AAIJ 12AO reports $(19.79 \pm 0.47 \pm 0.52) \times 10^{-2}$ from a measurement of $[\Gamma(B_s^0 \to J/\psi(1S)\pi^+\pi^-)/\Gamma(B_s^0 \to J/\psi(1S)\phi)]$ / $[B(\phi(1020) \to K^+K^-)]$ assuming $B(\phi(1020) \to K^+K^-) = (48.9 \pm 0.5) \times 10^{-2}$.

NODE=S086R04;LINKAGE=AA

$\Gamma(J/\psi(1S)f_0(980),\ f_0 \to \pi^+\pi^-)/\Gamma(J/\psi(1S)\phi)$ — Γ_{28}/Γ_{21}

NODE=S086R53
NODE=S086R53

	VALUE	DOCUMENT ID		TECN	COMMENT
	$0.130^{+0.010}_{-0.008}$ OUR AVERAGE				
	[0.126 ± 0.010 OUR 2012 AVERAGE]				
YOUR DATA	$0.139 \pm 0.006^{+0.025}_{-0.012}$	[1,2] AAIJ	12AO	LHCB	pp at 7 TeV
	$0.135 \pm 0.036 \pm 0.001$	[3] ABAZOV	12C	D0	$p\bar{p}$ at 1.96 TeV
	$0.123^{+0.026}_{-0.022} \pm 0.001$	[4] AAIJ	11	LHCB	pp at 7 TeV
	$0.126 \pm 0.012 \pm 0.001$	[5] AALTONEN	11AB	CDF	$p\bar{p}$ at 1.96 TeV

NEW

[1] AAIJ 12AO reports $(13.9 \pm 0.6^{+2.5}_{-1.2}) \times 10^{-2}$ from a measurement of $[\Gamma(B_s^0 \to J/\psi(1S)f_0(980),\ f_0 \to \pi^+\pi^-)/\Gamma(B_s^0 \to J/\psi(1S)\phi)]$ / $[B(\phi(1020) \to K^+K^-)]$ assuming $B(\phi(1020) \to K^+K^-) = (48.9 \pm 0.5) \times 10^{-2}$.

NODE=S086R53;LINKAGE=AJ

[2] Measured in Dalitz plot like analysis of $B_s \to J/\psi\pi^+\pi^-$ decays.

NODE=S086R53;LINKAGE=DA

[3] ABAZOV 12C reports $[\Gamma(B_s^0 \to J/\psi(1S)f_0(980),\ f_0 \to \pi^+\pi^-)/\Gamma(B_s^0 \to J/\psi(1S)\phi)]$ / $[B(\phi(1020) \to K^+K^-)] = 0.275 \pm 0.041 \pm 0.061$ which we multiply by our best value $B(\phi(1020) \to K^+K^-) = (48.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=S086R53;LINKAGE=AB

[4] AAIJ 11 reports $[\Gamma(B_s^0 \to J/\psi(1S)f_0(980),\ f_0 \to \pi^+\pi^-)/\Gamma(B_s^0 \to J/\psi(1S)\phi)]$ / $[B(\phi(1020) \to K^+K^-)] = 0.252^{+0.046}_{-0.032}{}^{+0.027}_{-0.033}$ which we multiply by our best value $B(\phi(1020) \to K^+K^-) = (48.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=S086R53;LINKAGE=AI

[5] AALTONEN 11AB reports $[\Gamma(B_s^0 \to J/\psi(1S)f_0(980),\ f_0 \to \pi^+\pi^-)/\Gamma(B_s^0 \to J/\psi(1S)\phi)]$ / $[B(\phi(1020) \to K^+K^-)] = 0.257 \pm 0.020 \pm 0.014$ which we multiply by our best value $B(\phi(1020) \to K^+K^-) = (48.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=S086R53;LINKAGE=AA

$\Gamma(J/\psi(1S)f_0(1370),\ f_0 \to \pi^+\pi^-)/\Gamma(J/\psi(1S)\phi)$ — Γ_{29}/Γ_{21}

NODE=S086R07
NODE=S086R07

	VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$4.2 \pm 0.5^{+0.1}_{-3.7}$**	[1,2] AAIJ	12AO	LHCB	pp at 7 TeV

[1] AAIJ 12AO reports $(4.19 \pm 0.53^{+0.12}_{-3.7}) \times 10^{-2}$ from a measurement of $[\Gamma(B_s^0 \to J/\psi(1S)f_0(1370),\ f_0 \to \pi^+\pi^-)/\Gamma(B_s^0 \to J/\psi(1S)\phi)]$ / $[B(\phi(1020) \to K^+K^-)]$ assuming $B(\phi(1020) \to K^+K^-) = (48.9 \pm 0.5) \times 10^{-2}$.

NODE=S086R07;LINKAGE=AA

[2] Measured in Dalitz plot like analysis of $B_s \to J/\psi\pi^+\pi^-$ decays.

NODE=S086R07;LINKAGE=DA

$\Gamma(J/\psi(1S)f_2(1270),\ f_2 \to \pi^+\pi^-)/\Gamma(J/\psi(1S)\phi)$ — Γ_{30}/Γ_{21}

NODE=S086R05
NODE=S086R05

	VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$\mathbf{9.8 \pm 3.3^{+0.6}_{-1.5}}$	[1,2] AAIJ	12AO	LHCB	pp at 7 TeV

[1] AAIJ 12AO reports $(0.098 \pm 0.033^{+0.006}_{-0.015}) \times 10^{-2}$ from a measurement of $[\Gamma(B^0_s \to J/\psi(1S)f_2(1270),\ f_2 \to \pi^+\pi^-)/\Gamma(B^0_s \to J/\psi(1S)\phi)]$ / $[B(\phi(1020) \to K^+K^-)]$ assuming $B(\phi(1020) \to K^+K^-) = (48.9 \pm 0.5) \times 10^{-2}$. NODE=S086R05;LINKAGE=AA

[2] Measured in Dalitz plot like analysis of $B_s \to J/\psi\pi^+\pi^-$ decays for the f_2 helicity state $\lambda = 0$. NODE=S086R05;LINKAGE=DA

$\Gamma(J/\psi(1S)\pi^+\pi^-(\text{nonresonant}))/\Gamma(J/\psi(1S)\phi)$ — Γ_{31}/Γ_{21}

NODE=S086R06
NODE=S086R06

	VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$\mathbf{1.66 \pm 0.31^{+0.96}_{-0.08}}$	[1,2] AAIJ	12AO	LHCB	pp at 7 TeV

[1] AAIJ 12AO reports $(1.66 \pm 0.31^{+0.96}_{-0.08}) \times 10^{-2}$ from a measurement of $[\Gamma(B^0_s \to J/\psi(1S)\pi^+\pi^-(\text{nonresonant}))/\Gamma(B^0_s \to J/\psi(1S)\phi)]$ / $[B(\phi(1020) \to K^+K^-)]$ assuming $B(\phi(1020) \to K^+K^-) = (48.9 \pm 0.5) \times 10^{-2}$. NODE=S086R06;LINKAGE=AA

[2] Measured in Dalitz plot like analysis of $B_s \to J/\psi\pi^+\pi^-$ decays. NODE=S086R06;LINKAGE=DA

B^0_s REFERENCES

NODE=S086

YOUR PAPER	AAIJ	12AO PR D86 052006	R. Aaij *et al.*	(LHCb Collab.)	REFID=54592
	ABAZOV	12C PR D85 011103	V.M. Abazov *et al.*	(D0 Collab.)	REFID=54013
	AAIJ	11 PL B698 115	R. Aaij *et al.*	(LHCb Collab.)	REFID=53671
	AALTONEN	11AB PR D84 052012	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53799

Reference = AAIJ 12AP; PR D86 071102
Verifier code = LHCB

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BOTTOM, STRANGE MESONS ($B = \pm1$, $S = \mp1$)

NODE=MXXX046

$B^0_s = s\bar{b}$, $\overline{B}^0_s = \bar{s}\,b$, similarly for B^*_s's

NODE=MXXX046

NODE=S086

B^0_s

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

B^0_s BRANCHING RATIOS

NODE=S086230

$\Gamma(J/\psi(1S)K^*(892)^0)/\Gamma_{total}$ — Γ_{25}/Γ

NODE=S086R47
NODE=S086R47

	VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT	
	4.6±0.8 OUR AVERAGE [$(9 \pm 4) \times 10^{-5}$ OUR 2012 AVERAGE]					NEW
YOUR DATA	**4.6±0.8±0.2**	[1] AAIJ	12AP	LHCB	pp at 7 TeV	
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	9 ±4 ±1	[2] AALTONEN	11A	CDF	$p\overline{p}$ at 1.96 TeV	

[1] AAIJ 12AP reports $[\Gamma(B^0_s \to J/\psi(1S)K^*(892)^0)/\Gamma_{total}]$ / $[B(B^0 \to J/\psi(1S)K^*(892)^0)] = (3.43^{+0.34}_{-0.36} \pm 0.50) \times 10^{-2}$ which we multiply by our best value $B(B^0 \to J/\psi(1S)K^*(892)^0) = (1.34 \pm 0.06) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=S086R47;LINKAGE=AI

[2] AALTONEN 11A reports $[\Gamma(B^0_s \to J/\psi(1S)K^*(892)^0)/\Gamma_{total}] \times [B(\overline{b} \to B^0_s)]$ / $[B(\overline{b} \to B^0)]$ / $[B(B^0 \to J/\psi(1S)K^*(892)^0)] = 0.0168 \pm 0.0024 \pm 0.0068$ which we multiply or divide by our best values $B(\overline{b} \to B^0_s) = (10.4 \pm 0.6) \times 10^{-2}$, $B(\overline{b} \to B^0) = (40.2 \pm 0.7) \times 10^{-2}$, $B(B^0 \to J/\psi(1S)K^*(892)^0) = (1.34 \pm 0.06) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best values. NODE=S086R47;LINKAGE=AA

POLARIZATION IN B^0_s DECAY

NODE=S086233

Γ_L/Γ for $B^0_s \to J/\psi(1S)K^*(892)^0$

NODE=S086PK1

Longitudinal polarization fraction, equals to f_L using notation of "Polarization in B decays" review. NODE=S086PK1

NODE=S086PK1

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.50±0.08±0.02**	[1] AAIJ	12AP	LHCB	pp at 7 TeV

[1] The non-resonant $K\pi$ background contributions are subtracted. Also reports an S-wave amplitude $|A_S|^2 = 0.07^{+0.15}_{-0.07}$. NODE=S086PK1;LINKAGE=AA

$\Gamma_{\parallel}/\Gamma$ for $B^0_s \to J/\psi(1S)K^*(892)^0$

NODE=S086PK2

Parallel polarization fraction, equals to $1 - f_L - f_\perp$ using notation of "Polarization in B decays" review. NODE=S086PK2

NODE=S086PK2

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$0.19^{+0.10}_{-0.08}$±0.02**	[1] AAIJ	12AP	LHCB	pp at 7 TeV

[1] The non-resonant $K\pi$ background contributions are subtracted. Also reports an S-wave amplitude $|A_S|^2 = 0.07^{+0.15}_{-0.07}$. NODE=S086PK2;LINKAGE=AA

B^0_s REFERENCES

NODE=S086

YOUR PAPER	AAIJ	12AP	PR D86 071102	R. Aaij *et al.*	(LHCb Collab.)	REFID=54593
	AALTONEN	11A	PR D83 052012	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53675

Reference = AAIJ 12AQ; PL B718 43
Verifier code = LHCB

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Tim Gershon

EMAIL: T.J.Gershon@warwick.ac.uk

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS ($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

CP VIOLATION

NODE=S041220

A_{CP} is defined as

NODE=S041220

$$\frac{B(B^- \to \overline{f}) - B(B^+ \to f)}{B(B^- \to \overline{f}) + B(B^+ \to f)},$$

the *CP*-violation charge asymmetry of exclusive B^- and B^+ decay.

$r_B(B^+ \to D^0 K^+)$

NODE=S041ARX

r_B and δ_B are the amplitude ratio and relative strong phase between the amplitudes of $A(B^+ \to D^0 K^+)$ and $A(B^+ \to \overline{D}^0 K^+)$,

NODE=S041ARX

NODE=S041ARX

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
0.096 ± 0.014 OUR AVERAGE Error includes scale factor of 1.2. [$0.113^{+0.024}_{-0.021}$ OUR 2012 AVERAGE]					
$0.092^{+0.013}_{-0.012}$		[1] LEES	13B	BABR	$e^+e^- \to \Upsilon(4S)$
YOUR DATA 0.07 ± 0.04		[2,3] AAIJ	12AQ	LHCB	pp at 7 TeV
$0.160^{+0.040}_{-0.038}{}^{+0.051}_{-0.015}$		[4] POLUEKTOV	10	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.145 \pm 0.030 \pm 0.015$		[3,5] AIHARA	12	BELL	$e^+e^- \to \Upsilon(4S)$
<0.13	90	[6] LEES	11D	BABR	$e^+e^- \to \Upsilon(4S)$
$0.096 \pm 0.029 \pm 0.006$		[7] DEL-AMO-SA..	10F	BABR	Repl. by LEES 13B
$0.095^{+0.051}_{-0.041}$		[8] DEL-AMO-SA..	10H	BABR	Repl. by LEES 13B
$0.086 \pm 0.032 \pm 0.015$		[9] AUBERT	08AL	BABR	Repl. by DEL-AMO-SANCHEZ 10F
<0.19	90	HORII	08	BELL	$e^+e^- \to \Upsilon(4S)$
$0.159^{+0.054}_{-0.050} \pm 0.050$		[10] POLUEKTOV	06	BELL	Repl. by POLUEKTOV 10
$0.12 \pm 0.08 \pm 0.05$		[11] AUBERT,B	05Y	BABR	Repl. by AUBERT 08AL

NODE=S041ARX;LINKAGE=LS

[1] Reports combination of published measurements using GGSZ, GLW, and ADS methods.

NODE=S041ARX;LINKAGE=AA

[2] Reports combined statistical and systematic uncertainties.

NODE=S041ARX;LINKAGE=AH

[3] Uses binned Dalitz plot of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays from $B^+ \to \overline{D}^0 K^+$. Measurement of strong phases in $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ Dalitz plot from LIBBY 10 is used as input.

NODE=S041ARX;LINKAGE=PU

[4] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays from $B^+ \to D^0 K^+$ modes. The corresponding two standard deviation interval is $0.084 < r_B < 0.239$.

NODE=S041ARX;LINKAGE=AI

[5] We combined the systematics in quadrature. The authors report separately the contribution to the systematic uncertainty due to the uncertainty on the bin-averaged strong phase difference between D^0 and $\overline{D}^0$ amplitudes.

NODE=S041ARX;LINKAGE=LE

[6] Uses decays of neutral D to $K^-\pi^+\pi^0$.

NODE=S041ARX;LINKAGE=DE

[7] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$, $K^0_S K^+ K^-$ decays from $B^+ \to D^{(*)} K^{(*)+}$ modes. The corresponding two standard deviation interval is $0.037 < r_B < 0.155$.

NODE=S041ARX;LINKAGE=DL

[8] Uses the Cabibbo suppressed decay of $B^+ \to \overline{D} K^+$ followed by $\overline{D} \to K^- \pi^+$.

NODE=S041ARX;LINKAGE=AB

[9] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ and $\overline{D}^0 \to K^0_S K^+ K^-$ decays coming from $B^\pm \to D^{(*)} K^{(*)\pm}$ modes.

NODE=S041ARX;LINKAGE=PO

[10] Uses a Dalitz plot analysis of the $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays; Combines the $D K^+$, $D^* K^+$ and $D K^{*+}$ modes.

[11] Uses a Dalitz analysis of neutral D decays to $K^0_S \pi^+ \pi^-$ in the processes $B^\pm \to D^{(*)} K^\pm$, $D^* \to D\pi^0$, $D\gamma$. NODE=S041ARX;LINKAGE=AU

$\delta_B(B^+ \to D^0 K^+)$

NODE=S041DRX
NODE=S041DRX

VALUE (°)	DOCUMENT ID		TECN	COMMENT
115 ±13 OUR AVERAGE				
[(125 ± 16)° OUR 2012 AVERAGE]				
$105 \; ^{+16}_{-17}$	[1] LEES	13B	BABR	$e^+e^- \to \Upsilon(4S)$
YOUR DATA $137 \; ^{+35}_{-46}$	[2,3] AAIJ	12AQ	LHCB	pp at 7 TeV
$136.7 ^{+13.0}_{-15.8} \pm 23.2$	[4] POLUEKTOV	10	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$129.9 \pm 15.0 \pm 6.0$	[3,5] AIHARA	12	BELL	$e^+e^- \to \Upsilon(4S)$
$119 \; ^{+19}_{-20} \pm 4$	[6] DEL-AMO-SA..	10F	BABR	Repl. by LEES 13B
$109 \; ^{+27}_{-30} \pm 8$	[7] AUBERT	08AL	BABR	Repl. by DEL-AMO-SANCHEZ 10F
$145.7 ^{+19.0}_{-19.7} \pm 23.1$	[8] POLUEKTOV	06	BELL	Repl. by POLUEKTOV 10
$104 \pm 45 \; ^{+23}_{-32}$	[9] AUBERT,B	05Y	BABR	Repl. by AUBERT 08AL

[1] Reports combination of published measurements using GGSZ, GLW, and ADS methods. NODE=S041DRX;LINKAGE=LE
[2] Reports combined statistical and systematic uncertainties. NODE=S041DRX;LINKAGE=AA
[3] Uses binned Dalitz plot of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays from $B^+ \to \overline{D}^0 K^+$. Measurement of strong phases in $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ Dalitz plot from LIBBY 10 is used as input. NODE=S041DRX;LINKAGE=AH
[4] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays from $B^+ \to \overline{D}^0 K^+$ modes. The corresponding two standard deviation interval is $102.2° < \delta_B < 162.3°$. NODE=S041DRX;LINKAGE=PU
[5] We combined the systematics in quadrature. The authors report separately the contribution to the systematic uncertainty due to the uncertainty on the bin-averaged strong phase difference between D^0 and $\overline{D}^0$ amplitudes. NODE=S041DRX;LINKAGE=AI
[6] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$, $K^0_S K^+ K^-$ decays from $B^+ \to D^{(*)} K^{(*)+}$ modes. The corresponding two standard deviation interval is $75° < \delta_B < 157°$. NODE=S041DRX;LINKAGE=DE
[7] Uses Dalitz plot analysis of $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ and $\overline{D}^0 \to K^0_S K^+ K^-$ decays coming from $B^\pm \to D^{(*)} K^{(*)\pm}$ modes. NODE=S041DRX;LINKAGE=AB
[8] Uses a Dalitz plot analysis of the $\overline{D}^0 \to K^0_S \pi^+ \pi^-$ decays; Combines the DK^+, D^*K^+ and DK^{*+} modes. NODE=S041DRX;LINKAGE=PO
[9] Uses a Dalitz analysis of neutral D decays to $K^0_S \pi^+ \pi^-$ in the processes $B^\pm \to D^{(*)} K^\pm$, $D^* \to D\pi^0$, $D\gamma$. NODE=S041DRX;LINKAGE=AU

$\gamma(B^+ \to D^{(*)0} K^{(*)+})$

NODE=S041GAM

For angle $\gamma(\phi_3)$ of the CKM unitarity triangle, see the review on "*CP* Violation" in the Reviews section. NODE=S041GAM

NODE=S041GAM

VALUE (°)	CL%	DOCUMENT ID		TECN	COMMENT
72 ±11 OUR AVERAGE					
[(73 ± 10)° OUR 2012 AVERAGE]					
$69 \; ^{+17}_{-16}$		[1] LEES	13B	BABR	$e^+e^- \to \Upsilon(4S)$
YOUR DATA $44 \; ^{+43}_{-38}$		[2,3] AAIJ	12AQ	LHCB	pp at 7 TeV
$78.4 ^{+10.8}_{-11.6} \pm 9.6$		[4] POLUEKTOV	10	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$77.3 ^{+15.1}_{-14.9} \pm 5.9$		[3,5] AIHARA	12	BELL	$e^+e^- \to \Upsilon(4S)$
$68 \pm 14 \pm 5$		[6] DEL-AMO-SA..	10F	BABR	Repl. by LEES 13B
7 to 173	95	[7] DEL-AMO-SA..	10G	BABR	$e^+e^- \to \Upsilon(4S)$
$76 \; ^{+22}_{-23} \pm 7.1$		[8] AUBERT	08AL	BABR	Repl. by DEL-AMO-SANCHEZ 10F
$53 \; ^{+15}_{-18} \pm 10$		[9] POLUEKTOV	06	BELL	Repl. by POLUEKTOV 10
$70 \pm 31 \; ^{+18}_{-15}$		[10] AUBERT,B	05Y	BABR	Repl. by AUBERT 08AL
$77 \; ^{+17}_{-19} \pm 17$		[11] POLUEKTOV	04	BELL	Repl. by POLUEKTOV 06

NEW

[1] Reports combination of published measurements using GGSZ, GLW, and ADS methods. Reports also 2σ range of 41–102° and a 5.9σ significance for $\gamma(B^+ \rightarrow D^{(*)0} K^{(*)+}) \neq 0$ hypothesis. NODE=S041GAM;LINKAGE=LE

[2] Reports combined statistical and systematic uncertainties. NODE=S041GAM;LINKAGE=AA

[3] Uses binned Dalitz plot of $\overline{D}^0 \rightarrow K^0_S \pi^+ \pi^-$ decays from $B^+ \rightarrow \overline{D}^0 K^+$. Measurement of strong phases in $\overline{D}^0 \rightarrow K^0_S \pi^+ \pi^-$ Dalitz plot from LIBBY 10 is used as input. NODE=S041GAM;LINKAGE=AH

[4] Uses Dalitz plot analysis of $\overline{D}^0 \rightarrow K^0_S \pi^+ \pi^-$ decays from $B^+ \rightarrow D^{(*)} K^+$ modes. The corresponding two standard deviation interval for γ is $54.2^\circ < \gamma < 100.5^\circ$. CP conservation in the combined result is ruled out with a significance of 3.5 standard deviations. NODE=S041GAM;LINKAGE=PU

[5] We combined the systematics in quadrature. The authors report separately the contribution to the systematic uncertainty due to the uncertainty on the bin-averaged strong phase difference between D^0 and $\overline{D}^0$ amplitudes. NODE=S041GAM;LINKAGE=AI

[6] Uses Dalitz plot analysis of $\overline{D}^0 \rightarrow K^0_S \pi^+ \pi^-$, $K^0_S K^+ K^-$ decays from $B^+ \rightarrow D^{(*)} K^+$, $D K^{*+}$ modes. The corresponding two standard deviation interval for γ is $39^\circ < \gamma < 98^\circ$. CP conservation in the combined result is ruled out with a significance of 3.5 standard deviations. NODE=S041GAM;LINKAGE=DE

[7] Reports confidence intervals for the CKM angle γ from the measured values of the GLW parameters using $B^\pm \rightarrow D K^\pm$ decays with D mesons decaying to non-$CP(K\pi)$, CP-even ($K^+ K^-$, $\pi^+ \pi^-$), and CP-odd ($K^0_S \pi^0$, $K^0_S \omega$) states. NODE=S041GAM;LINKAGE=DA

[8] Uses Dalitz plot analysis of $\overline{D}^0 \rightarrow K^0_S \pi^+ \pi^-$ and $\overline{D}^0 \rightarrow K^0_S K^+ K^-$ decays coming from $B^\pm \rightarrow D^{(*)} K^{(*)\pm}$ modes. The corresponding two standard deviation interval is $29^\circ < \gamma < 122^\circ$. NODE=S041GAM;LINKAGE=AB

[9] Uses a Dalitz plot analysis of the $\overline{D}^0 \rightarrow K^0_S \pi^+ \pi^-$ decays; Combines the $D K^+$, $D^* K^+$ and $D K^{*+}$ modes. The corresponding two standard deviations interval for gamma is $8^\circ < \gamma < 111^\circ$. NODE=S041GAM;LINKAGE=PL

[10] Uses a Dalitz plot analysis of neutral $D \rightarrow K^0_S \pi^+ \pi^-$ decays coming from $B^\pm \rightarrow D K^\pm$ and $B^\pm \rightarrow D^{*0} K^\pm$ followed by $D^{*0} \rightarrow D\pi^0$, $D\gamma$. The corresponding two standard deviations interval for gamma is $12^\circ < \gamma < 137^\circ$. AUBERT,B 05Y also reports the amplitude ratios and the strong phases. NODE=S041GAM;LINKAGE=AU

[11] Uses a Dalitz plot analysis of the 3-body $D \rightarrow K^0_S \pi^+ \pi^-$ decays coming from $B^\pm \rightarrow D K^\pm$ and $B^\pm \rightarrow D^* K^\pm$ followed by $D^* \rightarrow D\pi^0$; here we use D to denote that the neutral D meson produced in the decay is an admixture of D^0 and $\overline{D}^0$. The corresponding two standard deviations interval for γ is $26^\circ < \gamma < 126^\circ$. POLUEKTOV 04 also reports the amplitude ratios and the strong phases. NODE=S041GAM;LINKAGE=PO

$B^\pm$ REFERENCES

NODE=S041

LEES	13B	PR D87 052015	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54948
YOUR PAPER AAIJ	12AQ	PL B718 43	R. Aaij *et al.*	(LHCb Collab.)	REFID=54594
AIHARA	12	PR D85 112014	H. Aihara *et al.*	(BELLE Collab.)	REFID=54412
LEES	11D	PR D84 012002	J.P. Lees *et al.*	(BABAR Collab.)	REFID=53751
DEL-AMO-SA...	10F	PRL 105 121801	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53413
DEL-AMO-SA...	10G	PR D82 072004	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53455
DEL-AMO-SA...	10H	PR D82 072006	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53456
LIBBY	10	PR D82 112006	J. Libby *et al.*	(CLEO Collab.)	REFID=53583
POLUEKTOV	10	PR D81 112002	A. Poluektov *et al.*	(BELLE Collab.)	REFID=53340
AUBERT	08AL	PR D78 034023	B. Aubert *et al.*	(BABAR Collab.)	REFID=52361
HORII	08	PR D78 071901	Y. Horii *et al.*	(BELLE Collab.)	REFID=52533
POLUEKTOV	06	PR D73 112009	A. Poluektov *et al.*	(BELLE Collab.)	REFID=51287
AUBERT,B	05Y	PRL 95 121802	B. Aubert *et al.*	(BABAR Collab.)	REFID=50919
POLUEKTOV	04	PR D70 072003	A. Poluektov *et al.*	(BELLE Collab.)	REFID=50223

Reference = AAIJ 12AR; JHEP 1210 037
Verifier code = LHCB

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PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Tim Gershon

EMAIL: T.J.Gershon@warwick.ac.uk

June 4, 2013

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(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

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(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(K^+K^-)/\Gamma_{total}$ — **Γ_{285}/Γ**

NODE=S042S1
NODE=S042S1

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
0.13±0.05 OUR AVERAGE					
0.10±0.08±0.04		[1,2] DUH	13	BELL	$e^+e^- \to \Upsilon(4S)$
YOUR DATA 0.12 $^{+0.08}_{-0.07}$ ±0.01		[3] AAIJ	12AR	LHCB	pp at 7 TeV
0.23±0.10±0.10		[4] AALTONEN	12L	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 0.7	90	[5] AALTONEN	09C	CDF	Repl. by AALTONEN 12L
< 0.5	90	[2] AUBERT	07B	BABR	$e^+e^- \to \Upsilon(4S)$
< 0.41	90	[2] LIN	07	BELL	Repl. by DUH 13
< 1.8	90	[6] ABULENCIA,A	06D	CDF	Repl. by AALTONEN 09C
< 0.37	90	ABE	05G	BELL	Repl. by LIN 07
< 0.7	90	CHAO	04	BELL	$e^+e^- \to \Upsilon(4S)$
< 0.8	90	[2] BORNHEIM	03	CLE2	$e^+e^- \to \Upsilon(4S)$
< 0.6	90	[2] AUBERT	02Q	BABR	$e^+e^- \to \Upsilon(4S)$
< 0.9	90	[2] CASEY	02	BELL	$e^+e^- \to \Upsilon(4S)$
< 2.7	90	[2] ABE	01H	BELL	$e^+e^- \to \Upsilon(4S)$
< 2.5	90	[2] AUBERT	01E	BABR	$e^+e^- \to \Upsilon(4S)$
< 66	90	[7] ABE	00C	SLD	$e^+e^- \to Z$
< 1.9	90	[2] CRONIN-HEN..	00	CLE2	$e^+e^- \to \Upsilon(4S)$
< 4.3	90	GODANG	98	CLE2	Repl. by CRONIN-HENNESSY 00
< 46		[8] ADAM	96D	DLPH	$e^+e^- \to Z$
< 4	90	ASNER	96	CLE2	Repl. by GODANG 98
< 18	90	[9] BUSKULIC	96V	ALEP	$e^+e^- \to Z$
<120	90	[10] ABREU	95N	DLPH	Sup. by ADAM 96D
< 7	90	[2] BATTLE	93	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] DUH 13 reports also for the same data $B(B^0 \to K^+K^-) < 0.20 \times 10^{-6}$ at 90% CL. NODE=S042S1;LINKAGE=B

[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042S1;LINKAGE=EP

[3] AAIJ 12AR reports $[\Gamma(B^0 \to K^+K^-)/\Gamma_{total}]$ / $[B(B^0_s \to K^+K^-)]$ / $[\Gamma(\overline{b} \to B^0_s)/\Gamma(\overline{b} \to B^0)] = 0.018^{+0.008}_{-0.007} \pm 0.009$ which we multiply by our best values $B(B^0_s \to K^+K^-) = (2.52 \pm 0.17) \times 10^{-5}$, $\Gamma(\overline{b} \to B^0_s)/\Gamma(\overline{b} \to B^0) = 0.259 \pm 0.016$. Our first error is their experiment's error and our second error is the systematic error from using our best values. NODE=S042S1;LINKAGE=AI

[4] Reported a central value of $(0.23 \pm 0.10 \pm 0.10) \times 10^{-6}$ using $B(B^0 \to K^+\pi^-) = (19.4 \pm 0.6) \times 10^{-6}$. NODE=S042S1;LINKAGE=AL

[5] Obtains this result from $B(K^+K^-)/B(K^+\pi^-) = 0.020 \pm 0.008 \pm 0.006$, assuming $B(B^0 \to K^+\pi^-) = (19.4 \pm 0.6) \times 10^{-6}$. NODE=S042S1;LINKAGE=AA

[6] ABULENCIA,A 06D obtains this from $\Gamma(K^+K^-)/\Gamma(K^+\pi^-) < 0.10$ at 90% CL, assuming $B(B^0 \to K^+\pi^-) = (18.9 \pm 0.7) \times 10^{-6}$. NODE=S042S1;LINKAGE=AB

[7] ABE 00C assumes B($Z \rightarrow b\bar{b}$)=(21.7 ± 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})$% and $f_{B_s}=(10.5^{+1.8}_{-2.2})$%. NODE=S042S1;LINKAGE=KQ

[8] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$. Contributions from B^0 and B_s decays cannot be separated. Limits are given for the weighted average of the decay rates for the two neutral B mesons. NODE=S042S1;LINKAGE=DQ

[9] BUSKULIC 96V assumes PDG 96 production fractions for B^0, B^+, B_s, b baryons. NODE=S042S1;LINKAGE=BV

[10] Assumes a B^0, B^- production fraction of 0.39 and a B_s production fraction of 0.12. Contributions from B^0 and B_s^0 decays cannot be separated. Limits are given for the weighted average of the decay rates for the two neutral B mesons. NODE=S042S1;LINKAGE=SR

$\Gamma(\pi^+\pi^-)/\Gamma(K^+\pi^-)$ — $\Gamma_{351}/\Gamma_{222}$

NODE=S042Q94
NODE=S042Q94

VALUE	DOCUMENT ID		TECN	COMMENT
0.261±0.015 OUR AVERAGE				NEW
[0.259 ± 0.023 OUR 2012 AVERAGE]				
YOUR DATA 0.262±0.009±0.017	AAIJ	12AR	LHCB	pp at 7 TeV
0.259±0.017±0.016	AALTONEN	11N	CDF	$p\bar{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.21 ±0.05 ±0.03	ABULENCIA,A	06D	CDF	Repl. by AALTONEN 11N

B^0 REFERENCES

NODE=S042

	DUH	13	PR D87 031103	Y. T. Duh *et al.*	(Belle)
YOUR PAPER	AAIJ	12AR	JHEP 1210 037	R. Aaij *et al.*	(LHCb Collab.)
	AALTONEN	12L	PRL 108 211803	T. Aaltonen *et al.*	(CDF Collab.)
	AALTONEN	11N	PRL 106 181802	T. Aaltonen *et al.*	(CDF Collab.)
	AALTONEN	09C	PRL 103 031801	T. Aaltonen *et al.*	(CDF Collab.)
	AUBERT	07B	PR D75 012008	B. Aubert *et al.*	(BABAR Collab.)
	LIN	07	PRL 98 181804	S.-W. Lin *et al.*	(BELLE Collab.)
	ABULENCIA,A	06D	PRL 97 211802	A. Abulencia *et al.*	(CDF Collab.)
	ABE	05G	PRL 95 231802	K. Abe *et al.*	(BELLE Collab.)
	CHAO	04	PR D69 111102	Y. Chao *et al.*	(BELLE Collab.)
	BORNHEIM	03	PR D68 052002	A. Bornheim *et al.*	(CLEO Collab.)
	AUBERT	02Q	PRL 89 281802	B. Aubert *et al.*	(BaBar Collab.)
	CASEY	02	PR D66 092002	B.C.K. Casey *et al.*	(BELLE Collab.)
	ABE	01H	PRL 87 101801	K. Abe *et al.*	(BELLE Collab.)
	AUBERT	01E	PRL 87 151802	B. Aubert *et al.*	(BaBar Collab.)
	ABE	00C	PR D62 071101	K. Abe *et al.*	(SLD Collab.)
	CRONIN-HEN...	00	PRL 85 515	D. Cronin-Hennessy *et al.*	(CLEO Collab.)
	GODANG	98	PRL 80 3456	R. Godang *et al.*	(CLEO Collab.)
	ADAM	96D	ZPHY C72 207	W. Adam *et al.*	(DELPHI Collab.)
	ASNER	96	PR D53 1039	D.M. Asner *et al.*	(CLEO Collab.)
	BUSKULIC	96V	PL B384 471	D. Buskulic *et al.*	(ALEPH Collab.)
	PDG	96	PR D54 1	R. M. Barnett *et al.*	
	ABREU	95N	PL B357 255	P. Abreu *et al.*	(DELPHI Collab.)
	BATTLE	93	PRL 71 3922	M. Battle *et al.*	(CLEO Collab.)

REFID=54957
REFID=54595
REFID=54241
REFID=16447
REFID=52698
REFID=51610
REFID=51752
REFID=51490
REFID=50936
REFID=50006
REFID=49546
REFID=49243
REFID=49071
REFID=48247
REFID=48378
REFID=47762
REFID=47659
REFID=45935
REFID=45276
REFID=44734
REFID=44909
REFID=44495
REFID=44417
REFID=43640

BOTTOM, STRANGE MESONS
($B = \pm1$, $S = \mp1$)

NODE=MXXX046

$B_s^0 = s\bar{b}$, $\overline{B}_s^0 = \bar{s}b$, similarly for B_s^*'s

NODE=MXXX046

NODE=S086

B_s^0

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

B_s^0 BRANCHING RATIOS

NODE=S086230

$\Gamma(\pi^+\pi^-)/\Gamma_{total}$ — Γ_{35}/Γ

NODE=S086R15
NODE=S086R15

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
0.76±0.19 OUR AVERAGE		Error includes scale factor of 1.4.			
YOUR DATA $0.99^{+0.23}_{-0.19}\pm0.07$		[1] AAIJ	12AR	LHCB	pp at 7 TeV
0.60±0.17±0.04		[2] AALTONEN	12L	CDF	$p\bar{p}$ at 1.96 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 12	90	[3] PENG	10	BELL	$e^+e^- \to \Upsilon(5S)$
< 1.2	90	[4] AALTONEN	09C	CDF	Repl. by AALTONEN 12L
< 1.7	90	[5] ABULENCIA,A	06D	CDF	Repl. by AALTONEN 09C
<232	90	[6] ABE	00C	SLD	$e^+e^- \to Z$
<170	90	[7] BUSKULIC	96V	ALEP	$e^+e^- \to Z$

[1] AAIJ 12AR reports $[\Gamma(B^0_s \to \pi^+\pi^-)/\Gamma_{total}]$ / $[B(B^0 \to \pi^+\pi^-)] \times [\Gamma(\overline{b} \to B^0_s)/\Gamma(\overline{b} \to B^0)] = 0.050^{+0.011}_{-0.009} \pm 0.004$ which we multiply or divide by our best values $B(B^0 \to \pi^+\pi^-) = (5.12 \pm 0.19) \times 10^{-6}$, $\Gamma(\overline{b} \to B^0_s)/\Gamma(\overline{b} \to B^0) = 0.259 \pm 0.016$. Our first error is their experiment's error and our second error is the systematic error from using our best values. NODE=S086R15;LINKAGE=AI

[2] AALTONEN 12L reports $[\Gamma(B^0_s \to \pi^+\pi^-)/\Gamma_{total}]$ / $[B(B^0 \to K^+\pi^-)] \times [\Gamma(\overline{b} \to B^0_s)/\Gamma(\overline{b} \to B^0)] = 0.008 \pm 0.002 \pm 0.001$ which we multiply or divide by our best values $B(B^0 \to K^+\pi^-) = (1.96 \pm 0.05) \times 10^{-5}$, $\Gamma(\overline{b} \to B^0_s)/\Gamma(\overline{b} \to B^0) = 0.259 \pm 0.016$. Our first error is their experiment's error and our second error is the systematic error from using our best values. NODE=S086R15;LINKAGE=AL

[3] Uses $\Upsilon(10860) \to B^*_s\overline{B}^*_s$ and assumes $B(\Upsilon(10860) \to B^{(*)}_s\overline{B}^{(*)}_s) = (19.3 \pm 2.9)\%$ and $\Gamma(\Upsilon(10860) \to B^*_s\overline{B}^*_s)$ / $\Gamma(\Upsilon(10860) \to B^{(*)}_s\overline{B}^{(*)}_s) = (90.1^{+3.8}_{-4.0})\%$. NODE=S086R15;LINKAGE=PE

[4] Obtains this result from $(f_s/f_d) \cdot B(B_s \to \pi^+\pi^-)/B(B^0 \to K^+\pi^-) = 0.007 \pm 0.004 \pm 0.005$, assuming $f_s/f_d = 0.276 \pm 0.034$ and $B(B^0 \to K^+\pi^-) = (19.4 \pm 0.6) \times 10^{-6}$. NODE=S086R15;LINKAGE=AA

[5] ABULENCIA,A 06D obtains this from $B(B_s \to \pi^+\pi^-)$ / $B(B_s \to K^+K^-) < 0.05$ at 90% CL, assuming $B(B_s \to K^+K^-) = (33 \pm 6 \pm 7) \times 10^{-6}$. NODE=S086R15;LINKAGE=AB

[6] ABE 00C assumes $B(Z \to b\overline{b})$=(21.7 ± 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})\%$ and $f_{B_s}=(10.5^{+1.8}_{-2.2})\%$. NODE=S086R15;LINKAGE=KQ

[7] BUSKULIC 96V assumes PDG 96 production fractions for B^0, B^+, B_s, b baryons. NODE=S086R15;LINKAGE=BV

$\Gamma(\pi^+K^-)/\Gamma_{total}$ — Γ_{42}/Γ

NODE=S086R7
NODE=S086R7

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
5.5±0.6 OUR AVERAGE					NEW
[(5.3 ± 1.0) × 10^{-6} OUR 2012 AVERAGE]					
YOUR DATA 5.6±0.6±0.4		[1] AAIJ	12AR	LHCB	pp at 7 TeV
5.4±0.9±0.4		[2] AALTONEN	09C	CDF	$p\overline{p}$ at 1.96 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 26	90	[3] PENG	10	BELL	$e^+e^- \to \Upsilon(5S)$
< 5.6	90	[4] ABULENCIA,A	06D	CDF	Repl. by AALTONEN 09C
<261	90	[5] ABE	00C	SLD	$e^+e^- \to Z$
<210	90	[6] BUSKULIC	96V	ALEP	$e^+e^- \to Z$
<260	90	[7] AKERS	94L	OPAL	$e^+e^- \to Z$

[1] AAIJ 12AR reports $[\Gamma(B^0_s \to \pi^+K^-)/\Gamma_{total}]$ / $[B(B^0 \to K^+\pi^-)] \times [\Gamma(\overline{b} \to B^0_s)/\Gamma(\overline{b} \to B^0)] = 0.074 \pm 0.006 \pm 0.006$ which we multiply or divide by our best values $B(B^0 \to K^+\pi^-) = (1.96 \pm 0.05) \times 10^{-5}$, $\Gamma(\overline{b} \to B^0_s)/\Gamma(\overline{b} \to B^0) = 0.259 \pm 0.016$. Our first error is their experiment's error and our second error is the systematic error from using our best values. NODE=S086R7;LINKAGE=AI

[2] AALTONEN 09C reports $[\Gamma(B^0_s \to \pi^+K^-)/\Gamma_{total}]$ / $[B(B^0 \to K^+\pi^-)] \times [B(\overline{b} \to B^0_s)]$ / $[B(\overline{b} \to B^0)] = 0.071 \pm 0.010 \pm 0.007$ which we multiply or divide by our best values $B(B^0 \to K^+\pi^-) = (1.96 \pm 0.05) \times 10^{-5}$, $B(\overline{b} \to B^0_s) = (10.4 \pm 0.6) \times 10^{-2}$, $B(\overline{b} \to B^0) = (40.2 \pm 0.7) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values. NODE=S086R7;LINKAGE=AL

[3] Uses $\Upsilon(10860) \to B^*_s\overline{B}^*_s$ and assumes $B(\Upsilon(10860) \to B^{(*)}_s\overline{B}^{(*)}_s) = (19.3 \pm 2.9)\%$ and $\Gamma(\Upsilon(10860) \to B^*_s\overline{B}^*_s)$ / $\Gamma(\Upsilon(10860) \to B^{(*)}_s\overline{B}^{(*)}_s) = (90.1^{+3.8}_{-4.0})\%$. NODE=S086R7;LINKAGE=PE

[4] ABULENCIA,A 06D obtains this from (f_s/f_d) $(B(B_s \to \pi^+K^-)$ / $B(B^0 \to K^+\pi^-)) < 0.08$ at 90% CL, assuming $f_s/f_d = 0.260 \pm 0.039$ and $B(B^0 \to K^+\pi^-) = (18.9 \pm 0.7) \times 10^{-6}$. NODE=S086R7;LINKAGE=AB

[5] ABE 00C assumes $B(Z \to b\overline{b})$=(21.7 ± 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})\%$ and $f_{B_s}=(10.5^{+1.8}_{-2.2})\%$. NODE=S086R7;LINKAGE=KQ

[6] BUSKULIC 96V assumes PDG 96 production fractions for B^0, B^+, B_s, b baryons. NODE=S086R7;LINKAGE=BV

[7] Assumes $B(Z \to b\overline{b}) = 0.217$ and B^0_d (B^0_s) fraction 39.5% (12%). NODE=S086R7;LINKAGE=A

$\Gamma(K^+K^-)/\Gamma_{total}$ — Γ_{43}/Γ

NODE=S086R8
NODE=S086R8

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
25.2± 1.7 OUR AVERAGE					NEW
[(26.4 ± 2.8) × 10^{-6} OUR 2012 AVERAGE]					
YOUR DATA 23.9± 1.6±1.6		[1] AAIJ	12AR	LHCB	pp at 7 TeV
26.3± 2.2±1.8		[2] AALTONEN	11N	CDF	$p\overline{p}$ at 1.96 TeV
$38\ ^{+10}_{-9}\ \pm7$		[3] PENG	10	BELL	$e^+e^- \to \Upsilon(5S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<310	90	DRUTSKOY	07A	BELL	$e^+e^- \to \Upsilon(5S)$
33 ± 6 ±7		[4] ABULENCIA,A	06D	CDF	Repl. by AALTONEN 11N
<283	90	[5] ABE	00C	SLD	$e^+e^- \to Z$
< 59	90	[6] BUSKULIC	96V	ALEP	$e^+e^- \to Z$
<140	90	[7] AKERS	94L	OPAL	$e^+e^- \to Z$

[1] AAIJ 12AR reports $[\Gamma(B^0_s \to K^+K^-)/\Gamma_{total}]$ / $[B(B^0 \to K^+\pi^-)] \times [\Gamma(\overline{b} \to B^0_s)/\Gamma(\overline{b} \to B^0)] = 0.316 \pm 0.009 \pm 0.019$ which we multiply or divide by our best values $B(B^0 \to K^+\pi^-) = (1.96 \pm 0.05) \times 10^{-5}$, $\Gamma(\overline{b} \to B^0_s)/\Gamma(\overline{b} \to B^0) = 0.259 \pm 0.016$. Our first error is their experiment's error and our second error is the systematic error from using our best values. NODE=S086R8;LINKAGE=AI

[2] AALTONEN 11N reports (f_s/f_d) $(B(B^0_s \to K^+K^-)$ / $B(B^0 \to K^+\pi^-)) = 0.347 \pm 0.020 \pm 0.021$. We multiply this result by our best value of $B(B^0 \to K^+\pi^-) = (1.96 \pm 0.05) \times 10^{-5}$ and divide by our best value of f_s/f_d, where $1/2\ f_s/f_d = 0.129 \pm 0.008$. Our first quoted uncertainty is the combined experiment's uncertainty and our second is the systematic uncertainty from using out best values. NODE=S086R8;LINKAGE=AA

[3] Uses $\Upsilon(10860) \to B^*_s\overline{B}^*_s$ and assumes $B(\Upsilon(10860) \to B^{(*)}_s\overline{B}^{(*)}_s) = (19.3 \pm 2.9)\%$ and $\Gamma(\Upsilon(10860) \to B^*_s\overline{B}^*_s)$ / $\Gamma(\Upsilon(10860) \to B^{(*)}_s\overline{B}^{(*)}_s) = (90.1^{+3.8}_{-4.0})\%$. NODE=S086R8;LINKAGE=PE

[4] ABULENCIA,A 06D obtains this from (f_s/f_d) $(B(B_s \to K^+K^-)$ / $B(B^0 \to K^+\pi^-))$ $= 0.46 \pm 0.08 \pm 0.07$, assuming $f_s/f_d = 0.260 \pm 0.039$ and $B(B^0 \to K^+\pi^-) = (18.9 \pm 0.7) \times 10^{-6}$. NODE=S086R8;LINKAGE=AB

[5] ABE 00C assumes $B(Z \to b\overline{b})$=(21.7 ± 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})\%$ and $f_{B_s}=(10.5^{+1.8}_{-2.2})\%$. NODE=S086R8;LINKAGE=KQ

[6] BUSKULIC 96V assumes PDG 96 production fractions for B^0, B^+, B_s, b baryons. NODE=S086R8;LINKAGE=BV

[7] Assumes $B(Z \to b\overline{b}) = 0.217$ and B^0_d (B^0_s) fraction 39.5% (12%). NODE=S086R8;LINKAGE=A

B^0_s REFERENCES

NODE=S086

YOUR PAPER AAIJ	12AR	JHEP 1210 037	R. Aaij *et al.*	(LHCb Collab.)	REFID=54595
AALTONEN	12L	PRL 108 211803	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54241
AALTONEN	11N	PRL 106 181802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=16447
PENG	10	PR D82 072007	C.-C. Peng *et al.*	(BELLE Collab.)	REFID=53470
AALTONEN	09C	PRL 103 031801	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52698
DRUTSKOY	07A	PR D76 012002	A. Drutskoy *et al.*	(BELLE Collab.)	REFID=51852
ABULENCIA,A	06D	PRL 97 211802	A. Abulencia *et al.*	(CDF Collab.)	REFID=51490
ABE	00C	PR D62 071101	K. Abe *et al.*	(SLD Collab.)	REFID=47762
BUSKULIC	96V	PL B384 471	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=44909
PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495
AKERS	94L	PL B337 393	R. Akers *et al.*	(OPAL Collab.)	REFID=44018

BOTTOM BARYONS
($B = -1$)

NODE=BXXX045

$\Lambda^0_b = u\,d\,b$, $\Xi^0_b = u\,s\,b$, $\Xi^-_b = d\,s\,b$, $\Omega^-_b = s\,s\,b$

NODE=BXXX045

NODE=S040

Λ^0_b

$I(J^P) = 0(\frac{1}{2}^+)$ Status: ∗∗∗

In the quark model, a Λ^0_b is an isospin-0 $u\,d\,b$ state. The lowest Λ^0_b ought to have $J^P = 1/2^+$. None of I, J, or P have actually been measured. NODE=S040

Λ^0_b BRANCHING RATIOS

NODE=S040215

$\Gamma(p\pi^-)/\Gamma(pK^-)$				Γ_{19}/Γ_{20}	NODE=S040R20
VALUE	DOCUMENT ID		TECN	COMMENT	NODE=S040R20
YOUR DATA **0.86±0.08±0.05**	AAIJ	12AR	LHCB	pp at 7 TeV	

Λ_b^0 REFERENCES

NODE=S040

YOUR PAPER AAIJ 12AR JHEP 1210 037 R. Aaij *et al.* (LHCb Collab.) REFID=54595

Reference = AAIJ 13; NP B867 1
Verifier code = LHCB

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Tim Gershon

EMAIL: T.J.Gershon@warwick.ac.uk

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
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BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

CP VIOLATION PARAMETERS

NODE=S042229

$A_{CP}(B^0 \to K^*(892)^0\gamma)$

NODE=S042AKG

VALUE	DOCUMENT ID		TECN	COMMENT
−0.002±0.015 OUR AVERAGE				
[−0.016 ± 0.023 OUR 2012 AVERAGE]				
YOUR DATA 0.008±0.017±0.009	AAIJ	13	LHCB	pp at 7 TeV
−0.016±0.022±0.007	AUBERT	09AO	BABR	$e^+e^- \to \Upsilon(4S)$

NODE=S042AKG
NEW

B^0 REFERENCES

NODE=S042

YOUR PAPER AAIJ	13	NP B867 1	R. Aaij *et al.*	(LHCb Collab.)	REFID=54596
AUBERT	09AO	PRL 103 211802	B. Aubert *et al.*	(BABAR Collab.)	REFID=53083

BOTTOM, STRANGE MESONS
($B = \pm 1$, $S = \mp 1$)

$B^0_s = s\overline{b}$, $\overline{B}^0_s = \overline{s}\,b$, similarly for B^*_s's

NODE=MXXX046

NODE=MXXX046

NODE=S086

B^0_s

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

B^0_s BRANCHING RATIOS

NODE=S086230

$\Gamma(\phi\gamma)/\Gamma_{total}$ — Γ_{50}/Γ

NODE=S086R17

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
36 ± 4 OUR AVERAGE					
[$(57^{+22}_{-19}) \times 10^{-6}$ OUR 2012 AVERAGE]					
YOUR DATA 35.1± 3.5± 1.2		[1] AAIJ	13	LHCB	pp at 7 TeV
$57^{+18}_{-15}{}^{+12}_{-11}$		[2] WICHT	08A	BELL	$e^+e^- \to \Upsilon(5S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
39 ± 5		[3] AAIJ	12AE	LHCB	Replaced by AAIJ 13
<390	90	DRUTSKOY	07A	BELL	$e^+e^- \to \Upsilon(5S)$
<120	90	ACOSTA	02G	CDF	$p\overline{p}$ at 1.8 TeV
<700	90	[4] ADAM	96D	DLPH	$e^+e^- \to Z$

NODE=S086R17
NEW

[1] AAIJ 13 reports $[\Gamma(B^0_s \rightarrow \phi\gamma)/\Gamma_{\rm total}]$ / $[{\rm B}(B^0 \rightarrow K^*(892)^0\gamma)] = 0.81 \pm 0.04 \pm 0.07$ which we multiply by our best value ${\rm B}(B^0 \rightarrow K^*(892)^0\gamma) = (4.33 \pm 0.15) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=S086R17;LINKAGE=AJ

[2] Assumes $\Upsilon(5S) \rightarrow B^*_s \overline{B}^*_s = (19.5^{+3.0}_{-2.3})$%. NODE=S086R17;LINKAGE=WI

[3] Measures ${\rm B}(B^0 \rightarrow K^{*0}\gamma)/{\rm B}(B_s \rightarrow \phi\gamma) = 1.12 \pm 0.08({\rm stat})^{+0.06}_{-0.04}({\rm sys})^{+0.09}_{-0.08}(f_s/f_d)$ and uses current world-average value of ${\rm B}(B^0 \rightarrow K^{*0}\gamma) = (4.33 \pm 0.15) \times 10^{-5}$. NODE=S086R17;LINKAGE=AI

[4] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$. NODE=S086R17;LINKAGE=DQ

B^0_s REFERENCES

NODE=S086

YOUR PAPER	AAIJ	13	NP B867 1	R. Aaij *et al.*	(LHCb Collab.)	REFID=54596
	AAIJ	12AE	PR D85 112013	R. Aaij *et al.*	(LHCb Collab.)	REFID=54374
	WICHT	08A	PRL 100 121801	J. Wicht *et al.*	(BELLE Collab.)	REFID=52436
	DRUTSKOY	07A	PR D76 012002	A. Drutskoy *et al.*	(BELLE Collab.)	REFID=51852
	ACOSTA	02G	PR D66 112002	D. Acosta *et al.*	(CDF Collab.)	REFID=49132
	ADAM	96D	ZPHY C72 207	W. Adam *et al.*	(DELPHI Collab.)	REFID=45276

Reference = AAIJ 13A; NP B867 547
Verifier code = LHCB

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Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(J/\psi(1S)\omega)/\Gamma(J/\psi(1S)\rho^0)$ **$\Gamma_{186}/\Gamma_{183}$**

NODE=S042C06
NODE=S042C06

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$0.89 \pm 0.19^{+0.07}_{-0.13}$**	AAIJ	13A	LHCB	pp at 7 TeV

B^0 REFERENCES

NODE=S042

YOUR PAPER AAIJ 13A NP B867 547 R. Aaij *et al.* (LHCb Collab.) REFID=54670

BOTTOM, STRANGE MESONS
($B = \pm 1$, $S = \mp 1$)

$B^0_s = s\overline{b}$, $\overline{B}^0_s = \overline{s}\,b$, similarly for B^*_s's

NODE=MXXX046

NODE=MXXX046

NODE=S086

B^0_s

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

B^0_s BRANCHING RATIOS

NODE=S086230

$\Gamma(J/\psi(1S)\eta)/\Gamma_{total}$ **Γ_{23}/Γ**

NODE=S086R20
NODE=S086R20

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
4.0 ±0.7 OUR AVERAGE		Error includes scale factor of 1.3.			$[(5.1^{+1.3}_{-1.0}) \times 10^{-4}$ OUR 2012 AVERAGE]
$3.6\ ^{+0.5}_{-0.6} \pm 0.3$		[1] AAIJ	13A	LHCB	pp at 7 TeV
$5.10 \pm 0.50^{+1.17}_{-0.83}$		[2] LI	12	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<38	90	[3] ACCIARRI	97C	L3	

NEW

YOUR DATA

[1] AAIJ 13A reports $[\Gamma(B^0_s \rightarrow J/\psi(1S)\eta)/\Gamma_{\rm total}]$ / $[B(B^0 \rightarrow J/\psi(1S)\rho^0)] = 14.0 \pm 1.2^{+1.1}_{-1.5}{}^{+1.1}_{-1.0}$ which we multiply by our best value $B(B^0 \rightarrow J/\psi(1S)\rho^0) = (2.59 \pm 0.21) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=S086R20;LINKAGE=AA

[2] Observed for the first time with significances over 10 σ. The second error are total systematic uncertainties including the error on $N(B_s^{(*)}\overline{B}_s^{(*)})$. NODE=S086R20;LINKAGE=LI

[3] ACCIARRI 97C assumes B^0 production fraction (39.5 ± 4.0%) and B_s (12.0 ± 3.0%). NODE=S086R20;LINKAGE=CQ

$\Gamma(J/\psi(1S)\eta')/\Gamma_{\rm total}$ — Γ_{26}/Γ

NODE=S086R01
NODE=S086R01

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
3.4 ±0.5 OUR AVERAGE				
$[(3.7^{+1.0}_{-0.9}) \times 10^{-4}$ OUR 2012 AVERAGE]				
YOUR DATA $3.3\ ^{+0.4}_{-0.5}\ \pm 0.3$	[1] AAIJ	13A	LHCB	pp at 7 TeV
$3.71 \pm 0.61^{+0.85}_{-0.60}$	[2] LI	12	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

NEW

[1] AAIJ 13A reports $[\Gamma(B^0_s \rightarrow J/\psi(1S)\eta')/\Gamma_{\rm total}]$ / $[B(B^0 \rightarrow J/\psi(1S)\rho^0)] = 12.7 \pm 1.1^{+0.5}_{-1.3}{}^{+1.0}_{-0.9}$ which we multiply by our best value $B(B^0 \rightarrow J/\psi(1S)\rho^0) = (2.59 \pm 0.21) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=S086R01;LINKAGE=AA

[2] Observed for the first time with significances over 10 σ. The second error are total systematic uncertainties including the error on $N(B_s^{(*)}\overline{B}_s^{(*)})$. NODE=S086R01;LINKAGE=LI

$\Gamma(J/\psi(1S)\eta')/\Gamma(J/\psi(1S)\eta)$ — Γ_{26}/Γ_{23}

NODE=S086R02
NODE=S086R02

VALUE	DOCUMENT ID		TECN	COMMENT
$0.85^{+0.09}_{-0.08}$ OUR AVERAGE				
[0.73 ± 0.14 OUR 2012 AVERAGE]				
YOUR DATA $0.90 \pm 0.09^{+0.06}_{-0.02}$	[1] AAIJ	13A	LHCB	pp at 7 TeV
$0.73 \pm 0.14 \pm 0.02$	[1] LI	12	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

NEW

[1] Strongly correlated with measurements of $\Gamma(J/\psi(1S)\eta)/\Gamma$ and $\Gamma(J/\psi(1S)\eta')/\Gamma$ reported in the same reference. NODE=S086R02;LINKAGE=SC

B^0_s REFERENCES

NODE=S086

YOUR PAPER

AAIJ	13A	NP B867 547	R. Aaij *et al.*	(LHCb Collab.)	REFID=54670
LI	12	PRL 108 181808	J. Li *et al.*	(BELLE Collab.)	REFID=54116
ACCIARRI	97C	PL B391 481	M. Acciarri *et al.*	(L3 Collab.)	REFID=45249

Reference = AAIJ 12AV; PRL 109 232001
Verifier code = LHCB

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BOTTOM, CHARMED MESONS ($B = C = \pm 1$)

NODE=MXXX049

$B_c^+ = c\bar{b}$, $B_c^- = \bar{c}b$, similarly for B_c^*'s

NODE=MXXX049

NODE=S091

$B_c^\pm$

$I(J^P) = 0(0^-)$
I, J, P need confirmation.

Quantum numbers shown are quark-model predictions.

NODE=S091

$B_c^\pm$ MASS

NODE=S091M

	VALUE (GeV)	DOCUMENT ID		TECN	COMMENT
	6.2745±0.0018 OUR AVERAGE				
	[6.277 ± 0.006 GeV OUR 2012 AVERAGE Scale factor = 1.6]				
YOUR DATA	6.2737±0.0013±0.0016	[1] AAIJ	12AV	LHCB	pp at 7 TeV
	6.2756±0.0029±0.0025	[2] AALTONEN	08M	CDF	$p\bar{p}$ at 1.96 TeV
	6.300 ±0.014 ±0.005	[2] ABAZOV	08T	D0	$p\bar{p}$ at 1.96 TeV
	6.4 ±0.39 ±0.13	[3] ABE	98M	CDF	$p\bar{p}$ at 1.8 TeV
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	6.2857±0.0053±0.0012	[2] ABULENCIA	06C	CDF	Repl. by AALTONEN 08M
	6.32 ±0.06	[4] ACKERSTAFF	98O	OPAL	$e^+e^- \to Z$

NODE=S091M;LINKAGE=AA

NEW

[1] AAIJ 12AV uses the $B(c)^+ \to J/\psi\pi^+$ mode and also measures the mass difference $M(B(c)^+) - M(B^+) = 994.6 \pm 1.3 \pm 0.6$ MeV/c^2.

[2] Measured using a fully reconstructed decay mode of $B_c \to J/\psi\pi$.

[3] ABE 98M observed $20.4^{+6.2}_{-5.5}$ events in the $B_c^+ \to J/\psi(1s)\ell\nu_\ell$ with a significance of > 4.8 standard deviations. The mass value is estimated from $m(J/\psi(1S)\ell)$.

[4] ACKERSTAFF 98O observed 2 candidate events in the $B_c \to J/\psi(1S)\pi^+$ channel with an estimated background of 0.63 ± 0.20 events.

NODE=S091M;LINKAGE=AN

NODE=S091M;LINKAGE=A

NODE=S091M;LINKAGE=D

B_c^+ BRANCHING RATIOS

NODE=S091225

$\Gamma(J/\psi(1S)\pi^+)/\Gamma_{total} \times B(\bar{b} \to B_c)$ — $\Gamma_2/\Gamma \times B$

NODE=S091R2

NODE=S091R2

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
	seen		AALTONEN	13	CDF	$p\bar{p}$ at 1.96 TeV
YOUR DATA	seen		[11] AAIJ	12AV	LHCB	pp at 7 TeV
	seen		AALTONEN	08M	CDF	$p\bar{p}$ at 1.96 TeV
	seen		ABAZOV	08T	D0	$p\bar{p}$ at 1.96 TeV
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	$<2.4 \times 10^{-4}$	90	[12] ACKERSTAFF	98O	OPAL	$e^+e^- \to Z$
	$<3.4 \times 10^{-4}$	90	[13] ABREU	97E	DLPH	$e^+e^- \to Z$
	$<8.2 \times 10^{-5}$	90	[14] BARATE	97H	ALEP	$e^+e^- \to Z$
	$<2.0 \times 10^{-5}$	95	[15] ABE	96R	CDF	$p\bar{p}$ 1.8 TeV

[11] AAIJ 12AV reports a measurement of $B(B_c^+ \to J/\psi\pi^+)/B(B^+ \to J/\psi K^+)\ f_c/f_u = (0.68 \pm 0.10 \pm 0.03 \pm 0.05)\%$ at $p_T(B) > 4$ GeV and $2.5 < \eta(B) < 4.5$.

NODE=S091R2;LINKAGE=AA

[12] ACKERSTAFF 98O reports $B(Z \to B_c X)/B(Z \to qq) \times B(B_c \to J/\psi(1S)\pi^+) < 1.06 \times 10^{-4}$ at 90%CL. We rescale to our PDG 98 values of $B(Z \to b\bar{b})$.

NODE=S091R2;LINKAGE=D

[13] ABREU 97E value listed is for an assumed $\tau_{B_c} = 0.4$ ps and improves to 2.7×10^{-4} for $\tau_{B_c} = 1.4$ ps.

NODE=S091R2;LINKAGE=A

[14] BARATE 97H reports $B(Z \to B_c X)/B(Z \to qq) \cdot B(B_c \to J/\psi(1S)\pi) < 3.6 \times 10^{-5}$ at 90%CL. We rescale to our PDG 96 values of $B(Z \to b\bar{b})$.

NODE=S091R2;LINKAGE=B

[15] ABE 96R reports $B(b \to B_c X)/B(b \to B^+ X) \cdot B(B_c^+ \to J/\psi(1S)\pi^+)/B(B^+ \to J/\psi(1S)K^+) < 0.053$ at 95%CL for $\tau_{B_c} = 0.8$ ps. It changes from 0.15 to 0.04 for 0.17 ps$< \tau_{B_c} < 1.6$ ps. We rescale to our PDG 96 values of $B(b \to B^+) = 0.378 \pm 0.022$ and $B(B^+ \to J/\psi(1S)K^+) = 0.00101 \pm 0.00014$.

NODE=S091R2;LINKAGE=C

$B_c^{\pm}$ REFERENCES

NODE=S091

	AALTONEN	13	PR D87 011101	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54798
YOUR PAPER	AAIJ	12AV	PRL 109 232001	R. Aaij *et al.*	(LHCb Colalb.)	REFID=54764
	AALTONEN	08M	PRL 100 182002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52252
	ABAZOV	08T	PRL 101 012001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52398
	ABULENCIA	06C	PRL 96 082002	A. Abulencia *et al.*	(CDF Collab.)	REFID=51085
	ABE	98M	PRL 81 2432	F. Abe *et al.*	(CDF Collab.)	REFID=46120
	Also		PR D58 112004	F. Abe *et al.*	(CDF Collab.)	REFID=46488
	ACKERSTAFF	98O	PL B420 157	K. Ackerstaff *et al.*	(OPAL Collab.)	REFID=46029
	PDG	98	EPJ C3 1	C. Caso *et al.*		REFID=45838
	ABREU	97E	PL B398 207	P. Abreu *et al.*	(DELPHI Collab.)	REFID=45322
	BARATE	97H	PL B402 213	R. Barate *et al.*	(ALEPH Collab.)	REFID=45480
	ABE	96R	PRL 77 5176	F. Abe *et al.*	(CDF Collab.)	REFID=45159
	PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495

Reference = AAIJ 12AX; PR D86 112005
Verifier code = LHCB

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BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(D_s^- K^+ \pi^+ \pi^-)/\Gamma_{total}$ — **Γ_{119}/Γ**

NODE=S042C10
NODE=S042C10

	VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**1.8±0.3±0.4**	[1] AAIJ	12AX	LHCB	pp at 7 TeV

[1] AAIJ 12AX reports $[\Gamma(B^0 \to D_s^- K^+ \pi^+ \pi^-)/\Gamma_{total}]$ / $[B(B^0_s \to D_s^- K^+ \pi^+ \pi^-)] = 0.54 \pm 0.07 \pm 0.07$ which we multiply by our best value $B(B^0_s \to D_s^- K^+ \pi^+ \pi^-) = (3.3 \pm 0.7) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=S042C10;LINKAGE=AI

B^0 REFERENCES

NODE=S042

YOUR PAPER AAIJ 12AX PR D86 112005 R. Aaij *et al.* (LHCb Collab.) REFID=54765

BOTTOM, STRANGE MESONS
($B = \pm 1$, $S = \mp 1$)

$B^0_s = s\overline{b}$, $\overline{B}^0_s = \overline{s}\,b$, similarly for B^*_s's

NODE=MXXX046

NODE=MXXX046

NODE=S086

B^0_s

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

B^0_s BRANCHING RATIOS

NODE=S086230

$\Gamma(D_{s1}(2536)^- \pi^+,\ D_{s1}^- \to D_s^- \pi^+ \pi^-)/\Gamma(D_s^- \pi^+ \pi^+ \pi^-)$ — **Γ_{10}/Γ_9**

NODE=S086R58
NODE=S086R58

	VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**4.0±1.0±0.4**	AAIJ	12AX	LHCB	pp at 7 TeV

$\Gamma(D_s^- K^+ \pi^+ \pi^-)/\Gamma(D_s^- \pi^+ \pi^+ \pi^-)$ — **Γ_{12}/Γ_9**

NODE=S086R57
NODE=S086R57

	VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**5.2±0.5±0.3**	AAIJ	12AX	LHCB	pp at 7 TeV

B^0_s REFERENCES

NODE=S086

YOUR PAPER AAIJ 12AX PR D86 112005 R. Aaij *et al.* (LHCb Collab.) REFID=54765

Reference = AAIJ 12AY; JHEP 1212 125
Verifier code = LHCB

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NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(\pi^+\mu^+\mu^-)/\Gamma(K^+\mu^+\mu^-)$				$\Gamma_{456}/\Gamma_{460}$
VALUE	*DOCUMENT ID*	*TECN*	*COMMENT*	
YOUR DATA **0.053±0.014±0.001**	AAIJ 12AY	LHCB	pp at 7 TeV	

NODE=S041T91
NODE=S041T91

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER AAIJ 12AY JHEP 1212 125 R. Aaij *et al.* (LHCb Collab.)

REFID=54766

Reference = AAIJ 13B; PRL 110 021801
Verifier code = LHCB

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Tim Gershon

EMAIL: T.J.Gershon@warwick.ac.uk

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(\mu^+\mu^-)/\Gamma_{total}$ **Γ_{455}/Γ**

NODE=S042R7

Test for ΔB=1 weak neutral current. Allowed by higher-order electroweak interactions.

NODE=S042R7

NODE=S042R7

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<8.0 \times 10^{-10}$ (CL = 90%)		[$<1.4 \times 10^{-9}$ (CL = 90%) OUR 2012 BEST LIMIT]			
YOUR DATA **$<0.80 \times 10^{-9}$**	90	[1] AAIJ	13B	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.6 \times 10^{-9}$	90	[1] AAIJ	12A	LHCB	Repl. by AAIJ 12W
$<0.81 \times 10^{-9}$	90	[2] AAIJ	12W	LHCB	Repl. by AAIJ 13B
$<1.4 \times 10^{-9}$	90	[2] CHATRCHYAN	12A	CMS	pp at 7 TeV
$<1.2 \times 10^{-8}$	90	[3] AAIJ	11B	LHCB	Repl. by AAIJ 12A
$<5.0 \times 10^{-9}$	90	[2] AALTONEN	11AG	CDF	$p\overline{p}$ at 1.96 TeV
$<3.7 \times 10^{-9}$	90	[2] CHATRCHYAN	11T	CMS	Repl. by CHATRCHYAN 12A
$<1.5 \times 10^{-8}$	90	[4] AALTONEN	08I	CDF	Repl. by AALTONEN 11AG
$<5.2 \times 10^{-8}$	90	[5] AUBERT	08P	BABR	$e^+e^- \to \Upsilon(4S)$
$<3.9 \times 10^{-8}$	90	[6] ABULENCIA	05	CDF	Repl. by AALTONEN 08I
$<8.3 \times 10^{-8}$	90	[5] AUBERT	05W	BABR	$e^+e^- \to \Upsilon(4S)$
$<1.5 \times 10^{-7}$	90	[7] ACOSTA	04D	CDF	$p\overline{p}$ at 1.96 TeV
$<1.6 \times 10^{-7}$	90	[5] CHANG	03	BELL	$e^+e^- \to \Upsilon(4S)$
$<6.1 \times 10^{-7}$	90	[5] BERGFELD	00B	CLE2	$e^+e^- \to \Upsilon(4S)$
$<4.0 \times 10^{-5}$	90	ABBOTT	98B	D0	$p\overline{p}$ 1.8 TeV
$<6.8 \times 10^{-7}$	90	[8] ABE	98	CDF	$p\overline{p}$ at 1.8 TeV
$<1.0 \times 10^{-5}$	90	[9] ACCIARRI	97B	L3	$e^+e^- \to Z$
$<1.6 \times 10^{-6}$	90	[10] ABE	96L	CDF	Repl. by ABE 98
$<5.9 \times 10^{-6}$	90	AMMAR	94	CLE2	$e^+e^- \to \Upsilon(4S)$
$<8.3 \times 10^{-6}$	90	[11] ALBAJAR	91C	UA1	$E^{p\overline{p}}_{cm}$= 630 GeV
$<1.2 \times 10^{-5}$	90	[12] ALBAJAR	91C	UA1	$E^{p\overline{p}}_{cm}$= 630 GeV
$<4.3 \times 10^{-5}$	90	[13] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$
$<4.5 \times 10^{-5}$	90	[14] ALBRECHT	87D	ARG	$e^+e^- \to \Upsilon(4S)$
$<7.7 \times 10^{-5}$	90	[15] AVERY	87	CLEO	$e^+e^- \to \Upsilon(4S)$
$<2 \times 10^{-4}$	90	GILES	84	CLEO	Repl. by AVERY 87

OCCUR=2

[1] Uses B($B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+$) = $(6.01 \pm 0.21) \times 10^{-5}$ and B($B^0 \to K^+\pi^-$) = $(1.94 \pm 0.06) \times 10^{-5}$ for normalization.

NODE=S042R7;LINKAGE=AJ

[2] Uses B($B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+$) = $(6.01 \pm 0.21) \times 10^{-5}$.

NODE=S042R7;LINKAGE=AT

[3] Uses B production ratio f($\overline{b} \to B^+$)/f($\overline{b} \to B^0_s$) = 3.71 ± 0.47 and three normalization modes.

NODE=S042R7;LINKAGE=AI

[4] Uses B($B^+ \to J/\psi K^+$) B($J/\psi \to \mu^+\mu^-$) = $(5.94 \pm 0.21) \times 10^{-5}$.

NODE=S042R7;LINKAGE=AA

[5] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042R7;LINKAGE=EP

[6] Uses B($B^+ \to J/\psi K^+$) B($J/\psi \to \mu^+\mu^-$) = $(5.88 \pm 0.26) \times 10^{-5}$.

NODE=S042R7;LINKAGE=AL

[7] Assumes production cross-section $\sigma(B_s)/\sigma(B^+) = 0.100/0.391$ and the CDF measured value of $\sigma(B^+) = 3.6 \pm 0.6$ μb.

NODE=S042R7;LINKAGE=AC

[8] ABE 98 assumes production of $\sigma(B^0) = \sigma(B^+)$ and $\sigma(B_s)/\sigma(B^0) = 1/3$. They normalize to their measured $\sigma(B^0, p_T(B) > 6, |y| < 1.0) = 2.39 \pm 0.32 \pm 0.44\,\mu$b. NODE=S042R7;LINKAGE=C

[9] ACCIARRI 97B assume PDG 96 production fractions for B^+, B^0, B_s, and Λ_b. NODE=S042R7;LINKAGE=BQ

[10] ABE 96L assumes equal B^0 and B^+ production. They normalize to their measured $\sigma(B^+, p_T(B) > 6$ GeV/c, $|y| < 1) = 2.39 \pm 0.54\,\mu$b. NODE=S042R7;LINKAGE=PA

[11] B^0 and B^0_s are not separated. NODE=S042R7;LINKAGE=A

[12] Obtained from unseparated B^0 and B^0_s measurement by assuming a B^0:B^0_s ratio 2:1. NODE=S042R7;LINKAGE=B

[13] AVERY 89B reports $< 5 \times 10^{-3}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%. NODE=S042R7;LINKAGE=A1

[14] ALBRECHT 87D reports $< 5 \times 10^{-5}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%. NODE=S042R7;LINKAGE=W

[15] AVERY 87 reports $< 9 \times 10^{-5}$ assuming the $\Upsilon(4S)$ decays 40% to $B^0\overline{B}^0$. We rescale to 50%. NODE=S042R7;LINKAGE=Y

B^0 REFERENCES

NODE=S042

YOUR PAPER

AAIJ	13B	PRL 110 021801	R. Aaij *et al.*	(LHCb Collab.)	REFID=54767
AAIJ	12A	PL B708 55	R. Aaij *et al.*	(LHCb Collab.)	REFID=54033
AAIJ	12W	PRL 108 231801	R. Aaij *et al.*	(LHCb Collab.)	REFID=54217
CHATRCHYAN	12A	JHEP 1204 033	S. Chatrchyan *et al.*	(CMS Collab.)	REFID=54060
AAIJ	11B	PL B699 330	R. Aaij *et al.*	(LHCb Collab.)	REFID=16667
AALTONEN	11AG	PRL 107 191801	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53834
Also		PRL 107 239903 (errat)	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54005
CHATRCHYAN	11T	PRL 107 191802	S. Chatrchyan *et al.*	(CMS Collab.)	REFID=53839
AALTONEN	08I	PRL 100 101802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52233
AUBERT	08P	PR D77 032007	B. Aubert *et al.*	(BABAR Collab.)	REFID=52225
ABULENCIA	05	PRL 95 221805	A. Abulencia *et al.*	(CDF Collab.)	REFID=50950
Also		PRL 95 249905 (errat)	A. Abulencia *et al.*	(CDF Collab.)	REFID=51015
AUBERT	05W	PRL 94 221803	B. Aubert *et al.*	(BABAR Collab.)	REFID=50658
ACOSTA	04D	PRL 93 032001	D. Acosta *et al.*	(CDF Collab.)	REFID=49995
CHANG	03	PR D68 111101	M.-C. Chang *et al.*	(BELLE Collab.)	REFID=49640
BERGFELD	00B	PR D62 091102	T. Bergfeld *et al.*	(CLEO Collab.)	REFID=47814
ABBOTT	98B	PL B423 419	B. Abbott *et al.*	(D0 Collab.)	REFID=45868
ABE	98	PR D57 R3811	F. Abe *et al.*	(CDF Collab.)	REFID=45879
ACCIARRI	97B	PL B391 474	M. Acciarri *et al.*	(L3 Collab.)	REFID=45248
ABE	96L	PRL 76 4675	F. Abe *et al.*	(CDF Collab.)	REFID=44807
PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495
AMMAR	94	PR D49 5701	R. Ammar *et al.*	(CLEO Collab.)	REFID=43736
ALBAJAR	91C	PL B262 163	C. Albajar *et al.*	(UA1 Collab.)	REFID=41551
AVERY	89B	PL B223 470	P. Avery *et al.*	(CLEO Collab.)	REFID=40820
ALBRECHT	87D	PL B199 451	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=40325
AVERY	87	PL B183 429	P. Avery *et al.*	(CLEO Collab.)	REFID=40387
GILES	84	PR D30 2279	R. Giles *et al.*	(CLEO Collab.)	REFID=11570

BOTTOM, STRANGE MESONS
($B = \pm 1$, $S = \mp 1$)

NODE=MXXX046

$B^0_s = s\overline{b}$, $\overline{B}^0_s = \overline{s}\,b$, similarly for B^*_s's

NODE=MXXX046

NODE=S086

B^0_s

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions. NODE=S086

B^0_s BRANCHING RATIOS

NODE=S086230

$\Gamma(\mu^+\mu^-)/\Gamma_{total}$ — Γ_{51}/Γ

NODE=S086R14

Test for $\Delta B = 1$ weak neutral current. NODE=S086R14

VALUE (units 10^{-9})	CL%	DOCUMENT ID		TECN	COMMENT	NODE=S086R14
YOUR DATA						
$\mathbf{3.2^{+1.4}_{-1.2}{}^{+0.5}_{-0.3}}$		[1] AAIJ	13B	LHCB	pp at 7, 8 TeV	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<$ 19	90	[2] AAD	12AE	ATLS	pp at 7 TeV	
$<$ 12	90	[3] AAIJ	12A	LHCB	Repl. by AAIJ 12W	
$<$ 3.8	90	[4] AAIJ	12W	LHCB	Repl. by AAIJ 13B	
$<$ 6.4	90	[5] CHATRCHYAN	12A	CMS	pp at 7 TeV	
$<$ 43	90	[6] AAIJ	11B	LHCB	Repl. by AAIJ 12A	
$<$ 35	90	[7] AALTONEN	11AG	CDF	$p\overline{p}$ at 1.96 TeV	
$<$ 16	90	[8] CHATRCHYAN	11T	CMS	Repl. by CHATRCHYAN 12A	
$<$ 42	90	[9] ABAZOV	10S	D0	$p\overline{p}$ at 1.96 TeV	

< 47	90	[9] AALTONEN	08I	CDF	Repl. by AALTONEN 11AG
< 94	90	[10] ABAZOV	07Q	D0	Repl. by ABAZOV 10S
< 410	90	[11] ABAZOV	05E	D0	$p\overline{p}$ at 1.96 TeV
< 150	90	[12] ABULENCIA	05	CDF	$p\overline{p}$ at 1.96 TeV
< 580	90	[13] ACOSTA	04D	CDF	$p\overline{p}$ at 1.96 TeV
< 2000	90	[14] ABE	98	CDF	$p\overline{p}$ at 1.8 TeV
<38000	90	[15] ACCIARRI	97B	L3	$e^+e^- \rightarrow Z$
< 8400	90	[16] ABE	96L	CDF	Repl. by ABE 98

[1] Uses B production ratio f($\overline{b} \rightarrow B^0_s$)/f$\overline{b} \rightarrow B^0_d$ = 0.256 ± 0.020 and two normalization modes: B($B^+ \rightarrow J/\psi K^+ \rightarrow \mu^+\mu^- K^+$) = (6.01 ± 0.21) × 10^{-5} and B($B^0 \rightarrow K^+\pi^-$) = (1.94 ± 0.06) × 10^{-5}. NODE=S086R14;LINKAGE=A

[2] Uses B production ratio f($\overline{b} \rightarrow B^+$)/f($\overline{b} \rightarrow B^0_s$) = 3.75±0.29 and B($B^+ \rightarrow J/\psi K^+ \rightarrow \mu^+\mu^- K^+$) = (6.0 ± 0.2) × 10^{-5}. NODE=S086R14;LINKAGE=AD

[3] Uses B production ratio f($\overline{b} \rightarrow B^0_s$)/f($\overline{b} \rightarrow B^0_d$) = $0.267^{+0.021}_{-0.020}$ and three normalization modes B($B^+ \rightarrow J/\psi K^+ \rightarrow \mu^+\mu^- K^+$) = (6.01 ± 0.21) × 10^{-5}, B($B^0 \rightarrow K^+\pi^-$) = (1.94 ± 0.06) × 10^{-5}, and B($B^0_s \rightarrow J/\psi\phi \rightarrow \mu^+\mu^- K^+K^-$) = (3.4 ± 0.9) × 10^{-5}. NODE=S086R14;LINKAGE=AJ

[4] Uses B production ratio f($\overline{b} \rightarrow B^0_s$)/f($\overline{b} \rightarrow B^0_d$) = $0.267^{+0.021}_{-0.020}$ and three normalization modes of $B^+ \rightarrow J/\psi K^+$, $B^0 \rightarrow K^+\pi^-$, and $B^0_s \rightarrow J/\psi\phi$. NODE=S086R14;LINKAGE=IJ

[5] Uses f_s/f_u = 0.267±0.021 and B($B^+ \rightarrow J/\psi K^+ \rightarrow \mu^+\mu^- K^+$) = (6.0±0.2)×$10^{-5}$. NODE=S086R14;LINKAGE=CA

[6] Uses B production ratio f($\overline{b} \rightarrow B^+$)/f($\overline{b} \rightarrow B^0_s$) = 3.71 ± 0.47 and three normalization modes. NODE=S086R14;LINKAGE=AI

[7] Uses B production ratio f($\overline{b} \rightarrow B^+$)/f($\overline{b} \rightarrow B^0_s$) = 3.55±0.47 and B($B^+ \rightarrow J/\psi K^+ \rightarrow \mu^+\mu^- K^+$) = (6.01 ± 0.21) × 10^{-5}. NODE=S086R14;LINKAGE=AT

[8] Uses B production ratio f($\overline{b} \rightarrow B^+$)/f($\overline{b} \rightarrow B^0_s$) = 3.55±0.42 and B($B^+ \rightarrow J/\psi K^+ \rightarrow \mu^+\mu^- K^+$) = (6.0 ± 0.2) × 10^{-5}. NODE=S086R14;LINKAGE=CH

[9] Uses B production ratio f($\overline{b} \rightarrow B^+$)/f($\overline{b} \rightarrow B^0_s$) = 3.86 ± 0.59, and the number of $B^+ \rightarrow J/\psi K^+$ decays. NODE=S086R14;LINKAGE=AA

[10] Uses B production ratio f($\overline{b} \rightarrow B^+$)/f($\overline{b} \rightarrow B^0_s$) = 3.86 ± 0.54 and the number of $B^+ \rightarrow J/\psi K^+$ decays. NODE=S086R14;LINKAGE=ZO

[11] Assumes production cross-section $\sigma(B_s)/\sigma(B^+)$ = 0.270 ± 0.034. NODE=S086R14;LINKAGE=AB

[12] Assumes production cross section $\sigma(B^+)/\sigma(B_s)$ = 3.71±0.41 and B($B^+ \rightarrow J/\psi K^+ \rightarrow \mu^+\mu^- K^+$) = (5.88 ± 0.26) × 10^{-5}. NODE=S086R14;LINKAGE=AL

[13] Assumes production cross-section $\sigma(B_s)/\sigma(B^+)$ = 0.100/0.391 and the CDF measured value of $\sigma(B^+)$ = 3.6 ± 0.6 μb. NODE=S086R14;LINKAGE=AC

[14] ABE 98 assumes production of $\sigma(B^0) = \sigma(B^+)$ and $\sigma(B_s)/\sigma(B^0)$ = 1/3. They normalize to their measured $\sigma(B^0, p_T(B) > 6, |y| < 1.0)$ = 2.39 ± 0.32 ± 0.44 μb. NODE=S086R14;LINKAGE=C

[15] ACCIARRI 97B assume PDG 96 production fractions for B^+, B^0, B_s, and Λ_b. NODE=S086R14;LINKAGE=BQ

[16] ABE 96L assumes B^+/B_s production ratio 3/1. They normalize to their measured $\sigma(B^+, p_T(B) > 6$ GeV/c, $|y| < 1)$ = 2.39 ± 0.54 μb. NODE=S086R14;LINKAGE=PA

B^0_s REFERENCES

NODE=S086

YOUR PAPER	AAIJ	13B	PRL 110 021801	R. Aaij *et al.*	(LHCb Collab.)	REFID=54767
	AAD	12AE	PL B713 387	G. Aad *et al.*	(ATLAS Collab.)	REFID=54194
	AAIJ	12A	PL B708 55	R. Aaij *et al.*	(LHCb Collab.)	REFID=54033
	AAIJ	12W	PRL 108 231801	R. Aaij *et al.*	(LHCb Collab.)	REFID=54217
	CHATRCHYAN	12A	JHEP 1204 033	S. Chatrchyan *et al.*	(CMS Collab.)	REFID=54060
	AAIJ	11B	PL B699 330	R. Aaij *et al.*	(LHCb Collab.)	REFID=16667
	AALTONEN	11AG	PRL 107 191801	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53834
	Also		PRL 107 239903 (errat)	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54005
	CHATRCHYAN	11T	PRL 107 191802	S. Chatrchyan *et al.*	(CMS Collab.)	REFID=53839
	ABAZOV	10S	PL B693 539	V.M. Abazov *et al.*	(D0 Collab.)	REFID=53481
	AALTONEN	08I	PRL 100 101802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52233
	ABAZOV	07Q	PR D76 092001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52002
	ABAZOV	05E	PRL 94 071802	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50575
	ABULENCIA	05	PRL 95 221805	A. Abulencia *et al.*	(CDF Collab.)	REFID=50950
	Also		PRL 95 249905 (errat)	A. Abulencia *et al.*	(CDF Collab.)	REFID=51015
	ACOSTA	04D	PRL 93 032001	D. Acosta *et al.*	(CDF Collab.)	REFID=49995
	ABE	98	PR D57 R3811	F. Abe *et al.*	(CDF Collab.)	REFID=45879
	ACCIARRI	97B	PL B391 474	M. Acciarri *et al.*	(L3 Collab.)	REFID=45248
	ABE	96L	PRL 76 4675	F. Abe *et al.*	(CDF Collab.)	REFID=44807
	PDG	96	PR D54 1	R. M. Barnett *et al.*		REFID=44495

Reference = AAIJ 12BD; EPJ C72 2100
Verifier code = LHCB

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Tim Gershon

EMAIL: T.J.Gershon@warwick.ac.uk

June 4, 2013

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(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

$B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE

NODE=S051

$B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE BRANCHING RATIOS

NODE=S051215

$\Gamma(\psi(2S)\text{anything})/\Gamma(J/\psi(1S)\text{anything})$ — Γ_{50}/Γ_{49}

NODE=S051R95

	VALUE	DOCUMENT ID		TECN	COMMENT
	0.242±0.014 OUR AVERAGE				
YOUR DATA	0.237±0.015±0.006	[1,2] AAIJ	12BD	LHCB	pp at 7 TeV
	0.262±0.015±0.029	[3,4] CHATRCHYAN	12AK	CMS	pp at 7 TeV

NODE=S051R95

[1] AAIJ 12BD reports 0.235 ± 0.005 ± 0.015 from a measurement of $[\Gamma(\overline{b} \to \psi(2S)\text{anything})/\Gamma(\overline{b} \to J/\psi(1S)\text{anything})] \times [B(J/\psi(1S) \to \mu^+\mu^-)] / [B(\psi(2S) \to e^+e^-)]$ assuming $B(J/\psi(1S) \to \mu^+\mu^-) = (5.93 \pm 0.06) \times 10^{-2}$, $B(\psi(2S) \to e^+e^-) = (7.72 \pm 0.17) \times 10^{-3}$, which we rescale to our best values $B(J/\psi(1S) \to \mu^+\mu^-) = (5.93 \pm 0.06) \times 10^{-2}$, $B(\psi(2S) \to e^+e^-) = (7.78 \pm 0.17) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=S051R95;LINKAGE=A

[2] Assumes lepton universality imposing $B(\psi(2s) \to \mu^+\mu^-) = B(\psi(2s) \to e^+e^-)$.

NODE=S051R95;LINKAGE=B

[3] CHATRCHYAN 12AK really reports $\Gamma_{50}/\Gamma = (3.08 \pm 0.12 \pm 0.13 \pm 0.42) \times 10^{-3}$ assuming PDG 10 value of $\Gamma_{49}/\Gamma = (1.16 \pm 0.10) \times 10^{-2}$ which we present as a ratio of $\Gamma_{50}/\Gamma_{49} = (26.5 \pm 1.0 \pm 1.1 \pm 2.8) \times 10^{-2}$.

NODE=S051R95;LINKAGE=AA

[4] CHATRCHYAN 12AK reports $(26.5 \pm 1.0 \pm 1.1 \pm 2.8) \times 10^{-2}$ from a measurement of $[\Gamma(\overline{b} \to \psi(2S)\text{anything})/\Gamma(\overline{b} \to J/\psi(1S)\text{anything})] \times [B(\psi(2S) \to \mu^+\mu^-)] / [B(J/\psi(1S) \to \mu^+\mu^-)]$ assuming $B(\psi(2S) \to \mu^+\mu^-) = (7.7 \pm 0.8) \times 10^{-3}$, $B(J/\psi(1S) \to \mu^+\mu^-) = (5.93 \pm 0.06) \times 10^{-2}$, which we rescale to our best values $B(\psi(2S) \to \mu^+\mu^-) = (7.8 \pm 0.9) \times 10^{-3}$, $B(J/\psi(1S) \to \mu^+\mu^-) = (5.93 \pm 0.06) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=S051R95;LINKAGE=CH

$B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE REFERENCES

NODE=S051

YOUR PAPER	AAIJ	12BD	EPJ C72 2100	R. Aaij *et al.*	(LHCb Collab.)
	CHATRCHYAN	12AK	JHEP 1202 011	S. Chatrchyan *et al.*	(CMS Collab.)
	PDG	10	JPG 37 075021	K. Nakamura *et al.*	(PDG Collab.)

REFID=54850
REFID=54566
REFID=53229

Reference = AAIJ 13E; PRL 110 031801
Verifier code = LHCB

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PLEASE REPLY WITHIN ONE WEEK

Tim Gershon

EMAIL: T.J.Gershon@warwick.ac.uk

June 4, 2013

Dear Colleague,

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

CP VIOLATION PARAMETERS

NODE=S042229

$A_{CP}(B^0 \to K^{*0}\mu^+\mu^-)$

NODE=S042CU1

	VALUE	DOCUMENT ID		TECN	COMMENT
	-0.07 ± 0.04 OUR AVERAGE				
	[0.00 ± 0.15 OUR 2012 AVERAGE]				
YOUR DATA	$-0.072 \pm 0.040 \pm 0.005$	AAIJ	13E	LHCB	pp at 7 TeV
	$0.00 \pm 0.15 \pm 0.03$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$

NODE=S042CU1

NEW

B^0 REFERENCES

NODE=S042

YOUR PAPER	AAIJ	13E	PRL 110 031801	R. Aaij *et al.*	(LHCb Collab.)
	WEI	09A	PRL 103 171801	J.-T. Wei *et al.*	(BELLE Collab.)
	Also		EPAPS Supplement EPAPS_appendix.pdf		(BELLE Collab.)

REFID=54856
REFID=53061
REFID=53240;ERROR=13

Reference = AAIJ 13F; PL B719 318
Verifier code = LHCB

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NODE=MXXX045

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0-$\overline{B}^0$ MIXING PARAMETERS

NODE=S042225

For a discussion of B^0-$\overline{B}^0$ mixing see the note on "B^0-$\overline{B}^0$ Mixing" in the B^0 Particle Listings above.

NODE=S042225

χ_d is a measure of the time-integrated B^0-$\overline{B}^0$ mixing probability that a produced $B^0(\overline{B}^0)$ decays as a $\overline{B}^0(B^0)$. Mixing violates $\Delta B \neq 2$ rule.

$$\chi_d = \frac{x_d^2}{2(1+x_d^2)}$$

$$x_d = \frac{\Delta m_{B^0}}{\Gamma_{B^0}} = (m_{B^0_H} - m_{B^0_L})\,\tau_{B^0}\ ,$$

where H, L stand for heavy and light states of two B^0 CP eigenstates and $\tau_{B^0} = \frac{1}{0.5(\Gamma_{B^0_H}+\Gamma_{B^0_L})}$.

$\Delta m_{B^0} = m_{B^0_H} - m_{B^0_L}$

NODE=S042D

$\Delta m_{B^0_s}$ is a measure of 2π times the B^0-$\overline{B}^0$ oscillation frequency in time-dependent mixing experiments.

NODE=S042D

The second "OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements.

The first "OUR EVALUATION", also provided by the HFAG, includes Δm_d calculated from χ_d measured at $\Upsilon(4S)$.

NODE=S042D

	VALUE (10^{12} $\hbar$ s^{-1})	DOCUMENT ID		TECN	COMMENT
	0.510 ±0.004 OUR EVALUATION First [(0.507 ± 0.004) × 10^{12} $\hbar$ s^{-1} OUR 2012 EVALUATION]				
	0.510 ±0.004 OUR EVALUATION Second [(0.507 ± 0.004) × 10^{12} $\hbar$ s^{-1} OUR 2012 EVALUATION]				
	Average is meaningless. [(0.505 ± 0.004) × 10^{12} $\hbar$ s^{-1} OUR 2012 AVERAGE]				
YOUR DATA	0.5156±0.0051±0.0033	[1] AAIJ	13F	LHCB	pp at 7 TeV
	0.499 ±0.032 ±0.003	[2] AAIJ	12I	LHCB	pp at 7 TeV
	0.506 ±0.020 ±0.016	[3] ABAZOV	06W	D0	$p\overline{p}$ at 1.96 TeV
	0.511 ±0.007 $^{+0.007}_{-0.006}$	[4] AUBERT	06G	BABR	$e^+e^- \to \Upsilon(4S)$
	0.511 ±0.005 ±0.006	[5] ABE	05B	BELL	$e^+e^- \to \Upsilon(4S)$
	0.531 ±0.025 ±0.007	[6] ABDALLAH	03B	DLPH	$e^+e^- \to Z$
	0.503 ±0.008 ±0.010	[7] HASTINGS	03	BELL	$e^+e^- \to \Upsilon(4S)$
	0.509 ±0.017 ±0.020	[8] ZHENG	03	BELL	$e^+e^- \to \Upsilon(4S)$
	0.516 ±0.016 ±0.010	[9] AUBERT	02I	BABR	$e^+e^- \to \Upsilon(4S)$
	0.493 ±0.012 ±0.009	[10] AUBERT	02J	BABR	$e^+e^- \to \Upsilon(4S)$

NEW;→ UNCHECKED ←

NEW;→ UNCHECKED ←

0.497 ±0.024 ±0.025	[11] ABBIENDI,G	00B	OPAL	$e^+e^- \to Z$		
0.503 ±0.064 ±0.071	[12] ABE	99K	CDF	$p\overline{p}$ at 1.8 TeV		
0.500 ±0.052 ±0.043	[13] ABE	99Q	CDF	$p\overline{p}$ at 1.8 TeV		
0.516 ±0.099 $^{+0.029}_{-0.035}$	[14] AFFOLDER	99C	CDF	$p\overline{p}$ at 1.8 TeV		
0.471 $^{+0.078}_{-0.068}$ $^{+0.033}_{-0.034}$	[15] ABE	98C	CDF	$p\overline{p}$ at 1.8 TeV	OCCUR=2	
0.458 ±0.046 ±0.032	[16] ACCIARRI	98D	L3	$e^+e^- \to Z$		
0.437 ±0.043 ±0.044	[17] ACCIARRI	98D	L3	$e^+e^- \to Z$	OCCUR=2	
0.472 ±0.049 ±0.053	[18] ACCIARRI	98D	L3	$e^+e^- \to Z$	OCCUR=3	
0.523 ±0.072 ±0.043	[19] ABREU	97N	DLPH	$e^+e^- \to Z$	OCCUR=2	
0.493 ±0.042 ±0.027	[17] ABREU	97N	DLPH	$e^+e^- \to Z$	OCCUR=3	
0.499 ±0.053 ±0.015	[20] ABREU	97N	DLPH	$e^+e^- \to Z$	OCCUR=4	
0.480 ±0.040 ±0.051	[16] ABREU	97N	DLPH	$e^+e^- \to Z$	OCCUR=5	
0.444 ±0.029 $^{+0.020}_{-0.017}$	[17] ACKERSTAFF	97U	OPAL	$e^+e^- \to Z$	OCCUR=2	
0.430 ±0.043 $^{+0.028}_{-0.030}$	[16] ACKERSTAFF	97V	OPAL	$e^+e^- \to Z$	OCCUR=2	
0.482 ±0.044 ±0.024	[21] BUSKULIC	97D	ALEP	$e^+e^- \to Z$	OCCUR=2	
0.404 ±0.045 ±0.027	[17] BUSKULIC	97D	ALEP	$e^+e^- \to Z$	OCCUR=3	
0.452 ±0.039 ±0.044	[16] BUSKULIC	97D	ALEP	$e^+e^- \to Z$	OCCUR=4	
0.539 ±0.060 ±0.024	[22] ALEXANDER	96V	OPAL	$e^+e^- \to Z$	OCCUR=2	
0.567 ±0.089 $^{+0.029}_{-0.023}$	[23] ALEXANDER	96V	OPAL	$e^+e^- \to Z$	OCCUR=3	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
0.492 ±0.018 ±0.013	[24] AUBERT	03C	BABR	Repl. by AUBERT 06G		
0.516 ±0.016 ±0.010	[25] AUBERT	02N	BABR	$e^+e^- \to \Upsilon(4S)$		
0.494 ±0.012 ±0.015	[26] HARA	02	BELL	Repl. by ABE 05B		
0.528 ±0.017 ±0.011	[27] TOMURA	02	BELL	Repl. by ABE 05B		
0.463 ±0.008 ±0.016	[10] ABE	01D	BELL	Repl. by HASTINGS 03		
0.444 ±0.028 ±0.028	[28] ACCIARRI	98D	L3	$e^+e^- \to Z$	OCCUR=4	
0.497 ±0.035	[29] ABREU	97N	DLPH	$e^+e^- \to Z$	OCCUR=6	
0.467 ±0.022 $^{+0.017}_{-0.015}$	[30] ACKERSTAFF	97V	OPAL	$e^+e^- \to Z$	OCCUR=3	
0.446 ±0.032	[31] BUSKULIC	97D	ALEP	$e^+e^- \to Z$	OCCUR=5	
0.531 $^{+0.050}_{-0.046}$ ±0.078	[32] ABREU	96Q	DLPH	Sup. by ABREU 97N		
0.496 $^{+0.055}_{-0.051}$ ±0.043	[16] ACCIARRI	96E	L3	Repl. by ACCIARRI 98D		
0.548 ±0.050 $^{+0.023}_{-0.019}$	[33] ALEXANDER	96V	OPAL	$e^+e^- \to Z$	OCCUR=4	
0.496 ±0.046	[34] AKERS	95J	OPAL	Repl. by ACKERSTAFF 97V		
0.462 $^{+0.040}_{-0.053}$ $^{+0.052}_{-0.035}$	[16] AKERS	95J	OPAL	Repl. by ACKERSTAFF 97V	OCCUR=2	
0.50 ±0.12 ±0.06	[19] ABREU	94M	DLPH	Sup. by ABREU 97N		
0.508 ±0.075 ±0.025	[22] AKERS	94C	OPAL	Repl. by ALEXANDER 96V		
0.57 ±0.11 ±0.02	[23] AKERS	94H	OPAL	Repl. by ALEXANDER 96V		
0.50 $^{+0.07}_{-0.06}$ $^{+0.11}_{-0.10}$	[16] BUSKULIC	94B	ALEP	Sup. by BUSKULIC 97D		
0.52 $^{+0.10}_{-0.11}$ $^{+0.04}_{-0.03}$	[23] BUSKULIC	93K	ALEP	Sup. by BUSKULIC 97D		

[1] Measured using $B^0 \to D^- \pi^+$ and $B^0 \to J/\psi K^*(892)^0$ decays. NODE=S042D;LINKAGE=AA
[2] Measured using $B^0 \to D^- \pi^+$. NODE=S042D;LINKAGE=AI
[3] Uses opposite-side flavor-tagging with $B \to D^{(*)} \mu \nu_\mu X$ events. NODE=S042D;LINKAGE=AZ
[4] Measured using a simultaneous fit of the B^0 lifetime and $\overline{B}^0 B^0$ oscillation frequency Δm_d in the partially reconstructed $B^0 \to D^{*-} \ell \nu$ decays. NODE=S042D;LINKAGE=AU
[5] Measurement performed using a combined fit of CP-violation, mixing and lifetimes. NODE=S042D;LINKAGE=AE
[6] Events with a high transverse momentum lepton were removed and an inclusively reconstructed vertex was required. NODE=S042D;LINKAGE=BL
[7] HASTINGS 03 measurement based on the time evolution of dilepton events. It also reports $f_+/f_0 = 1.01 \pm 0.03 \pm 0.09$ and CPT violation parameters in B^0-$\overline{B}^0$ mixing. NODE=S042D;LINKAGE=HH
[8] ZHENG 03 data analyzed using partially reconstructed $\overline{B}^0 \to D^{*-} \pi^+$ decay and a flavor tag based on the charge of the lepton from the accompanying B decay. NODE=S042D;LINKAGE=ZH
[9] Uses a tagged sample of fully-reconstructed neutral B decays at $\Upsilon(4S)$. NODE=S042D;LINKAGE=KI
[10] Measured based on the time evolution of dilepton events in $\Upsilon(4S)$ decays. NODE=S042D;LINKAGE=D9
[11] Data analyzed using partially reconstructed $\overline{B}^0 \to D^{*+} \ell^- \overline{\nu}$ decay and a combination of flavor tags from the rest of the event. NODE=S042D;LINKAGE=C2
[12] Uses di-muon events. NODE=S042D;LINKAGE=M
[13] Uses jet-charge and lepton-flavor tagging. NODE=S042D;LINKAGE=N
[14] Uses $\ell^- D^{*+} - \ell$ events. NODE=S042D;LINKAGE=N3
[15] Uses π-B in the same side. NODE=S042D;LINKAGE=C1

[16] Uses ℓ-ℓ. NODE=S042D;LINKAGE=A1
[17] Uses ℓ-Q_{hem}. NODE=S042D;LINKAGE=A2
[18] Uses ℓ-ℓ with impact parameters. NODE=S042D;LINKAGE=A3
[19] Uses $D^{*\pm}$-Q_{hem}. NODE=S042D;LINKAGE=C
[20] Uses $\pi_s^{\pm}$ ℓ-Q_{hem}. NODE=S042D;LINKAGE=A9
[21] Uses $D^{*\pm}$-ℓ/Q_{hem}. NODE=S042D;LINKAGE=B6
[22] Uses $D^{*\pm}$ ℓ-Q_{hem}. NODE=S042D;LINKAGE=A6
[23] Uses $D^{*\pm}$-ℓ. NODE=S042D;LINKAGE=A7
[24] AUBERT 03C uses a sample of approximately 14,000 exclusively reconstructed $B^0 \rightarrow D^*(2010)^- \ell\nu$ and simultaneously measures the lifetime and oscillation frequency. NODE=S042D;LINKAGE=C3
[25] AUBERT 02N result based on the same analysis and data sample reported in AUBERT 02I. NODE=S042D;LINKAGE=N2
[26] Uses a tagged sample of B^0 decays reconstructed in the mode $B^0 \rightarrow D^* \ell\nu$. NODE=S042D;LINKAGE=H3
[27] Uses a tagged sample of fully-reconstructed hadronic B^0 decays at $\Upsilon(4S)$. NODE=S042D;LINKAGE=K2
[28] ACCIARRI 98D combines results from ℓ-ℓ, ℓ-Q_{hem}, and ℓ-ℓ with impact parameters. NODE=S042D;LINKAGE=A4
[29] ABREU 97N combines results from $D^{*\pm}$-Q_{hem}, ℓ-Q_{hem}, $\pi_s^{\pm}$ ℓ-Q_{hem}, and ℓ-ℓ. NODE=S042D;LINKAGE=B9
[30] ACKERSTAFF 97V combines results from ℓ-ℓ, ℓ-Q_{hem}, D^*-ℓ, and $D^{*\pm}$-Q_{hem}. NODE=S042D;LINKAGE=A5
[31] BUSKULIC 97D combines results from $D^{*\pm}$-ℓ/Q_{hem}, ℓ-Q_{hem}, and ℓ-ℓ. NODE=S042D;LINKAGE=A8
[32] ABREU 96Q analysis performed using lepton, kaon, and jet-charge tags. NODE=S042D;LINKAGE=LK
[33] ALEXANDER 96V combines results from $D^{*\pm}$-ℓ and $D^{*\pm}$ ℓ-Q_{hem}. NODE=S042D;LINKAGE=B3
[34] AKERS 95J combines results from charge measurement, $D^{*\pm}$ ℓ-Q_{hem} and ℓ-ℓ. NODE=S042D;LINKAGE=F

B^0 REFERENCES

NODE=S042

YOUR PAPER	AAIJ	13F	PL B719 318	R. Aaij *et al.*	(LHCb Colalb.)	REFID=54857
	AAIJ	12I	PL B709 177	R. Aaij *et al.*	(LHCb Collab.)	REFID=54061
	ABAZOV	06W	PR D74 112002	V.M. Abazov *et al.*	(D0 Collab.)	REFID=51589
	AUBERT	06G	PR D73 012004	B. Aubert *et al.*	(BABAR Collab.)	REFID=51087
	ABE	05B	PR D71 072003	K. Abe *et al.*	(BELLE Collab.)	REFID=50517
	Also		PR D71 079903 (errat.)	K. Abe *et al.*	(BELLE Collab.)	REFID=50555
	ABDALLAH	03B	EPJ C28 155	J. Abdallah *et al.*	(DELPHI Collab.)	REFID=49242
	AUBERT	03C	PR D67 072002	B. Aubert *et al.*	(BaBar Collab.)	REFID=49210
	HASTINGS	03	PR D67 052004	N.C. Hastings *et al.*	(BELLE Collab.)	REFID=49209
	ZHENG	03	PR D67 092004	Y. Zheng *et al.*	(BELLE Collab.)	REFID=49219
	AUBERT	02I	PRL 88 221802	B. Aubert *et al.*	(BaBar Collab.)	REFID=48640
	AUBERT	02J	PRL 88 221803	B. Aubert *et al.*	(BaBar Collab.)	REFID=48641
	AUBERT	02N	PR D66 032003	B. Aubert *et al.*	(BaBar Collab.)	REFID=48902
	HARA	02	PRL 89 251803	K. Hara *et al.*	(BELLE Collab.)	REFID=49082
	TOMURA	02	PL B542 207	T. Tomura *et al.*	(BELLE Collab.)	REFID=48782
	ABE	01D	PRL 86 3228	K. Abe *et al.*	(BELLE Collab.)	REFID=48061
	ABBIENDI,G	00B	PL B493 266	G. Abbiendi *et al.*	(OPAL Collab.)	REFID=47835
	ABE	99K	PR D60 051101	F. Abe *et al.*	(CDF Collab.)	REFID=47134
	ABE	99Q	PR D60 072003	F. Abe *et al.*	(CDF Collab.)	REFID=47263
	AFFOLDER	99C	PR D60 112004	T. Affolder *et al.*	(CDF Collab.)	REFID=47269
	ABE	98C	PRL 80 2057	F. Abe *et al.*	(CDF Collab.)	REFID=45884
	Also		PR D59 032001	F. Abe *et al.*	(CDF Collab.)	REFID=46704
	ACCIARRI	98D	EPJ C5 195	M. Acciarri *et al.*	(L3 Collab.)	REFID=45947
	ABREU	97N	ZPHY C76 579	P. Abreu *et al.*	(DELPHI Collab.)	REFID=45789
	ACKERSTAFF	97U	ZPHY C76 401	K. Ackerstaff *et al.*	(OPAL Collab.)	REFID=45786
	ACKERSTAFF	97V	ZPHY C76 417	K. Ackerstaff *et al.*	(OPAL Collab.)	REFID=45787
	BUSKULIC	97D	ZPHY C75 397	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=45611
	ABREU	96Q	ZPHY C72 17	P. Abreu *et al.*	(DELPHI Collab.)	REFID=44934
	ACCIARRI	96E	PL B383 487	M. Acciarri *et al.*	(L3 Collab.)	REFID=44857
	ALEXANDER	96V	ZPHY C72 377	G. Alexander *et al.*	(OPAL Collab.)	REFID=45279
	AKERS	95J	ZPHY C66 555	R. Akers *et al.*	(OPAL Collab.)	REFID=44289
	ABREU	94M	PL B338 409	P. Abreu *et al.*	(DELPHI Collab.)	REFID=44022
	AKERS	94C	PL B327 411	R. Akers *et al.*	(OPAL Collab.)	REFID=43762
	AKERS	94H	PL B336 585	R. Akers *et al.*	(OPAL Collab.)	REFID=43968
	BUSKULIC	94B	PL B322 441	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=43741
	BUSKULIC	93K	PL B313 498	D. Buskulic *et al.*	(ALEPH Collab.)	REFID=43523

Reference = AAIJ 13H; JHEP 1302 105
Verifier code = LHCB

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(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(K^+\ell^+\ell^-)/\Gamma_{total}$ — Γ_{458}/Γ

NODE=S041RA1

Test for ΔB=1 weak neutral current. Allowed by higher-order electroweak interactions.

NODE=S041RA1

NODE=S041RA1

	VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
	4.51±0.23 OUR AVERAGE Error includes scale factor of 1.1. [$(5.1 \pm 0.5) \times 10^{-7}$ OUR 2012 AVERAGE]				
YOUR DATA	4.36±0.15±0.18	[1] AAIJ	13H	LHCB	pp at 7 TeV
	4.8 ±0.9 ±0.2	[2] AUBERT	09T	BABR	$e^+e^- \to \Upsilon(4S)$
	5.3 $^{+0.6}_{-0.5}$ ±0.3	[2] WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	3.8 $^{+0.9}_{-0.8}$ ±0.2	[2] AUBERT,B	06J	BABR	Repl. by AUBERT 09T
	5.3 $^{+1.1}_{-1.0}$ ±0.3	[2] ISHIKAWA	03	BELL	Repl. by WEI 09A

NEW

[1] Uses B($B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+$) = $(6.01 \pm 0.21) \times 10^{-5}$.

[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041RA1;LINKAGE=AA

NODE=S041RA1;LINKAGE=EP

$\Gamma(K^+\mu^+\mu^-)/\Gamma_{total}$ — Γ_{460}/Γ

NODE=S041R10

Test for ΔB=1 weak neutral current. Allowed by higher-order electroweak interactions.

NODE=S041R10

NODE=S041R10

	VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
	4.43±0.26 OUR AVERAGE Error includes scale factor of 1.2. [$(5.1^{+0.8}_{-0.7}) \times 10^{-7}$ OUR 2012 AVERAGE]					
YOUR DATA	4.36±0.15±0.18		[1] AAIJ	13H	LHCB	pp at 7 TeV
	4.1 $^{+1.6}_{-1.5}$ ±0.2		[2] AUBERT	09T	BABR	$e^+e^- \to \Upsilon(4S)$
	5.3 $^{+0.8}_{-0.7}$ ±0.3		[2] WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	3.1 $^{+1.5}_{-1.2}$ ±0.3		[2] AUBERT,B	06J	BABR	Repl. by AUBERT 09T
	0.7 $^{+1.9}_{-1.1}$ ±0.2		[2] AUBERT	03U	BABR	Repl. by AUBERT,B 06J
	4.5 $^{+1.4}_{-1.2}$ ±0.3		[3] ISHIKAWA	03	BELL	Repl. by WEI 09A
	9.8 $^{+4.6}_{-3.6}$ ±1.6		[2] ABE	02	BELL	Repl. by ISHIKAWA 03
	< 12	90	[2] AUBERT	02L	BABR	$e^+e^- \to \Upsilon(4S)$
	< 36.8	90	[4] ANDERSON	01B	CLE2	$e^+e^- \to \Upsilon(4S)$
	< 52	90	[5] AFFOLDER	99B	CDF	$p\overline{p}$ at 1.8 TeV
	< 100	90	[6] ABE	96L	CDF	Repl. by AFFOLDER 99B
	< 2400	90	[7] ALBRECHT	91E	ARG	$e^+e^- \to \Upsilon(4S)$
	<64000	90	[8] WEIR	90B	MRK2	e^+e^- 29 GeV
	< 1700	90	[9] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$
	< 3800	90	[10] AVERY	87	CLEO	$e^+e^- \to \Upsilon(4S)$

NEW

[1] Uses B($B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+$) = $(6.01 \pm 0.21) \times 10^{-5}$.

[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

[3] Assumes equal production of B^0 and B^+ at $\Upsilon(4S)$. The second error is a total of systematic uncertainties including model dependence.

[4] The result is for di-lepton masses above 0.5 GeV.

NODE=S041R10;LINKAGE=AI

NODE=S041R10;LINKAGE=EP

NODE=S041R10;LINKAGE=IS

NODE=S041R10;LINKAGE=DL

[5] AFFOLDER 99B measured relative to $B^+ \to J/\psi(1S)K^+$. NODE=S041R10;LINKAGE=N1
[6] ABE 96L measured relative to $B^+ \to J/\psi(1S)K^+$ using PDG 94 branching ratios. NODE=S041R10;LINKAGE=PB
[7] ALBRECHT 91E reports $< 2.2 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%. NODE=S041R10;LINKAGE=B2
[8] WEIR 90B assumes B^+ production cross section from LUND. NODE=S041R10;LINKAGE=A
[9] AVERY 89B reports $< 1.5 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%. NODE=S041R10;LINKAGE=A1
[10] AVERY 87 reports $< 3.2 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 40% to $B^0\overline{B}^0$. We rescale to 50%. NODE=S041R10;LINKAGE=B1

PARTIAL BRANCHING FRACTIONS IN $B^+ \to K^{(*)+}\ell^+\ell^-$ NODE=S041240

B($B^+ \to K^+\ell^+\ell^-$) ($q^2 < 2.0$ GeV^2/c^4) NODE=S041PB9

NODE=S041PB9

	VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
	0.51 ±0.08 OUR AVERAGE Error includes scale factor of 1.5. [(0.36 ± 0.11) × 10^{-7} OUR 2012 AVERAGE]				
YOUR DATA	0.556±0.053±0.027	AAIJ	13H	LHCB	pp at 7 TeV
	0.36 ±0.11 ±0.03	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

NEW

B($B^+ \to K^+\ell^+\ell^-$) (2.0 < q^2 < 4.3 GeV^2/c^4) NODE=S041PBA

NODE=S041PBA

	VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
	0.60 ±0.07 OUR AVERAGE Error includes scale factor of 1.3. [(0.80 ± 0.16) × 10^{-7} OUR 2012 AVERAGE]				
YOUR DATA	0.573±0.053±0.023	AAIJ	13H	LHCB	pp at 7 TeV
	0.80 ±0.15 ±0.05	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

NEW

B($B^+ \to K^+\ell^+\ell^-$) (4.3 < q^2 < 8.68 GeV^2/c^4) NODE=S041PBB

NODE=S041PBB

	VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
	1.03 ±0.07 OUR AVERAGE [(1.18 ± 0.21) × 10^{-7} OUR 2012 AVERAGE]				
YOUR DATA	1.003±0.070±0.039	AAIJ	13H	LHCB	pp at 7 TeV
	1.18 ±0.19 ±0.09	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

NEW

B($B^+ \to K^+\ell^+\ell^-$) (10.09 < q^2 < 12.86 GeV^2/c^4) NODE=S041PBC

NODE=S041PBC

	VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
	0.58 ±0.05 OUR AVERAGE [(0.68 ± 0.13) × 10^{-7} OUR 2012 AVERAGE]				
YOUR DATA	0.565±0.050±0.022	AAIJ	13H	LHCB	pp at 7 TeV
	0.68 ±0.12 ±0.05	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

NEW

B($B^+ \to K^+\ell^+\ell^-$) (14.18 < q^2 < 16.0 GeV^2/c^4) NODE=S041PBD

NODE=S041PBD

	VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
	0.40 ±0.05 OUR AVERAGE Error includes scale factor of 1.4. [(0.53 ± 0.10) × 10^{-7} OUR 2012 AVERAGE]				
YOUR DATA	0.377±0.036±0.015	AAIJ	13H	LHCB	pp at 7 TeV
	0.53 ±0.10 ±0.03	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

NEW

B($B^+ \to K^+\ell^+\ell^-$) (16.0 < q^2 < 18.0 GeV^2/c^4) NODE=S041PBH

NODE=S041PBH

	VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.354±0.036±0.018**	AAIJ	13H	LHCB	pp at 7 TeV

B($B^+ \to K^+\ell^+\ell^-$) (18.0 < q^2 < 22.0 GeV^2/c^4) NODE=S041PBI

NODE=S041PBI

	VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.312±0.040±0.016**	AAIJ	13H	LHCB	pp at 7 TeV

B($B^+ \to K^+\ell^+\ell^-$) (1.0 < q^2 < 6.0 GeV^2/c^4) NODE=S041PBF

NODE=S041PBF

	VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
	1.25 ±0.10 OUR AVERAGE [(1.41 ± 0.22) × 10^{-7} OUR 2012 AVERAGE]				
YOUR DATA	1.205±0.085±0.070	AAIJ	13H	LHCB	pp at 7 TeV
	1.41 ±0.20 ±0.10	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

NEW

$B^{\pm}$ REFERENCES

NODE=S041

YOUR PAPER	AAIJ	13H	JHEP 1302 105	R. Aaij *et al.*	(LHCb Collab.)	REFID=54859
	AALTONEN	11AI	PRL 107 201802	T. Aaltonen *et al.*	(CDF Collab.)	REFID=53836
	AUBERT	09T	PRL 102 091803	B. Aubert *et al.*	(BABAR Collab.)	REFID=52829
	Also		EPAPS Document No. E-PRLTAO-102-060910		(BABAR Collab.)	REFID=53060;ERROR=14
	WEI	09A	PRL 103 171801	J.-T. Wei *et al.*	(BELLE Collab.)	REFID=53061
	Also		EPAPS Supplement EPAPS_appendix.pdf		(BELLE Collab.)	REFID=53240;ERROR=15
	AUBERT,B	06J	PR D73 092001	B. Aubert *et al.*	(BABAR Collab.)	REFID=51305
	AUBERT	03U	PRL 91 221802	B. Aubert *et al.*	(BaBar Collab.)	REFID=49648
	ISHIKAWA	03	PRL 91 261601	A. Ishikawa *et al.*	(BELLE Collab.)	REFID=49641
	ABE	02	PRL 88 021801	K. Abe *et al.*	(BELLE Collab.)	REFID=48518
	AUBERT	02L	PRL 88 241801	B. Aubert *et al.*	(BaBar Collab.)	REFID=48751
	ANDERSON	01B	PRL 87 181803	S. Anderson *et al.*	(CLEO Collab.)	REFID=48389
	AFFOLDER	99B	PRL 83 3378	T. Affolder *et al.*	(CDF Collab.)	REFID=47213
	ABE	96L	PRL 76 4675	F. Abe *et al.*	(CDF Collab.)	REFID=44807
	PDG	94	PR D50 1173	L. Montanet *et al.*	(CERN, LBL, BOST+)	REFID=43653
	ALBRECHT	91E	PL B262 148	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=41549
	WEIR	90B	PR D41 1384	A.J. Weir *et al.*	(Mark II Collab.)	REFID=41242
	AVERY	89B	PL B223 470	P. Avery *et al.*	(CLEO Collab.)	REFID=40820
	AVERY	87	PL B183 429	P. Avery *et al.*	(CLEO Collab.)	REFID=40387

$B^{\pm}/B^0$ ADMIXTURE

NODE=S049

LEPTON FORWARD-BACKWARD ASYMMETRY IN $B \to K^{(*)}\ell^+\ell^-$ DECAY

NODE=S049220

The forward-backward angular asymmetry of the lepton pair in $B \to K^{(*)}\ell^+\ell^-$ decay is defined as

NODE=S049220

$$A_{FB}(s) = \frac{N(cos\theta>0)-N(cos\theta<0)}{N(cos\theta>0)+N(cos\theta<0)},$$

where $s=q^2/m_B^2$, and θ is the angle of the lepton with respect to the flight direction of the B meson, measured in the dilepton rest frame. In addition, the fraction of longitudinal polarization F_L of the K^* and F_S, the relative contribution from scalar and pseudoscalar penguin amplitudes in $B \to K\ell^+\ell^-$, can be measured from the angular distribution of its decay products.

$A_{FB}(B \to K\ell^+\ell^-)$ ($q^2 < 2.0$ GeV^2/c^4)

NODE=S049FB8
NODE=S049FB8

VALUE	DOCUMENT ID		TECN	COMMENT
$0.00^{+0.06}_{-0.05}$ OUR AVERAGE				
[-0.02 ± 0.26 OUR 2012 AVERAGE]				
YOUR DATA $0.00^{+0.06}_{-0.05}{}^{+0.03}_{-0.01}$	AAIJ	13H	LHCB	pp at 7 TeV
$0.13^{+0.42}_{-0.43} \pm 0.07$	AALTONEN	12I	CDF	$p\bar{p}$ at 1.96 TeV
$0.06^{+0.32}_{-0.35} \pm 0.02$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.15^{+0.46}_{-0.39} \pm 0.08$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

NEW

$A_{FB}(B \to K\ell^+\ell^-)$ ($2.0 < q^2 < 4.3$ GeV^2/c^4)

NODE=S049FB9
NODE=S049FB9

VALUE	DOCUMENT ID		TECN	COMMENT
$0.09^{+0.10}_{-0.07}$ OUR AVERAGE Error includes scale factor of 1.4. [0.2 ± 0.6 OUR 2012 AVERAGE Scale factor = 2.2]				
YOUR DATA $0.07^{+0.08}_{-0.05}{}^{+0.02}_{-0.01}$	AAIJ	13H	LHCB	pp at 7 TeV
$0.32^{+0.15}_{-0.16} \pm 0.05$	AALTONEN	12I	CDF	$p\bar{p}$ at 1.96 TeV
$-0.43^{+0.38}_{-0.40} \pm 0.09$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.72^{+0.40}_{-0.35} \pm 0.07$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

NEW

$A_{FB}(B \to K\ell^+\ell^-)$ ($1.0 < q^2 < 6.0$ GeV^2/c^4)

NODE=S049FBJ
NODE=S049FBJ

VALUE	DOCUMENT ID		TECN	COMMENT
$0.034^{+0.040}_{-0.029}$ OUR AVERAGE				

NEW

[-0.01 ± 0.13 OUR 2012 AVERAGE]

YOUR DATA	$0.02\ ^{+0.05}_{-0.03}\ ^{+0.02}_{-0.01}$	AAIJ	13H	LHCB	pp at 7 TeV	
	$0.13 \pm 0.09 \pm 0.02$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV	
	$-0.04\ ^{+0.13}_{-0.16} \pm 0.05$	WEI	09A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$	

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.08\ ^{+0.27}_{-0.22} \pm 0.07$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I	

$A_{FB}(B \rightarrow K\ell^+\ell^-)$ ($4.3 < q^2 < 8.6$ GeV^2/c^4)

NODE=S049FBA
NODE=S049FBA

VALUE	DOCUMENT ID	TECN	COMMENT
$-0.04^{+0.04}_{-0.05}$ OUR AVERAGE			
[$-0.20^{+0.10}_{-0.13}$ OUR 2012 AVERAGE]			
YOUR DATA $-0.02^{+0.03}_{-0.05} \pm 0.03$	AAIJ 13H	LHCB	pp at 7 TeV
$0.01^{+0.13}_{-0.10} \pm 0.01$	AALTONEN 12I	CDF	$p\overline{p}$ at 1.96 TeV
$-0.20^{+0.12}_{-0.14} \pm 0.03$	WEI 09A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$-0.20^{+0.17}_{-0.28} \pm 0.03$	AALTONEN 11L	CDF	Repl. by AALTONEN 12I

NEW

$A_{FB}(B \rightarrow K\ell^+\ell^-)$ ($10.09 < q^2 < 12.86$ GeV^2/c^4)

NODE=S049FBG
NODE=S049FBG

VALUE	DOCUMENT ID	TECN	COMMENT
-0.05 ± 0.06 OUR AVERAGE			
[$-0.15^{+0.13}_{-0.12}$ OUR 2012 AVERAGE]			
YOUR DATA $-0.03 \pm 0.07 \pm 0.01$	AAIJ 13H	LHCB	pp at 7 TeV
$-0.03^{+0.11}_{-0.10} \pm 0.04$	AALTONEN 12I	CDF	$p\overline{p}$ at 1.96 TeV
$-0.21^{+0.17}_{-0.15} \pm 0.06$	WEI 09A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$-0.10^{+0.17}_{-0.15} \pm 0.07$	AALTONEN 11L	CDF	Repl. by AALTONEN 12I

NEW

$A_{FB}(B \rightarrow K\ell^+\ell^-)$ ($14.18 < q^2 < 16.0$ GeV^2/c^4)

NODE=S049FBH
NODE=S049FBH

VALUE	DOCUMENT ID	TECN	COMMENT
$-0.02^{+0.07}_{-0.05}$ OUR AVERAGE			
[$0.03^{+0.27}_{-0.14}$ OUR 2012 AVERAGE]			
YOUR DATA $-0.01^{+0.12}_{-0.06} \pm 0.01$	AAIJ 13H	LHCB	pp at 7 TeV
$-0.05^{+0.09}_{-0.11} \pm 0.03$	AALTONEN 12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.04^{+0.32}_{-0.26} \pm 0.05$	WEI 09A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.03^{+0.49}_{-0.16} \pm 0.04$	AALTONEN 11L	CDF	Repl. by AALTONEN 12I

NEW

$A_{FB}(B \rightarrow K\ell^+\ell^-)$ ($16.0 < q^2 < 18.0$ GeV^2/c^4)

NODE=S049FBL
NODE=S049FBL

VALUE	DOCUMENT ID	TECN	COMMENT
YOUR DATA **$-0.09^{+0.07}_{-0.09}\ ^{+0.02}_{-0.01}$**	AAIJ 13H	LHCB	pp at 7 TeV

$A_{FB}(B \rightarrow K\ell^+\ell^-)$ ($18.0 < q^2 < 22.0$ GeV^2/c^4)

NODE=S049FBM
NODE=S049FBM

VALUE	DOCUMENT ID	TECN	COMMENT
YOUR DATA **$0.02 \pm 0.11 \pm 0.01$**	AAIJ 13H	LHCB	pp at 7 TeV

$B^\pm/B^0$ ADMIXTURE REFERENCES

NODE=S049

YOUR PAPER AAIJ	13H	JHEP 1302 105	R. Aaij *et al.*	(LHCb Collab.)	REFID=54859
AALTONEN	12I	PRL 108 081807	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54206
AALTONEN	11L	PRL 106 161801	T. Aaltonen *et al.*	(CDF Collab.)	REFID=16443
WEI	09A	PRL 103 171801	J.-T. Wei *et al.*	(BELLE Collab.)	REFID=53061
Also		EPAPS Supplement EPAPS_appendix.pdf		(BELLE Collab.)	REFID=53240;ERROR=16

Reference = AAIJ 13L; JHEP 1303 067
Verifier code = LHCB

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Tim Gershon

EMAIL: T.J.Gershon@warwick.ac.uk

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
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1 Cyclotron Road
Berkeley, CA 94720-8153
USA

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FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma([K^+K^-]_D K^*(892)^0)/\Gamma(\overline{D}^0 K^*(892)^0)$ **$\Gamma_{127}/\Gamma_{124}$**

NODE=S042C15
NODE=S042C15

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$1.36^{+0.37}_{-0.32}\pm0.07$	AAIJ	13L	LHCB	pp at 7 TeV

CP VIOLATION PARAMETERS

NODE=S042229

$A_{CP}(B^0 \to [K^+K^-]_D K^*(892)^0)$

NODE=S042AD3
NODE=S042AD3

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$-0.45\pm0.23\pm0.02$	AAIJ	13L	LHCB	pp at 7 TeV

$A_{CP}(B^0 \to [K^+\pi^-]_D K^*(892)^0)$

NODE=S042AD4
NODE=S042AD4

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$-0.08\pm0.08\pm0.01$	AAIJ	13L	LHCB	pp at 7 TeV

B^0 REFERENCES

NODE=S042

YOUR PAPER AAIJ 13L JHEP 1303 067 R. Aaij *et al.* (LHCb Collab.) REFID=54950

BOTTOM, STRANGE MESONS
($B = \pm 1$, $S = \mp 1$)

NODE=MXXX046

$B^0_s = s\overline{b}$, $\overline{B}^0_s = \overline{s}\,b$, similarly for B^*_s's

NODE=MXXX046

NODE=S086

B^0_s

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

CP VIOLATION PARAMETERS in B^0_s

NODE=S086240

$A_{CP}(B^0_s \to [K^+K^-]_D \overline{K}^*(892)^0)$

NODE=S086CP2
NODE=S086CP2

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$0.04\pm0.16\pm0.01$	AAIJ	13L	LHCB	pp at 7 TeV

B^0_s REFERENCES

NODE=S086

YOUR PAPER AAIJ 13L JHEP 1303 067 R. Aaij *et al.* (LHCb Collab.) REFID=54950

Reference = AAIJ 13M; PR D87 052001
Verifier code = LHCB

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PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Tim Gershon

EMAIL: T.J.Gershon@warwick.ac.uk

June 4, 2013

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS ($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(J/\psi(1S)\pi^+\pi^-)/\Gamma_{total}$ — Γ_{179}/Γ

NODE=S042B45
NODE=S042B45

	VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
	4.03±0.18 OUR AVERAGE				
	[(4.6 ± 0.9) × 10^{-5} OUR 2012 AVERAGE]				
YOUR DATA	4.01±0.14±0.12	[1,2] AAIJ	13M	LHCB	pp at 7 TeV
	4.6 ±0.7 ±0.6	[3] AUBERT	03B	BABR	$e^+e^- \to \Upsilon(4S)$

NEW

[1] AAIJ 13M reports $(3.97 \pm 0.09 \pm 0.11 \pm 0.16) \times 10^{-5}$ from a measurement of $[\Gamma(B^0 \to J/\psi(1S)\pi^+\pi^-)/\Gamma_{total}]$ / $[B(B^+ \to J/\psi(1S)K^+)]$ assuming $B(B^+ \to J/\psi(1S)K^+) = (1.018 \pm 0.042) \times 10^{-3}$, which we rescale to our best value $B(B^+ \to J/\psi(1S)K^+) = (1.029 \pm 0.031) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=S042B45;LINKAGE=AI

[2] AAIJ 13M does not report correlations between various measurements of the $J/\psi\pi\pi$ final state.

NODE=S042B45;LINKAGE=NC

[3] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S042B45;LINKAGE=EP

$\Gamma(J/\psi(1S)f_0(500),\ f_0 \to \pi\pi)/\Gamma_{total}$ — Γ_{181}/Γ

NODE=S042C11
NODE=S042C11

	VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$6.5^{+2.5}_{-1.1}\pm0.3$	[1,2] AAIJ	13M	LHCB	pp at 7 TeV

[1] AAIJ 13M reports $(6.4 \pm 0.8^{+2.4}_{-0.8}) \times 10^{-6}$ from a measurement of $[\Gamma(B^0 \to J/\psi(1S)f_0(500),\ f_0 \to \pi\pi)/\Gamma_{total}]$ / $[B(B^0 \to J/\psi(1S)\pi^+\pi^-)]$ assuming $B(B^0 \to J/\psi(1S)\pi^+\pi^-) = (3.97 \pm 0.09 \pm 0.11 \pm 0.16) \times 10^{-5}$, which we rescale to our best value $B(B^0 \to J/\psi(1S)\pi^+\pi^-) = (4.03 \pm 0.18) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=S042C11;LINKAGE=AI

[2] AAIJ 13M does not report correlations between various measurements of the $J/\psi\pi\pi$ final state. Measured in Dalitz plot like analysis of $B^0 \to J/\psi\pi^+\pi^-$.

NODE=S042C11;LINKAGE=NC

$\Gamma(J/\psi(1S)f_2)/\Gamma_{total}$ — Γ_{182}/Γ

NODE=S042Q75
NODE=S042Q75

	VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.42±0.06±0.02**		[1,2] AAIJ	13M	LHCB	pp at 7 TeV
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	<0.5	90	[3,4] AUBERT	07AC	BABR	$e^+e^- \to \Upsilon(4S)$

[1] AAIJ 13M reports $[\Gamma(B^0 \to J/\psi(1S)f_2)/\Gamma_{total}] \times [B(f_2(1270) \to \pi\pi)] = (3.5 \pm 0.4 \pm 0.4) \times 10^{-6}$ from a measurement of $[\Gamma(B^0 \to J/\psi(1S)f_2)/\Gamma_{total}] \times [B(f_2(1270) \to \pi\pi)]$ / $[B(B^0 \to J/\psi(1S)\pi^+\pi^-)]$ assuming $B(B^0 \to J/\psi(1S)\pi^+\pi^-) = (3.97 \pm 0.09 \pm 0.11 \pm 0.16) \times 10^{-5}$, which we rescale to our best values $B(f_2(1270) \to \pi\pi) = (84.8^{+2.4}_{-1.2}) \times 10^{-2}$, $B(B^0 \to J/\psi(1S)\pi^+\pi^-) = (4.03 \pm 0.18) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=S042Q75;LINKAGE=AI

[2] AAIJ 13M does not report correlations between various measurements of the $J/\psi\pi\pi$ final state. Measured in Dalitz plot like analysis of $B^0 \to J/\psi\pi^+\pi^-$. NODE=S042Q75;LINKAGE=NC

[3] AUBERT 07AC reports $[\Gamma(B^0 \to J/\psi(1S) f_2)/\Gamma_{total}] \times [B(f_2(1270) \to \pi\pi)] < 0.46 \times 10^{-5}$ which we divide by our best value $B(f_2(1270) \to \pi\pi) = 84.8 \times 10^{-2}$. NODE=S042Q75;LINKAGE=AU

[4] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042Q75;LINKAGE=EP

$\Gamma(J/\psi(1S)\rho^0)/\Gamma_{total}$ — Γ_{183}/Γ

NODE=S042S46
NODE=S042S46

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
2.59±0.21 OUR AVERAGE					
[(2.7 ± 0.4) × 10^{-5} OUR 2012 AVERAGE]					
YOUR DATA $2.53^{+0.22}_{-0.23} \pm 0.11$		[1,2] AAIJ	13M	LHCB	pp at 7 TeV
2.7 ±0.3 ±0.2		[3] AUBERT	07AC	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.6 ±0.6 ±0.4		[3] AUBERT	03B	BABR	Repl. by AUBERT 07AC
<25	90	BISHAI	96	CLE2	$e^+e^- \to \Upsilon(4S)$

NEW

[1] AAIJ 13M reports $(2.49^{+0.20}_{-0.13}{}^{+0.16}_{-0.23}) \times 10^{-5}$ from a measurement of $[\Gamma(B^0 \to J/\psi(1S)\rho^0)/\Gamma_{total}]$ / $[B(B^0 \to J/\psi(1S)\pi^+\pi^-)]$ assuming $B(B^0 \to J/\psi(1S)\pi^+\pi^-) = (3.97 \pm 0.09 \pm 0.11 \pm 0.16) \times 10^{-5}$, which we rescale to our best value $B(B^0 \to J/\psi(1S)\pi^+\pi^-) = (4.03 \pm 0.18) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=S042S46;LINKAGE=AI

[2] AAIJ 13M does not report correlations between various measurements of the $J/\psi\pi\pi$ final state. Measured in Dalitz plot like analysis of $B^0 \to J/\psi\pi^+\pi^-$. Assumes $B(\rho(770)^0 \to \pi\pi) = 100\%$. NODE=S042S46;LINKAGE=NC

[3] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. NODE=S042S46;LINKAGE=EP

$\Gamma(J/\psi(1S) f_0(980),\ f_0 \to \pi^+\pi^-)/\Gamma_{total}$ — Γ_{184}/Γ

NODE=S042C12
NODE=S042C12

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA **<1.1 × 10^{-6}**	90	[1] AAIJ	13M	LHCB	pp at 7 TeV

[1] AAIJ 13M does not provide correlations between various measurements of the $J/\psi\pi^+\pi^-$ final state. The measurements were obtained from a Dalitz plot like analysis of $B^0 \to J/\psi\pi^+\pi^-$. Also reports $\Gamma(J/\psi(1S) f_0(980),\ f_0 \to \pi^+\pi^-)/\Gamma_{total} = (6.1^{+3.1}_{-2.0}{}^{+1.7}_{-1.4}) \times 10^{-6}$. NODE=S042C12;LINKAGE=NC

$\Gamma(J/\psi(1S)\rho(1450)^0,\ \rho^0 \to \pi\pi)/\Gamma_{total}$ — Γ_{185}/Γ

NODE=S042C13
NODE=S042C13

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
YOUR DATA **$2.1^{+2.5}_{-0.7} \pm 0.1$**	[1,2] AAIJ	13M	LHCB	pp at 7 TeV

[1] AAIJ 13M reports $(2.1^{+1.0}_{-0.6}{}^{+2.2}_{-0.4}) \times 10^{-6}$ from a measurement of $[\Gamma(B^0 \to J/\psi(1S)\rho(1450)^0,\ \rho^0 \to \pi\pi)/\Gamma_{total}]$ / $[B(B^0 \to J/\psi(1S)\pi^+\pi^-)]$ assuming $B(B^0 \to J/\psi(1S)\pi^+\pi^-) = (3.97 \pm 0.09 \pm 0.11 \pm 0.16) \times 10^{-5}$, which we rescale to our best value $B(B^0 \to J/\psi(1S)\pi^+\pi^-) = (4.03 \pm 0.18) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=S042C13;LINKAGE=AI

[2] AAIJ 13M does not report correlations between various measurements of the $J/\psi\pi\pi$ final state. Measured in Dalitz plot like analysis of $B^0 \to J/\psi\pi^+\pi^-$. NODE=S042C13;LINKAGE=NC

$\Gamma(J/\psi(1S)\omega)/\Gamma(J/\psi(1S)\rho^0)$ — $\Gamma_{186}/\Gamma_{183}$

NODE=S042C14
NODE=S042C14

VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA **$0.61^{+0.24}_{-0.14}{}^{+0.31}_{-0.16}$**	[1,2] AAIJ	13M	LHCB	pp at 7 TeV

[1] AAIJ 13M reports $0.61^{+0.24}_{-0.14}{}^{+0.31}_{-0.16}$ from a measurement of $[\Gamma(B^0 \to J/\psi(1S)\omega)/\Gamma(B^0 \to J/\psi(1S)\rho^0)] \times [B(\omega(782) \to \pi^+\pi^-)]$ assuming $B(\omega(782) \to \pi^+\pi^-) = (1.53^{+0.11}_{-0.13}) \times 10^{-2}$. NODE=S042C14;LINKAGE=AI

[2] AAIJ 13M does not report correlations between various measurements of the $J/\psi\pi\pi$ final state. Measured in Dalitz plot like analysis of $B^0 \to J/\psi\pi^+\pi^-$. Assumes $B(\rho(770)^0 \to \pi\pi) = 100\%$. NODE=S042C14;LINKAGE=NC

B^0 REFERENCES

NODE=S042

YOUR PAPER

AAIJ	13M	PR D87 052001	R. Aaij *et al.*	(LHCb Colalb.)	REFID=54951
AUBERT	07AC	PR D76 031101	B. Aubert *et al.*	(BABAR Collab.)	REFID=51857
AUBERT	03B	PRL 90 091801	B. Aubert *et al.*	(BaBar Collab.)	REFID=49207
BISHAI	96	PL B369 186	M. Bishai *et al.*	(CLEO Collab.)	REFID=44832

Reference = AAIJ 13O; PRL 110 151803
Verifier code = LHCB

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USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S085

B^*

$I(J^P) = \frac{1}{2}(1^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S085

$m_{B^{*+}} - m_{B^+}$

NODE=S085DM+

NODE=S085DM+

	VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**45.01±0.30±0.23**	[5] AAIJ	13O	LHCB	pp at 7 TeV

[5] Obtained the mass difference between $B^{*+}K^-$ and B^+K^- from $B^*_{s2}(5840)^0$ decay.

NODE=S085DM+;LINKAGE=AI

B^* REFERENCES

NODE=S085

YOUR PAPER	AAIJ	13O	PRL 110 151803	R. Aaij *et al.*	(LHCb Collab.)

REFID=54968

BOTTOM, STRANGE MESONS
($B = \pm 1$, $S = \mp 1$)

$B^0_s = s\overline{b}$, $\overline{B}^0_s = \overline{s}\,b$, similarly for B^*_s's

NODE=MXXX046

NODE=MXXX046

NODE=M187

$B_{s1}(5830)^0$

$I(J^P) = 0(1^+)$ Status: ***

I, J, P need confirmation.

Quantum numbers shown are quark-model predictions.

NODE=M187

$B_{s1}(5830)^0$ MASS

NODE=M187M

NODE=M187M

	VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
	5828.7 ±0.4 OUR AVERAGE Error includes scale factor of 1.2. [5829.4 ± 0.7 MeV OUR 2012 AVERAGE]				
YOUR DATA	5828.40±0.04±0.41	[1] AAIJ	13O	LHCB	pp at 7 TeV
	5829.4 ±0.7	[2] AALTONEN	08K	CDF	$p\overline{p}$ at 1.96 TeV

NEW

[1] Uses $B_{s1}(5830)^0 \rightarrow B^{*+}K^-$ decay.

[2] Uses two-body decays into K^- and B^+ mesons reconstructed as $B^+ \rightarrow J/\psi K^+$, $J/\psi \rightarrow \mu^+\mu^-$ or $B^+ \rightarrow \overline{D}^0\pi^+$, $\overline{D}^0 \rightarrow K^+\pi^-$.

NODE=M187M;LINKAGE=AI

NODE=M187M;LINKAGE=AA

$B_{s1}(5830)^0$ REFERENCES

NODE=M187

YOUR PAPER	AAIJ	13O	PRL 110 151803	R. Aaij *et al.*	(LHCb Collab.)
	AALTONEN	08K	PRL 100 082001	T. Aaltonen *et al.*	(CDF Collab.)

REFID=54968
REFID=52235
NODE=M186

$B^*_{s2}(5840)^0$

$I(J^P) = 0(2^+)$ Status: ***

I, J, P need confirmation.

Quantum numbers shown are quark-model predictions.

NODE=M186

$B^*_{s2}(5840)^0$ MASS

NODE=M186M

NODE=M186M

	VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
	5839.96±0.20 OUR AVERAGE [5839.7 ± 0.6 MeV OUR 2012 AVERAGE]				
YOUR DATA	5839.99±0.05±0.20	AAIJ	13O	LHCB	pp at 7 TeV
	5839.7 ±0.7	[1] AALTONEN	08K	CDF	$p\overline{p}$ at 1.96 TeV
	5839.6 ±1.1 ±0.7	[2] ABAZOV	08E	D0	$p\overline{p}$ at 1.96 TeV

NEW

[1] Uses two-body decays into K^- and B^+ mesons reconstructed as $B^+ \rightarrow J/\psi K^+$, $J/\psi \rightarrow \mu^+\mu^-$ or $B^+ \rightarrow \overline{D}^0\pi^+$, $\overline{D}^0 \rightarrow K^+\pi^-$. NODE=M186M;LINKAGE=AA

[2] Observed in $B^{*0}_{s2} \rightarrow B^+K^-$. Measured production rate of B^{*0}_{s2} relative to B^+ to be $(1.15 \pm 0.23 \pm 0.13)$%. NODE=M186M;LINKAGE=AB

$B^*_{s2}(5840)^0$ WIDTH

NODE=M186W

NODE=M186W

	VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**1.56±0.13±0.47**	[4] AAIJ	13O	LHCB	pp at 7 TeV

[4] Uses $B^*_{s2}(5840)^0 \rightarrow B^{*+}K^-$ decays. NODE=M186W;LINKAGE=AI

$B^*_{s2}(5840)^0$ BRANCHING RATIOS

NODE=M186220

$\Gamma(B^{*+}K^-)/\Gamma(B^+K^-)$ — Γ_2/Γ_1

NODE=M186R02

NODE=M186R02

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.093±0.013±0.012**	AAIJ	13O	LHCB	pp at 7 TeV

$B^*_{s2}(5840)^0$ REFERENCES

NODE=M186

YOUR PAPER	AAIJ	13O	PRL 110 151803	R. Aaij *et al.*	(LHCb Collab.)
	AALTONEN	08K	PRL 100 082001	T. Aaltonen *et al.*	(CDF Collab.)
	ABAZOV	08E	PRL 100 082002	V.M. Abazov *et al.*	(D0 Collab.)

REFID=54968
REFID=52235
REFID=52232

Reference = AAIJ 13K; PL B721 24
Verifier code = LHCB

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BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

CP VIOLATION PARAMETERS

NODE=S042229

$C_{J/\psi(nS)K^0}$ ($B^0 \to J/\psi(nS)K^0$)

NODE=S042CJK

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements.

NODE=S042CJK

NODE=S042CJK

	VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
	0.5±2.0 OUR EVALUATION				
	0.3±1.8 OUR AVERAGE				
	[$(0.0 \pm 1.8) \times 10^{-2}$ OUR 2012 AVERAGE]				
YOUR DATA	$3 \pm 9 \pm 1$	[1] AAIJ	13K	LHCB	pp at 7 TeV
	$1.5 \pm 2.1^{+2.3}_{-4.5}$	[2,3] ADACHI	12A	BELL	$e^+e^- \to \Upsilon(4S)$
	$-10.4 \pm 5.5^{+2.7}_{-4.7}$	[3,4] ADACHI	12A	BELL	$e^+e^- \to \Upsilon(4S)$
	$-1.9 \pm 2.6^{+4.1}_{-1.7}$	[3,5] ADACHI	12A	BELL	$e^+e^- \to \Upsilon(4S)$
	$8.9 \pm 7.6 \pm 2.0$	[4] AUBERT	09K	BABR	$e^+e^- \to \Upsilon(4S)$
	$1.6 \pm 2.3 \pm 1.8$	AUBERT	09K	BABR	$e^+e^- \to \Upsilon(4S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	$-4 \pm 7 \pm 5$	[3,4] SAHOO	08	BELL	Repl. by ADACHI 12A
	$-1.8 \pm 2.1 \pm 1.4$	[3] CHEN	07	BELL	Repl. by ADACHI 12A

NODE=S042CJK

→ UNCHECKED ←

NEW

OCCUR=2

OCCUR=3

OCCUR=2

[1] AAIJ 13K uses 8200 flavor-tagged $B_d \to J/\psi K^0_S$ events from 1 fb^{-1} of integrated luminosity. Provides the correlation coefficient $\rho = 0.42$ between the statistical uncertainties of $S_{J/\psi(nS)K^0}$ ($B^0 \to J/\psi(nS)K^0$) and $C_{J/\psi(nS)K^0}$ ($B^0 \to J/\psi(nS)K^0$) measurements.

NODE=S042CJK;LINKAGE=AA

[2] Uses $B^0 \to J/\psi K^0_S$ decays.

NODE=S042CJK;LINKAGE=AD

[3] The paper reports A, which is equal to $-C$.

NODE=S042CJK;LINKAGE=CH

[4] Uses $B^0 \to \psi(2S)K^0_S$ decays.

NODE=S042CJK;LINKAGE=SA

[5] Uses $B^0 \to J/\psi K^0_L$ decays.

NODE=S042CJK;LINKAGE=AH

$S_{J/\psi(nS)K^0}$ ($B^0 \to J/\psi(nS)K^0$)

NODE=S042SJK

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements.

NODE=S042SJK

NODE=S042SJK

	VALUE	DOCUMENT ID		TECN	COMMENT
	0.676±0.021 OUR EVALUATION				
	0.680±0.021 OUR AVERAGE Error includes scale factor of 1.1. [0.67 ± 0.04 OUR 2012 AVERAGE Scale factor = 1.6]				
YOUR DATA	$0.73 \pm 0.07 \pm 0.04$	[1] AAIJ	13K	LHCB	pp at 7 TeV
	$0.670 \pm 0.029 \pm 0.013$	[2] ADACHI	12A	BELL	$e^+e^- \to \Upsilon(4S)$
	$0.738 \pm 0.079 \pm 0.036$	[3] ADACHI	12A	BELL	$e^+e^- \to \Upsilon(4S)$
	$0.642 \pm 0.047 \pm 0.021$	[4] ADACHI	12A	BELL	$e^+e^- \to \Upsilon(4S)$

NODE=S042SJK

→ UNCHECKED ←

NEW

OCCUR=2

OCCUR=3

$0.57 \pm 0.58 \pm 0.06$	[5] SATO	12	BELL	$e^+e^- \to \Upsilon(5S)$	
$0.897 \pm 0.100 \pm 0.036$	[3] AUBERT	09K	BABR	$e^+e^- \to \Upsilon(4S)$	
$0.666 \pm 0.031 \pm 0.013$	AUBERT	09K	BABR	$e^+e^- \to \Upsilon(4S)$	OCCUR=2
$0.79 \; {}^{+0.41}_{-0.44}$	[6] AFFOLDER	00C	CDF	$p\overline{p}$ at 1.8 TeV	
$0.84 \; {}^{+0.82}_{-1.04} \pm 0.16$	[7] BARATE	00Q	ALEP	$e^+e^- \to Z$	
$3.2 \; {}^{+1.8}_{-2.0} \pm 0.5$	[8] ACKERSTAFF	98Z	OPAL	$e^+e^- \to Z$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.650 \pm 0.029 \pm 0.018$	[9] SAHOO	08	BELL	Repl. by ADACHI 12A	
$0.72 \pm 0.09 \pm 0.03$	[3] SAHOO	08	BELL	Repl. by ADACHI 12A	OCCUR=2
$0.642 \pm 0.031 \pm 0.017$	CHEN	07	BELL	Repl. by ADACHI 12A	

[1] AAIJ 13K uses 8200 flavor-tagged $B_d \to J/\psi K^0_S$ events from 1 fb^{-1} of integrated luminosity. Provides the correlation coefficient $\rho = 0.42$ between the statistical uncertainties of $S_{J/\psi(\mathrm{nS})K^0}$ ($B^0 \to J/\psi(\mathrm{nS})K^0$) and $C_{J/\psi(\mathrm{nS})K^0}$ ($B^0 \to J/\psi(\mathrm{nS})K^0$) measurements. NODE=S042SJK;LINKAGE=AA

[2] Uses $B^0 \to J/\psi K^0_S$ decays. NODE=S042SJK;LINKAGE=AD

[3] Based on $B^0 \to \psi(2S)K^0_S$ decays. NODE=S042SJK;LINKAGE=SA

[4] Uses $B^0 \to J/\psi K^0_L$ decays. NODE=S042SJK;LINKAGE=AH

[5] SATO 12 uses 121 fb^{-1} data collected at $\Upsilon(5S)$ resonance. Uses the "$B - \pi$ tagging" where $B\pi^+$ and $B\pi^-$ tagged $J/\psi K^0_S$ events are compared. NODE=S042SJK;LINKAGE=ST

[6] AFFOLDER 00C uses about 400 $B^0 \to J/\psi(1S)K^0_S$ events. The production flavor of B^0 was determined using three tagging algorithms: a same-side tag, a jet-charge tag, and a soft-lepton tag. NODE=S042SJK;LINKAGE=AF

[7] BARATE 00Q uses 23 candidates for $B^0 \to J/\psi(1S)K^0_S$ decays. A combination of jet-charge, vertex-charge, and same-side tagging techniques were used to determine the B^0 production flavor. NODE=S042SJK;LINKAGE=BA

[8] ACKERSTAFF 98Z uses 24 candidates for $B^0_d \to J/\psi(1S)K^0_S$ decay. A combination of jet-charge and vertex-charge techniques were used to tag the B^0_d production flavor. NODE=S042SJK;LINKAGE=AC

[9] Combined result of CHEN 07 and SAHOO 08. NODE=S042SJK;LINKAGE=SC

B^0 REFERENCES

NODE=S042

YOUR PAPER	AAIJ	13K	PL B721 24	R. Aaij *et al.*	(LHCb Collab.)	REFID=54974
	ADACHI	12A	PRL 108 171802	I. Adachi *et al.*	(BELLE Collab.)	REFID=54222
	SATO	12	PRL 108 171801	Y. Sato *et al.*	(BELLE Collab.)	REFID=54221
	AUBERT	09K	PR D79 072009	B. Aubert *et al.*	(BABAR Collab.)	REFID=52704
	SAHOO	08	PR D77 091103	H. Sahoo *et al.*	(BELLE Collab.)	REFID=52346
	CHEN	07	PRL 98 031802	K.-F. Chen *et al.*	(BELLE Collab.)	REFID=51609
	AFFOLDER	00C	PR D61 072005	T. Affolder *et al.*	(CDF Collab.)	REFID=47438
	BARATE	00Q	PL B492 259	R. Barate *et al.*	(ALEPH Collab.)	REFID=47826
	ACKERSTAFF	98Z	EPJ C5 379	K. Ackerstaff *et al.*	(OPAL Collab.)	REFID=46262

Reference = AAIJ 13P; JHEP 1304 001
Verifier code = LHCB

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PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Tim Gershon

EMAIL: T.J.Gershon@warwick.ac.uk

June 4, 2013

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Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
Lawrence Berkeley National Lab.
1 Cyclotron Road
Berkeley, CA 94720-8153
USA

PHONE: 1-(510)-486–5449
FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM MESONS ($B = \pm 1$)

NODE=MXXX045

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=S042

B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S042

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

See the Note "Production and Decay of b-flavored Hadrons" at the beginning of the $B^\pm$ Particle Listings and the Note on "B^0-$\overline{B}^0$ Mixing" near the end of the B^0 Particle Listings.

B^0 BRANCHING RATIOS

NODE=S042220

For branching ratios in which the charge of the decaying B is not determined, see the $B^\pm$ section.

NODE=S042220

$\Gamma(D^- K^+)/\Gamma(D^- \pi^+)$ — **Γ_{36}/Γ_{31}**

NODE=S042C17
NODE=S042C17

	VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**8.22±0.11±0.25**	AAIJ	13P	LHCB	pp at 7 TeV

B^0 REFERENCES

NODE=S042

YOUR PAPER	AAIJ	13P	JHEP 1304 001	R. Aaij *et al.*	(LHCb Collab.)

REFID=54975

$B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE

NODE=S051

$B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE BRANCHING RATIOS

NODE=S051215

$\Gamma(B^0_s)/\Gamma(B^0)$ — **Γ_3/Γ_2**

NODE=S051R01
NODE=S051R01

	VALUE	DOCUMENT ID		TECN	COMMENT
	0.259±0.016 OUR EVALUATION				→ UNCHECKED ←
YOUR DATA	**0.238±0.004±0.015±0.021**	[1] AAIJ	13P	LHCB	pp at 7 TeV

[1] AAIJ 13P studies also separately the $p_T(B)$ and $\eta(B)$ dependency of $\Gamma(\overline{b} \to B^0_s)/\Gamma(\overline{b} \to B^0)$, finding $f_s/f_d(p_T)$= (0.256 ± 0.020) + (−2.0 ± 0.6) 10^{-3} /GeV/c $(p_T - \langle p_T \rangle)$ and $f_s/f_d(\eta)$= (0.256 ± 0.020) + (0.005 ± 0.006) $(\eta - \langle \eta \rangle)$, where $\langle p_T \rangle$ = 10.4 GeV/c and $\langle \eta \rangle$ = 3.28.

NODE=S051R01;LINKAGE=AA

$B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE REFERENCES

NODE=S051

YOUR PAPER	AAIJ	13P	JHEP 1304 001	R. Aaij *et al.*	(LHCb Collab.)

REFID=54975

Reference = AAIJ 13R; JHEP 1302 043
Verifier code = LHCB

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BOTTOM MESONS
($B = \pm 1$)

$B^+ = u\overline{b}$, $B^0 = d\overline{b}$, $\overline{B}^0 = \overline{d}\,b$, $B^- = \overline{u}\,b$, similarly for B^*'s

NODE=MXXX045

NODE=MXXX045

NODE=S041

$B^\pm$

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

NODE=S041

See also the $B^\pm/B^0$ ADMIXTURE and $B^\pm/B^0/B^0_s/b$-baryon ADMIXTURE sections.

B^+ BRANCHING RATIOS

NODE=S041215

$\Gamma(D^+ K^{*0})/\Gamma_{total}$ — **Γ_{83}/Γ**

NODE=S041P02
NODE=S041P02

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
	<1.8 (CL = 90%)	[<3.0 × 10^{-6} (CL = 90%) OUR 2012 BEST LIMIT]				
YOUR DATA	**<1.8**	90	AAIJ	13R	LHCB	pp at 7 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	<3.0	90	[1] DEL-AMO-SA..	10K	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041P02;LINKAGE=EP

$\Gamma(D^+ \overline{K}^{*0})/\Gamma_{total}$ — **Γ_{84}/Γ**

NODE=S041C76
NODE=S041C76

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<1.4**	90	AAIJ	13R	LHCB	pp at 7 TeV

$\Gamma(D_s^+ \phi)/\Gamma_{total}$ — **Γ_{172}/Γ**

NODE=S041S67
NODE=S041S67

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$1.9^{+1.2}_{-0.7} \pm 0.4$**		[1] AAIJ	13R	LHCB	pp at 7 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	< 1.9	90	[2] AUBERT	06F	BABR	$e^+e^- \to \Upsilon(4S)$
	<1000	90	[3] ALBRECHT	93E	ARG	$e^+e^- \to \Upsilon(4S)$
	< 260	90	[4] ALEXANDER	93B	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] AAIJ 13R reports $(1.87^{+1.25}_{-0.73} \pm 0.19 \pm 0.32) \times 10^{-6}$ from a measurement of $[\Gamma(B^+ \to D_s^+ \phi)/\Gamma_{total}]$ / $[B(B^+ \to \overline{D}^0 D_s^+)]$ assuming $B(B^+ \to \overline{D}^0 D_s^+) = (10.0 \pm 1.7) \times 10^{-3}$.

NODE=S041S67;LINKAGE=AA

[2] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

NODE=S041S67;LINKAGE=EP

[3] ALBRECHT 93E reports $< 1.7 \times 10^{-3}$ from a measurement of $[\Gamma(B^+ \to D_s^+ \phi)/\Gamma_{total}] \times [B(D_s^+ \to \phi\pi^+)]$ assuming $B(D_s^+ \to \phi\pi^+) = 0.027$, which we rescale to our best value $B(D_s^+ \to \phi\pi^+) = 4.5 \times 10^{-2}$.

NODE=S041S67;LINKAGE=CA

[4] ALEXANDER 93B reports $< 3.1 \times 10^{-4}$ from a measurement of $[\Gamma(B^+ \to D_s^+ \phi)/\Gamma_{total}] \times [B(D_s^+ \to \phi\pi^+)]$ assuming $B(D_s^+ \to \phi\pi^+) = 0.037$, which we rescale to our best value $B(D_s^+ \to \phi\pi^+) = 4.5 \times 10^{-2}$.

NODE=S041S67;LINKAGE=XB

$\Gamma(D_s^+ \overline{K}^*(892)^0)/\Gamma_{total}$ — **Γ_{176}/Γ**

NODE=S041S89
NODE=S041S89

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
	<4.4 × 10^{-6} (CL = 90%)	[<4 × 10^{-4} (CL = 90%) OUR 2012 BEST LIMIT]				
YOUR DATA	**<4.4 × 10^{-6}**	90	AAIJ	13R	LHCB	pp at 7 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	<4 × 10^{-4}	90	[1] ALEXANDER	93B	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] ALEXANDER 93B reports $< 4.4 \times 10^{-4}$ from a measurement of $[\Gamma(B^+ \to D_s^+ \overline{K}^*(892)^0)/\Gamma_{total}] \times [B(D_s^+ \to \phi\pi^+)]$ assuming $B(D_s^+ \to \phi\pi^+) = 0.037$, which we rescale to our best value $B(D_s^+ \to \phi\pi^+) = 4.5 \times 10^{-2}$.

NODE=S041S89;LINKAGE=XB

$\Gamma(D_s^+ K^{*0})/\Gamma_{total}$ — Γ_{177}/Γ

NODE=S041C77
NODE=S041C77

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<3.5**	90	AAIJ	13R	LHCB	pp at 7 TeV

CP VIOLATION

NODE=S041220

A_{CP} is defined as

NODE=S041220

$$\frac{B(B^- \to \overline{f}) - B(B^+ \to f)}{B(B^- \to \overline{f}) + B(B^+ \to f)},$$

the *CP*-violation charge asymmetry of exclusive B^- and B^+ decay.

$A_{CP}(B^+ \to D_s^+ \phi)$

NODE=S041ADP
NODE=S041ADP

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**−0.01±0.41±0.03**	AAIJ	13R	LHCB	pp at 7 TeV

$B^\pm$ REFERENCES

NODE=S041

YOUR PAPER

AAIJ	13R	JHEP 1302 043	R. Aaij *et al.*	(LHCb Collab.)	REFID=54991
DEL-AMO-SA...	10K	PR D82 092006	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53459
AUBERT	06F	PR D73 011103	B. Aubert *et al.*	(BABAR Collab.)	REFID=51086
ALBRECHT	93E	ZPHY C60 11	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=43514
ALEXANDER	93B	PL B319 365	J. Alexander *et al.*	(CLEO Collab.)	REFID=43725

BOTTOM, CHARMED MESONS ($B = C = \pm 1$)

NODE=MXXX049

$B_c^+ = c\overline{b}$, $B_c^- = \overline{c}\,b$, similarly for B_c^*'s

NODE=MXXX049

NODE=S091

$B_c^\pm$

$I(J^P) = 0(0^-)$
I, J, P need confirmation.

Quantum numbers shown are quark-model predictions.

NODE=S091

B_c^+ BRANCHING RATIOS

NODE=S091225

$\Gamma(D^+ K^{*0})/\Gamma_{total} \times B(\overline{b} \to B_c)$ — $\Gamma_6/\Gamma \times B$

NODE=S091R06
NODE=S091R06

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<0.20**	90	[19] AAIJ	13R	LHCB	pp at 7 TeV

[19] AAIJ 13R reports $[\Gamma(B_c^+ \to D^+ K^{*0})/\Gamma_{total} \times B(\overline{b} \to B_c)] / [B(\overline{b} \to B^+)] < 0.5 \times 10^{-6}$ which we multiply by our best value $B(\overline{b} \to B^+) = 40.2 \times 10^{-2}$.

NODE=S091R06;LINKAGE=AA

$\Gamma(D^+ \overline{K}^{*0})/\Gamma_{total} \times B(\overline{b} \to B_c)$ — $\Gamma_7/\Gamma \times B$

NODE=S091R07
NODE=S091R07

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<0.16**	90	[20] AAIJ	13R	LHCB	pp at 7 TeV

[20] AAIJ 13R reports $[\Gamma(B_c^+ \to D^+ \overline{K}^{*0})/\Gamma_{total} \times B(\overline{b} \to B_c)] / [B(\overline{b} \to B^+)] < 0.4 \times 10^{-6}$ which we multiply by our best value $B(\overline{b} \to B^+) = 40.2 \times 10^{-2}$.

NODE=S091R07;LINKAGE=AA

$\Gamma(D_s^+ K^{*0})/\Gamma_{total} \times B(\overline{b} \to B_c)$ — $\Gamma_8/\Gamma \times B$

NODE=S091R08
NODE=S091R08

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<0.28**	90	[21] AAIJ	13R	LHCB	pp at 7 TeV

[21] AAIJ 13R reports $[\Gamma(B_c^+ \to D_s^+ K^{*0})/\Gamma_{total} \times B(\overline{b} \to B_c)] / [B(\overline{b} \to B^+)] < 0.7 \times 10^{-6}$ which we multiply by our best value $B(\overline{b} \to B^+) = 40.2 \times 10^{-2}$.

NODE=S091R08;LINKAGE=AA

$\Gamma(D_s^+ \overline{K}^{*0})/\Gamma_{total} \times B(\overline{b} \to B_c)$ — $\Gamma_9/\Gamma \times B$

NODE=S091R09
NODE=S091R09

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<0.4**	90	[22] AAIJ	13R	LHCB	pp at 7 TeV

[22] AAIJ 13R reports $[\Gamma(B_c^+ \to D_s^+ \overline{K}^{*0})/\Gamma_{total} \times B(\overline{b} \to B_c)] / [B(\overline{b} \to B^+)] < 1.1 \times 10^{-6}$ which we multiply by our best value $B(\overline{b} \to B^+) = 40.2 \times 10^{-2}$.

NODE=S091R09;LINKAGE=AA

$\Gamma(D_s^+\phi)/\Gamma_{total} \times B(\overline{b} \to B_c)$ $\Gamma_{10}/\Gamma \times B$

NODE=S091R10
NODE=S091R10

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<0.32**	90	[23] AAIJ	13R	LHCB	pp at 7 TeV

[23] AAIJ 13R reports $[\Gamma(B_c^+ \to D_s^+\phi)/\Gamma_{total} \times B(\overline{b} \to B_c)] / [B(\overline{b} \to B^+)] < 0.8 \times 10^{-6}$ which we multiply by our best value $B(\overline{b} \to B^+) = 40.2 \times 10^{-2}$.

NODE=S091R10;LINKAGE=AA

$B_c^\pm$ REFERENCES

NODE=S091

YOUR PAPER AAIJ 13R JHEP 1302 043 R. Aaij *et al.* (LHCb Collab.)

REFID=54991

Reference = ESEN 13; PR D87 031101
Verifier code = SAKAI

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Yoshihide Sakai

EMAIL: yoshihide.sakai@kek.jp

June 4, 2013

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FAX: 1-(510)-486–4799
EMAIL: wmyao@lbl.gov

BOTTOM, STRANGE MESONS ($B = \pm 1$, $S = \mp 1$)

NODE=MXXX046

$B_s^0 = s\overline{b}$, $\overline{B}_s^0 = \overline{s}\,b$, similarly for B_s^*'s

NODE=MXXX046

B_s^0

NODE=S086

$I(J^P) = 0(0^-)$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

NODE=S086

$\Delta\Gamma_{B_s^0}/\Gamma_{B_s^0}$

NODE=S086DRA

$\Gamma_{B_s^0}$ and $\Delta\Gamma_{B_s^0}$ are the decay rate average and difference between two B_s^0 CP eigenstates (light − heavy).

NODE=S086DRA

"OUR EVALUATION" is an average of all available B_s flavor-specific lifetime measurements with the $\Delta\Gamma_{B_s^0}/\Gamma_s$ analyses performed by the Heavy Flavor Averaging Group (HFAG) as described in our "Review on B-$\overline{B}$ Mixing" in the B^0 Section of these Listings.

NODE=S086DRA

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
0.123±0.017 OUR EVALUATION					
[0.150 ± 0.020 OUR 2012 EVALUATION]					
		[1] AAIJ	12D	LHCB	pp at 7 TeV
		[2] ABAZOV	12D	D0	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA $0.090 \pm 0.009 \pm 0.023$		[3] ESEN	13	BELL	$e^+e^- \to \Upsilon(5S)$
		[4] AALTONEN	12D	CDF	$p\overline{p}$ at 1.96 TeV
$0.147^{+0.036}_{-0.030}{}^{+0.042}_{-0.041}$		[3] ESEN	10	BELL	$e^+e^- \to \Upsilon(5S)$
$0.116^{+0.09}_{-0.10} \pm 0.010$		[5] AALTONEN	08J	CDF	Repl. by AALTONEN 12D
$0.24^{+0.28}_{-0.38}{}^{+0.03}_{-0.04}$		[5,6] ABAZOV	05W	D0	Repl. by ABAZOV 08AM
$0.65^{+0.25}_{-0.33} \pm 0.01$		[5] ACOSTA	05	CDF	Repl. by AALTONEN 08J
<0.46	95	[7] ABREU	00Y	DLPH	$e^+e^- \to Z$
<0.69	95	[8] ABREU,P	00G	DLPH	$e^+e^- \to Z$
<0.83	95	[9] ABE	99D	CDF	$p\overline{p}$ at 1.8 TeV
<0.67	95	[10] ACCIARRI	98S	L3	$e^+e^- \to Z$

NODE=S086DRA;LINKAGE=AJ
NODE=S086DRA;LINKAGE=CE
NODE=S086DRA;LINKAGE=ES
NODE=S086DRA;LINKAGE=AT
NODE=S086DRA;LINKAGE=AC
NODE=S086DRA;LINKAGE=AZ
NODE=S086DRA;LINKAGE=LZ
NODE=S086DRA;LINKAGE=H
NODE=S086DRA;LINKAGE=B
NODE=S086DRA;LINKAGE=A

[1] Measured using the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.
[2] Measured using fully reconstructed $B_s \to J/\psi\phi$ decays.
[3] Assumes CP violation is negligible.
[4] Uses the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays and assuming CP-violating angle $\beta_s(B^0 \to J/\psi\phi) = 0.02$.
[5] Measured using the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.
[6] Uses $|A_0|^2 - |A_{||}|^2 = 0.355 \pm 0.066$ from ACOSTA 05.
[7] Uses $D_s^- \ell^+$, and $\phi\ell^+$ vertices.
[8] Measured using D_s hadron vertices.
[9] ABE 99D assumes $\tau_{B_s^0} = 1.55 \pm 0.05$ ps.
[10] ACCIARRI 98S assumes $\tau_{B_s^0} = 1.49 \pm 0.06$ ps and PDG 98 values of b production fraction.

B_s^0 BRANCHING RATIOS

NODE=S086230

$\Gamma(D_s^+ D_s^-)/\Gamma_{total}$ — Γ_{13}/Γ

NODE=S086R32
NODE=S086R32

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
5.3±0.8 OUR AVERAGE					
[(5.3 ± 0.9) × 10^{-3} OUR 2012 AVERAGE]					
YOUR DATA $5.8^{+1.1}_{-0.9}\pm1.3$		[1] ESEN	13	BELL	$e^+e^- \to \Upsilon(5S)$
$5.1\pm0.8\pm0.6$		[2] AALTONEN	12C	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$10.3^{+3.9}_{-3.2}{}^{+2.6}_{-2.5}$		[3] ESEN	10	BELL	Repl. by ESEN 13
$10.4^{+3.5}_{-3.2}\pm1.1$		[4] AALTONEN	08F	CDF	Repl. by AALTONEN 12C
<67	90	DRUTSKOY	07A	BELL	Repl. by ESEN 10

NEW

[1] Use $\Upsilon(5S) \to B_s^* \overline{B}_s^*$ decays assuming B($\Upsilon(5S) \to B_s^* \overline{B}_s^*$) = (17.1 ± 3.0)% and $\Gamma(\Upsilon(5S) \to B_s^* \overline{B}_s^*)$ / $\Gamma(\Upsilon(5S) \to B_s^{(*)} \overline{B}_s^{(*)})$ = (87.0 ± 1.7)%. NODE=S086R32;LINKAGE=EN

[2] AALTONEN 12C reports (f_s/f_d) (B($B_s^0 \to D_s^+ D_s^-$) / B($B^0 \to D^- D_s^+$)) = 0.183 ± 0.021 ± 0.017. We multiply this result by our best value of B($B^0 \to D^- D_s^+$) = (7.2±0.8)×10^{-3} and divide by our best value of f_s/f_d, where 1/2 f_s/f_d = 0.129±0.008. Our first quoted uncertainty is the combined experiment's uncertainty and our second is the systematic uncertainty from using out best values. NODE=S086R32;LINKAGE=AL

[3] Uses $\Upsilon(10860) \to B_s^* \overline{B}_s^*$ assuming B($\Upsilon(10860) \to B_s^{(*)} \overline{B}_s^{(*)}$) = (19.3 ± 2.9)% and $\Gamma(\Upsilon(10860) \to B_s^* \overline{B}_s^*)$ / $\Gamma(\Upsilon(10860) \to B_s^{(*)} \overline{B}_s^{(*)})$ = $(90.1^{+3.8}_{-4.0})$%. NODE=S086R32;LINKAGE=ES

[4] AALTONEN 08F reports [$\Gamma(B_s^0 \to D_s^+ D_s^-)/\Gamma_{total}$] / [B($B^0 \to D^- D_s^+$)] = $1.44^{+0.48}_{-0.44}$ which we multiply by our best value B($B^0 \to D^- D_s^+$) = (7.2±0.8)×10^{-3}. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=S086R32;LINKAGE=AA

$[\Gamma(D_s^{*+} D_s^-) + \Gamma(D_s^{*-} D_s^+)]/\Gamma_{total}$ — Γ_{16}/Γ

NODE=S086R33
NODE=S086R33

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
12.9±2.2 OUR AVERAGE Error includes scale factor of 1.1. [(12.4 ± 2.1) × 10^{-3} OUR 2012 AVERAGE]					
YOUR DATA $17.6^{+2.3}_{-2.2}\pm4.04$		[1] ESEN	13	BELL	$e^+e^- \to \Upsilon(5S)$
$11.9\pm1.6\pm1.5$		[2] AALTONEN	12C	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$27.5^{+8.3}_{-7.1}\pm6.9$		[3] ESEN	10	BELL	Repl. by ESEN 13
<121	90	DRUTSKOY	07A	BELL	Repl. by ESEN 10

NEW

[1] Use $\Upsilon(5S) \to B_s^* \overline{B}_s^*$ decays assuming B($\Upsilon(5S) \to B_s^* \overline{B}_s^*$) = (17.1 ± 3.0)% and $\Gamma(\Upsilon(5S) \to B_s^* \overline{B}_s^*)$ / $\Gamma(\Upsilon(5S) \to B_s^{(*)} \overline{B}_s^{(*)})$ = (87.0 ± 1.7)%. NODE=S086R33;LINKAGE=EN

[2] AALTONEN 12C reports (f_s/f_d) (B($B_s^0 \to D_s^{*+} D_s^- + D_s^{*-} D_s^+$) / B($B^0 \to D^- D_s^+$)) = 0.424 ± 0.046 ± 0.035. We multiply this result by our best value of B($B^0 \to D^- D_s^+$) = (7.2 ± 0.8) × 10^{-3} and divide by our best value of f_s/f_d, where 1/2 f_s/f_d = 0.129 ± 0.008. Our first quoted uncertainty is the combined experiment's uncertainty and our second is the systematic uncertainty from using out best values. NODE=S086R33;LINKAGE=AL

[3] Uses $\Upsilon(10860) \to B_s^* \overline{B}_s^*$ assuming B($\Upsilon(10860) \to B_s^{(*)} \overline{B}_s^{(*)}$) = (19.3 ± 2.9)% and $\Gamma(\Upsilon(10860) \to B_s^* \overline{B}_s^*)$ / $\Gamma(\Upsilon(10860) \to B_s^{(*)} \overline{B}_s^{(*)})$ = $(90.1^{+3.8}_{-4.0})$%. NODE=S086R33;LINKAGE=ES

$\Gamma(D_s^{*+} D_s^{*-})/\Gamma_{total}$ — Γ_{17}/Γ

NODE=S086R34
NODE=S086R34

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
18.7± 3.0 OUR AVERAGE					
[(18.8 ± 3.4) × 10^{-3} OUR 2012 AVERAGE]					
YOUR DATA $19.8^{+3.3}_{-3.1}{}^{+5.2}_{-5.0}$		[1] ESEN	13	BELL	$e^+e^- \to \Upsilon(5S)$
$18.3\pm2.7\pm2.3$		[2] AALTONEN	12C	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$30.8^{+12.2}_{-10.4}{}^{+8.5}_{-8.6}$		[3] ESEN	10	BELL	Repl. by ESEN 13
<257	90	DRUTSKOY	07A	BELL	Repl. by ESEN 10

NEW

[1] Use $\Upsilon(5S) \rightarrow B_s^* \overline{B}_s^*$ decays assuming B($\Upsilon(5S) \rightarrow B_s^* \overline{B}_s^*$) = (17.1 ± 3.0)% and $\Gamma(\Upsilon(5S) \rightarrow B_s^* \overline{B}_s^*) / \Gamma(\Upsilon(5S) \rightarrow B_s^{(*)} \overline{B}_s^{(*)})$ = (87.0 ± 1.7)%. NODE=S086R34;LINKAGE=EN

[2] AALTONEN 12C reports (f_s/f_d) (B($B_s^0 \rightarrow D_s^{*+} D_s^{*-}$) / B($B^0 \rightarrow D^- D_s^+$)) = 0.654 ± 0.072 ± 0.065. We multiply this result by our best value of B($B^0 \rightarrow D^- D_s^+$) = (7.2±0.8)×$10^{-3}$ and divide by our best value of f_s/f_d, where 1/2 f_s/f_d = 0.129±0.008. Our first quoted uncertainty is the combined experiment's uncertainty and our second is the systematic uncertainty from using out best values. NODE=S086R34;LINKAGE=AL

[3] Uses $\Upsilon(10860) \rightarrow B_s^* \overline{B}_s^*$ assuming B($\Upsilon(10860) \rightarrow B_s^{(*)} \overline{B}_s^{(*)}$) = (19.3 ± 2.9)% and $\Gamma(\Upsilon(10860) \rightarrow B_s^* \overline{B}_s^*) / \Gamma(\Upsilon(10860) \rightarrow B_s^{(*)} \overline{B}_s^{(*)})$ = $(90.1^{+3.8}_{-4.0})$%. NODE=S086R34;LINKAGE=ES

$\Gamma(D_s^{(*)+} D_s^{(*)-})/\Gamma_{total}$ — Γ_{18}/Γ

NODE=S086R23

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements. NODE=S086R23

NODE=S086R23

VALUE (%)	CL%	DOCUMENT ID		TECN	COMMENT
4.5 ±1.4 OUR EVALUATION					
3.7 ±0.5 OUR AVERAGE					
[(3.7 ± 0.6)% OUR 2012 AVERAGE]					
YOUR DATA $4.32^{+0.42}_{-0.39}{}^{+1.04}_{-1.03}$		[1] ESEN	13	BELL	$e^+ e^- \rightarrow \Upsilon(5S)$
3.5 ±0.4 ±0.4		[2] AALTONEN	12C	CDF	$p\overline{p}$ at 1.96 TeV
3.5 ±1.0 ±1.1		[3] ABAZOV	09I	D0	$p\overline{p}$ at 1.96 TeV
14 ±6 ±3		[4,5] BARATE	00K	ALEP	$e^+ e^- \rightarrow Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$6.85^{+1.53}_{-1.30}{}^{+1.79}_{-1.80}$		[6,7] ESEN	10	BELL	Repl. by ESEN 13
$3.9^{+1.9}_{-1.7}{}^{+1.6}_{-1.5}$		[3] ABAZOV	07Y	D0	Repl. by ABAZOV 09I
<0.218	90	BARATE	98Q	ALEP	$e^+ e^- \rightarrow Z$

→ UNCHECKED ← NEW

[1] Use $\Upsilon(5S) \rightarrow B_s^* \overline{B}_s^*$ decays assuming B($\Upsilon(5S) \rightarrow B_s^* \overline{B}_s^*$) = (17.1 ± 3.0)% and $\Gamma(\Upsilon(5S) \rightarrow B_s^* \overline{B}_s^*) / \Gamma(\Upsilon(5S) \rightarrow B_s^{(*)} \overline{B}_s^{(*)})$ = (87.0 ± 1.7)%. NODE=S086R23;LINKAGE=EN

[2] AALTONEN 12C reports (f_s/f_d) (B($B_s^0 \rightarrow D_s^{(*)+} D_s^{(*)-}$) / B($B^0 \rightarrow D^- D_s^+$)) = 1.261 ± 0.095 ± 0.112. We multiply this result by our best value of B($B^0 \rightarrow D^- D_s^+$) = (7.2±0.8)×$10^{-3}$ and divide by our best value of f_s/f_d, where 1/2 f_s/f_d = 0.129±0.008. Our first quoted uncertainty is the combined experiment's uncertainty and our second is the systematic uncertainty from using out best values. NODE=S086R23;LINKAGE=AL

[3] Uses the final states where $D_s^+ \rightarrow \phi\pi^+$ and $D_s^- \rightarrow \phi\mu^-\overline{\nu}_\mu$. NODE=S086R23;LINKAGE=AB

[4] Reports B(B_s^0(short) $\rightarrow D_s^{(*)} D_s^{(*)}$) = (0.23 ± 0.10 ± 0.05) · $[0.17/\text{B}(D_s \rightarrow \phi\chi)]^2$ assuming B($B_s^0 \rightarrow B_s^0$(short)) = 50%. We use our best value of B($D_s \rightarrow \phi\chi$) = 15.7 ± 1.0% to obtain the quoted result. NODE=S086R23;LINKAGE=BA

[5] Uses $\phi\phi$ correlations from B_s^0(short) $\rightarrow D_s^{(*)+} D_s^{(*)-}$. NODE=S086R23;LINKAGE=KB

[6] Sum of exclusive $B_s \rightarrow D_s^+ D_s^-$, $B_s \rightarrow D_s^{*\pm} D_s^{\mp}$ and $B_s \rightarrow D_s^{*+} D_s^{*-}$. NODE=S086R23;LINKAGE=EE

[7] Uses $\Upsilon(10860) \rightarrow B_s^* \overline{B}_s^*$ assuming B($\Upsilon(10860) \rightarrow B_s^{(*)} \overline{B}_s^{(*)}$) = (19.3 ± 2.9)% and $\Gamma(\Upsilon(10860) \rightarrow B_s^* \overline{B}_s^*) / \Gamma(\Upsilon(10860) \rightarrow B_s^{(*)} \overline{B}_s^{(*)})$ = $(90.1^{+3.8}_{-4.0})$%. NODE=S086R23;LINKAGE=ES

POLARIZATION IN B_s^0 DECAY

NODE=S086233

Γ_L/Γ in $B_s^0 \rightarrow D_s^{*+} D_s^{*-}$

NODE=S086P08

NODE=S086P08

VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA **$0.06^{+0.18}_{-0.17}$±0.03**	ESEN	13	BELL	$e^+ e^- \rightarrow \Upsilon(5S)$

B_s^0 REFERENCES

NODE=S086

YOUR PAPER

ESEN	13	PR D87 031101	S. Esen *et al.*	(BELLE Collab.)	REFID=54894
AAIJ	12D	PRL 108 101803	R. Aaij *et al.*	(LHCb Collab.)	REFID=54036
AALTONEN	12C	PRL 108 201801	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54065
AALTONEN	12D	PR D85 072002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=54070
ABAZOV	12D	PR D85 032006	V.M. Abazov *et al.*	(D0 Collab.)	REFID=54062
ESEN	10	PRL 105 201802	S. Esen *et al.*	(BELLE Collab.)	REFID=53462
ABAZOV	09I	PRL 102 091801	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52703
AALTONEN	08F	PRL 100 021803	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52227
AALTONEN	08J	PRL 100 121803	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52234

ABAZOV	08AM	PRL 101 241801	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52604
ABAZOV	07Y	PRL 99 241801	V.M. Abazov *et al.*	(D0 Collab.)	REFID=52091
DRUTSKOY	07A	PR D76 012002	A. Drutskoy *et al.*	(BELLE Collab.)	REFID=51852
ABAZOV	05W	PRL 95 171801	V.M. Abazov *et al.*	(D0 Collab.)	REFID=50929
ACOSTA	05	PRL 94 101803	D. Acosta *et al.*	(CDF Collab.)	REFID=50519
ABREU	00Y	EPJ C16 555	P. Abreu *et al.*	(DELPHI Collab.)	REFID=47784
ABREU,P	00G	EPJ C18 229	P. Abreu *et al.*	(DELPHI Collab.)	REFID=48030
BARATE	00K	PL B486 286	R. Barate *et al.*	(ALEPH Collab.)	REFID=47721
ABE	99D	PR D59 032004	F. Abe *et al.*	(CDF Collab.)	REFID=46705
ACCIARRI	98S	PL B438 417	M. Acciarri *et al.*	(L3 Collab.)	REFID=46503
BARATE	98Q	EPJ C4 387	R. Barate *et al.*	(ALEPH Collab.)	REFID=46146
PDG	98	EPJ C3 1	C. Caso *et al.*		REFID=45838

Reference = ABAZOV 12AB; PR D86 051103
Verifier code = not found

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

June 4, 2013

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.*, "`NODE=S043M`.")

Thank you for helping us make the Review accurate and useful.

Sincerely,

Wei-Ming Yao
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QUARKS

NODE=QXXX005

NODE=Q007

t

$I(J^P) = 0(\frac{1}{2}^+)$

NODE=Q007

Charge $= \frac{2}{3}\ e$ Top $= +1$

t-QUARK MASS

NODE=Q007210

NODE=Q007210

We first list the direct measurements of the top quark mass which employ the event kinematics and then list the measurements which extract a top quark mass from the measured $t\bar{t}$ cross-section using theory calculations. A discussion of the definition of the top quark mass in these measurements can be found in the review "The Top Quark."

OUR EVALUATION of $173.07 \pm 0.52 \pm 0.72$ GeV is an average of published top mass measurements from Tevatron Runs. The LHC experiments are working on a combined average that should appear in the 2014 PDG edition once the correlated uncertainties between experiments are understood. The Tevatron average was provided by the Tevatron Electroweak Working Group (TEVEWWG). It takes correlated uncertainties into account and has a χ^2 of 8.4 for 11 degrees of freedom.

For earlier search limits see PDG 96, Physical Review **D54** 1 (1996). We no longer include a compilation of indirect top mass determinations from Standard Model Electroweak fits in the Listings (our last compilation can be found in the Listings of the 2007 partial update). For a discussion of current results see the reviews "The Top Quark" and "Electroweak Model and Constraints on New Physics."

t-Quark Mass (Direct Measurements)

NODE=Q007TP

NODE=Q007TP

The following measurements extract a t-quark mass from the kinematics of $t\bar{t}$ events. They are sensitive to the top quark mass used in the MC generator that is usually interpreted as the pole mass, but the theoretical uncertainty in this interpretation is hard to quantify. See the review "The Top Quark" and references therein for more information.

NODE=Q007TP

	VALUE (GeV)	DOCUMENT ID		TECN	COMMENT
	173.07± 0.52± 0.72 OUR EVALUATION	See comments in the header above.			
	[173.5 ± 0.6 ± 0.8 GeV OUR 2012 EVALUATION]				
	174.5 ± 0.6 ± 2.3	[1] AAD	12I	ATLS	$\ell+\not{E}_T+\geq 4$ jets (≥ 1 b), MT
	172.85± 0.71± 0.85	[2] AALTONEN	12AI	CDF	$\ell+\not{E}_T+\geq 4$j (0,1,2b) template
	172.7 ± 9.3 ± 3.7	[3] AALTONEN	12AL	CDF	$\tau_h + \not{E}_T$ +4j ($\geq 1b$)
	172.5 ± 1.4 ± 1.5	[4] AALTONEN	12G	CDF	6–8 jets with ≥ 1 b
YOUR DATA	173.9 ± 1.9 ± 1.6	[5] ABAZOV	12AB	D0	$\ell\ell+\not{E}_T+\geq 2$j ($\nu$WT+MWT)
	172.5 ± 0.4 ± 1.5	[6] CHATRCHYAN	12BA	CMS	$\ell\ell+\not{E}_T+\geq 2$j ($\geq 1b$), AMWT
	173.49± 0.43± 0.98	[7] CHATRCHYAN	12BP	CMS	$\ell+\not{E}_T+\geq 4$j ($\geq 2b$)
	172.3 ± 2.4 ± 1.0	[8] AALTONEN	11AK	CDF	$\not{E}_T + \geq 4$ jets (≥ 1 b-tag)
	172.1 ± 1.1 ± 0.9	[9] AALTONEN	11E	CDF	ℓ + jets and dilepton
	174.94± 0.83± 1.24	[10] ABAZOV	11P	D0	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag)
	173.0 ± 1.2	[11] AALTONEN	10AE	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag), ME method
	170.7 ± 6.3 ± 2.6	[12] AALTONEN	10D	CDF	$\ell + \not{E}_T$ + 4 jets (b-tag)
	180.1 ± 3.6 ± 3.9	[13,14] ABAZOV	04G	D0	lepton + jets
	176.1 ± 5.1 ± 5.3	[15] AFFOLDER	01	CDF	lepton + jets
	167.4 ±10.3 ± 4.8	[16,17] ABE	99B	CDF	dilepton
	168.4 ±12.3 ± 3.6	[14] ABBOTT	98D	D0	dilepton
	186 ±10 ± 5.7	[16,18] ABE	97R	CDF	6 or more jets
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	173.18± 0.56± 0.75	[19] AALTONEN	12AP	TEVA	CDF, D0 combination
YOUR DATA	173.7 ± 2.8 ± 1.5	[20] ABAZOV	12AB	D0	$\ell\ell + \not{E}_T + \geq 2$ j (νWT)
	172.4 ± 1.4 ± 1.3	[21] AALTONEN	11AC	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag)
	176.9 ± 8.0 ± 2.7	[22] AALTONEN	11T	CDF	$\ell + \not{E}_T$ + 4 jets (≥ 1 b-tag), $p_T(\ell)$ shape
	174.0 ± 1.8 ± 2.4	[23] ABAZOV	11R	D0	dilepton + $\not{E}_T + \geq 2$ jets
	175.5 ± 4.6 ± 4.6	[24] CHATRCHYAN	11F	CMS	dilepton + $\not{E}_T$ + jets
	169.3 ± 2.7 ± 3.2	[25] AALTONEN	10C	CDF	dilepton + b-tag (MT2+NWA)
	174.8 ± 2.4 $^{+1.2}_{-1.0}$	[26] AALTONEN	10E	CDF	≥ 6 jets, vtx b-tag

NEW;→ UNCHECKED ←

OCCUR=2

OCCUR=2

$180.5 \pm 12.0 \pm 3.6$	[27] AALTONEN	09AK	CDF	$\ell + \not{E}_T$ + jets (soft μ b-tag)	
$172.7 \pm 1.8 \pm 1.2$	[28] AALTONEN	09J	CDF	$\ell + \not{E}_T$ + 4 jets (b-tag)	
$171.1 \pm 3.7 \pm 2.1$	[29] AALTONEN	09K	CDF	6 jets, vtx b-tag	
$171.9 \pm 1.7 \pm 1.1$	[30] AALTONEN	09L	CDF	ℓ + jets, $\ell\ell$ + jets	
$171.2 \pm 2.7 \pm 2.9$	[31] AALTONEN	09O	CDF	dilepton	
$165.5 {}^{+3.4}_{-3.3} \pm 3.1$	[32] AALTONEN	09X	CDF	$\ell\ell + \not{E}_T$ ($\nu\phi$ weighting)	
$174.7 \pm 4.4 \pm 2.0$	[33] ABAZOV	09AH	D0	dilepton + b-tag (νWT+MWT)	
$170.7 {}^{+4.2}_{-3.9} \pm 3.5$	[34,35] AALTONEN	08C	CDF	dilepton, $\sigma_{t\bar{t}}$ constrained	
$171.5 \pm 1.8 \pm 1.1$	[36] ABAZOV	08AH	D0	$\ell + \not{E}_T$ + 4 jets	
$177.1 \pm 4.9 \pm 4.7$	[37,38] AALTONEN	07	CDF	6 jets with ≥ 1 b vtx	
$172.3 {}^{+10.8}_{-9.6} \pm 10.8$	[39] AALTONEN	07B	CDF	≥ 4 jets (b-tag)	
$174.0 \pm 2.2 \pm 4.8$	[40] AALTONEN	07D	CDF	≥ 6 jets, vtx b-tag	
$170.8 \pm 2.2 \pm 1.4$	[41,42] AALTONEN	07I	CDF	lepton + jets (b-tag)	
$173.7 \pm 4.4 {}^{+2.1}_{-2.0}$	[38,43] ABAZOV	07F	D0	lepton + jets	
$176.2 \pm 9.2 \pm 3.9$	[44] ABAZOV	07W	D0	dilepton (MWT)	
$179.5 \pm 7.4 \pm 5.6$	[44] ABAZOV	07W	D0	dilepton (νWT)	OCCUR=2
$164.5 \pm 3.9 \pm 3.9$	[42,45] ABULENCIA	07D	CDF	dilepton	
$180.7 {}^{+15.5}_{-13.4} \pm 8.6$	[46] ABULENCIA	07J	CDF	lepton + jets	
$170.3 {}^{+4.1}_{-4.5} {}^{+1.2}_{-1.8}$	[42,47] ABAZOV	06U	D0	lepton + jets (b-tag)	
$173.2 {}^{+2.6}_{-2.4} \pm 3.2$	[48,49] ABULENCIA	06D	CDF	lepton + jets	
$173.5 {}^{+3.7}_{-3.6} \pm 1.3$	[35,48] ABULENCIA	06D	CDF	lepton + jets	OCCUR=2
$165.2 \pm 6.1 \pm 3.4$	[42,50] ABULENCIA	06G	CDF	dilepton	
$170.1 \pm 6.0 \pm 4.1$	[35,51] ABULENCIA	06V	CDF	dilepton	
$178.5 \pm 13.7 \pm 7.7$	[52,53] ABAZOV	05	D0	6 or more jets	
176.1 ± 6.6	[54] AFFOLDER	01	CDF	dilepton, lepton+jets, all-jets	OCCUR=2
$172.1 \pm 5.2 \pm 4.9$	[55] ABBOTT	99G	D0	di-lepton, lepton+jets	
176.0 ± 6.5	[17,56] ABE	99B	CDF	dilepton, lepton+jets, all-jets	
$173.3 \pm 5.6 \pm 5.5$	[14,57] ABBOTT	98F	D0	lepton + jets	
$175.9 \pm 4.8 \pm 5.3$	[16,58] ABE	98E	CDF	lepton + jets	
$161 \pm 17 \pm 10$	[16] ABE	98F	CDF	dilepton	
$172.1 \pm 5.2 \pm 4.9$	[59] BHAT	98B	RVUE	dilepton and lepton+jets	
173.8 ± 5.0	[60] BHAT	98B	RVUE	dilepton, lepton+jets, all-jets	OCCUR=2
$173.3 \pm 5.6 \pm 6.2$	[14] ABACHI	97E	D0	lepton + jets	
$199 {}^{+19}_{-21} \pm 22$	ABACHI	95	D0	lepton + jets	
$176 \pm 8 \pm 10$	ABE	95F	CDF	lepton + b-jet	
$174 \pm 10 {}^{+13}_{-12}$	ABE	94E	CDF	lepton + b-jet	

[1] Based on 1.04 fb^{-1} of data at LHC7. Uses 2d-template analysis (MT) with m_t and jet energy scale factor (JSF) from m_W mass fit. NODE=Q007TP;LINKAGE=GD

[2] Based on 8.7 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. The JES is calibrated by using the dijet mass from the W boson decay. NODE=Q007TP;LINKAGE=CL

[3] Use the ME method based on 2.2 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. NODE=Q007TP;LINKAGE=CD

[4] Based on 5.8 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. The quoted systematic error is the sum of JES($\pm$1.0) and systematic($\pm$1.0) uncertainties. The measurement is performed with a liklihood fit technique which simultaneously determines m_t and JES. NODE=Q007TP;LINKAGE=OA

[5] Combination with the result in 1 fb^{-1} of preceding data reported in ABAZOV 09AH as well as the MWT result of ABAZOV 11R with a statistical correlation of 60%. NODE=Q007TP;LINKAGE=VB

[6] Based on 5.0 fb^{-1} of data at LHC7. Uses an analytical matrix weighting technique (AMWT) and full kinematic analysis (KIN). NODE=Q007TP;LINKAGE=CA

[7] Based on 5.0 fb^{-1} of data at LHC7. The first error is statistical and JES combined, and the second is systematic. Ideogram method is used to obtain 2D liklihood for the kinematical fit with two parameters mtop and JES. NODE=Q007TP;LINKAGE=RC

[8] Based on 5.7 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. Events with an identified charged lepton or small $\not{E}_T$ are rejected from the event sample, so that the measurement is statistically independent from those in the ℓ + jets and all hadronic channels while being sensitive to those events with a τ lepton in the final state. Supersedes AALTONEN 07B. NODE=Q007TP;LINKAGE=TL

[9] Based on 5.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. Employs a multi-dimensional template likelihood technique where the lepton plus jets (one or two b-tags) channel gives 172.2 $\pm$ 1.2 $\pm$ 0.9 GeV while the dilepton channel yields 170.3 $\pm$ 2.0 $\pm$ 3.1 GeV. The results are combined. OUR EVALUATION includes the measurement in the dilepton channel only. NODE=Q007TP;LINKAGE=NT

[10] Based on 3.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s} = 1.96$ TeV. ABAZOV 11P reports 174.94 $\pm$ 0.83$\pm$0.78$\pm$0.96 GeV, where the first uncertainty is from statistics, the second from JES, and the last from other systematic uncertainties. We combine the JES and systematic uncertainties. A matrix-element method is used where the JES uncertainty is constrained NODE=Q007TP;LINKAGE=ZA

by the W mass. ABAZOV 11P describes a measurement based on 2.6 fb^{-1} that is combined with ABAZOV 08AH, which employs an independent 1 fb^{-1} of data.

[11] Based on 5.6 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The likelihood calculated using a matrix element method gives m_t = 173.0 ± 0.7(stat)±0.6(JES)±0.9(syst) GeV, for a total uncertainty of 1.2 GeV. NODE=Q007TP;LINKAGE=NA

[12] Based on 1.9 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The result is from the measurement using the transverse decay lenght of b-hadrons and that using the transverse momentum of the W decay muons, which are both insensitive to the JES (jet energy scale) uncertainty. OUR EVALUATION uses only the measurement exploiting the decay length significance which yields $166.9^{+9.5}_{-8.5}$(stat)±2.9 (syst) GeV. The measurement that uses the lepton transverse momentum is excluded from the average because of a statistical correlation with other samples. NODE=Q007TP;LINKAGE=AE

[13] Obtained by re-analysis of the lepton + jets candidate events that led to ABBOTT 98F. It is based upon the maximum likelihood method which makes use of the leading order matrix elements. NODE=Q007TP;LINKAGE=AO

[14] Based on 125 ± 7 pb^{-1} of data at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=WW

[15] Based on ∼ 106 pb^{-1} of data at $\sqrt{s}$= 1.8 TeV. NODE=Q007TP;LINKAGE=F1

[16] Based on 109 ± 7 pb^{-1} of data at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=XX

[17] See AFFOLDER 01 for details of systematic error re-evaluation. NODE=Q007TP;LINKAGE=XZ

[18] Based on the first observation of all hadronic decays of $t\overline{t}$ pairs. Single b-quark tagging with jet-shape variable constraints was used to select signal enriched multi-jet events. The updated systematic error is listed. See AFFOLDER 01, appendix C. NODE=Q007TP;LINKAGE=AR

[19] Combination based on up to 5.8 fb^{-1} of data in $p\overline{p}$ collisions at 1.96 TeV. NODE=Q007TP;LINKAGE=EA

[20] Based on 4.3 fb^{-1} of data in p-pbar collisions at 1.96 TeV. The measurement reduces the JES uncertainty by using the single lepton channel study of ABAZOV 11P. NODE=Q007TP;LINKAGE=VA

[21] Based on 3.2 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and JES combined, and the latter is from the other systematic uncertainties. The result is obtained using an unbinned maximum likelihood method where the top quark mass and the JES are measured simultaneously, with Δ_{JES} = 0.3 ± 0.3(stat). NODE=Q007TP;LINKAGE=NL

[22] Uses a likelihood fit of the lepton p_T distribution based on 2.7 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=NN

[23] Based on a matrix-element method which employs 5.4 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. Superseded by ABAZOV 12AB. NODE=Q007TP;LINKAGE=OZ

[24] Based on 36 pb^{-1} of pp collisions at $\sqrt{s}$ = 7 TeV. A Kinematic Method using b-tagging and an analytical Matrix Weighting Technique give consistent results and are combined. Superseded by CHATRCHYAN 12BA. NODE=Q007TP;LINKAGE=CH

[25] Based on 3.4 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The result is obtained by combining the MT2 variable method and the NWA (Neutrino Weighting Algorithm). The MT2 method alone gives $m_t = 168.0^{+4.8}_{-4.0}$(stat)±2.9(syst) GeV with smaller systematic error due to small JES uncertainty. NODE=Q007TP;LINKAGE=TA

[26] Based on 2.9 fb^{-1} in $p\overline{p}$ collisions at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and JES uncertainty, and the latter is from the other systematics. Neural-network-based kinematical selection of 6 highest E_T jets with a vtx b-tag is used to distinguish signal from background. Superseded by AALTONEN 12G. NODE=Q007TP;LINKAGE=LN

[27] Based on 2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The top mass is obtained from the measurement of the invariant mass of the lepton (e or μ) from W decays and the soft μ in b-jet. The result is insensitive to jet energy scaling. NODE=Q007TP;LINKAGE=NO

[28] Based on 1.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and jet energy scale uncertainty, and the latter is from the other systematics. Matrix element method with effective propagators. NODE=Q007TP;LINKAGE=LO

[29] Based on 943 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistical and jet-energy-scale uncertainties, and the latter is from other systematics. AALTONEN 09K selected 6 jet events with one or more vertex b-tags and used the tree-level matrix element to construct template models of signal and background. NODE=Q007TP;LINKAGE=OT

[30] Based on 1.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistical and jet-energy-scale (JES) uncertainties, and the second is from other systematics. Events with lepton + jets and those with dilepton + jets were simultaneously fit to constrain m_t and JES. Lepton + jets data only give m_t = 171.8 ± 2.2 GeV, and dilepton data only give $m_t = 171.2^{+5.3}_{-5.1}$ GeV. NODE=Q007TP;LINKAGE=EN

[31] Based on 2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Matrix Element method. Optimal selection criteria for candidate events with two high p_T leptons, high $\not{E}_T$, and two or more jets with and without b-tag are obtained by neural network with neuroevolution technique to minimize the statistical error of m_t. NODE=Q007TP;LINKAGE=TE

[32] Based on 2.9 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Mass m_t is estimated from the likelihood for the eight-fold kinematical solutions in the plane of the azimuthal angles of the two neutrino momenta. NODE=Q007TP;LINKAGE=ON

[33] Based on 1 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Events with two identified leptons, and those with one lepton plus one isolated track and a b-tag were used to constrain m_t. The result is a combination of the νWT (ν Weighting Technique) result of 176.2 ± 4.8 ± 2.1 GeV and the MWT (Matrix-element Weighting Technique) result of 173.2 ± 4.9 ± 2.0 GeV. NODE=Q007TP;LINKAGE=ZV

[34] Reports measurement of $170.7^{+4.2}_{-3.9} \pm 2.6 \pm 2.4$ GeV based on 1.2 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The last error is due to the theoretical uncertainty on $\sigma_{t\bar{t}}$. Without the cross-section constraint a top mass of $169.7^{+5.2}_{-4.9} \pm 3.1$ GeV is obtained. NODE=Q007TP;LINKAGE=AN

[35] Template method. NODE=Q007TP;LINKAGE=BC

[36] Result is based on 1 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is from statistics and jet energy scale uncertainty, and the latter is from the other systematics. NODE=Q007TP;LINKAGE=BV

[37] Based on 310 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=TN

[38] Ideogram method. NODE=Q007TP;LINKAGE=TO

[39] Based on 311 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Events with 4 or more jets with $E_T >$ 15 GeV, significant missing E_T, and secondary vertex b-tag are used in the fit. About 44% of the signal acceptance is from $\tau\nu$ + 4 jets. Events with identified e or μ are vetoed to provide a statistically independent measurement. NODE=Q007TP;LINKAGE=LT

[40] Based on 1.02 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Superseded by AALTONEN 12G. NODE=Q007TP;LINKAGE=NE

[41] Based on 955 pb^{-1} of data $\sqrt{s}$ = 1.96 TeV. m_t and JES (Jet Energy Scale) are fitted simultaneously, and the first error contains the JES contribution of 1.5 GeV. NODE=Q007TP;LINKAGE=LA

[42] Matrix element method. NODE=Q007TP;LINKAGE=UB

[43] Based on 425 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error is a combination of statistics and JES (Jet Energy Scale) uncertainty, which has been measured simultaneously to give JES = 0.989 ± 0.029(stat). NODE=Q007TP;LINKAGE=OV

[44] Based on 370 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. Combined result of MWT (Matrix-element Weighting Technique) and νWT (ν Weighting Technique) analyses is 178.1 ± 6.7 ± 4.8 GeV. NODE=Q007TP;LINKAGE=ZO

[45] Based on 1.0 fb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. ABULENCIA 07D improves the matrix element description by including the effects of initial-state radiation. NODE=Q007TP;LINKAGE=LE

[46] Based on 695 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The transverse decay length of the b hadron is used to determine m_t, and the result is free from the JES (jet energy scale) uncertainty. NODE=Q007TP;LINKAGE=UL

[47] Based on ∼ 400 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. The first error includes statistical and systematic jet energy scale uncertainties, the second error is from the other systematics. The result is obtained with the b-tagging information. The result without b-tagging is $169.2^{+5.0}_{-7.4}{}^{+1.5}_{-1.4}$ GeV. Superseded by ABAZOV 08AH. NODE=Q007TP;LINKAGE=BZ

[48] Based on 318 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=BA

[49] Dynamical likelihood method. NODE=Q007TP;LINKAGE=BB

[50] Based on 340 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=UA

[51] Based on 360 pb^{-1} of data at $\sqrt{s}$ = 1.96 TeV. NODE=Q007TP;LINKAGE=AL

[52] Based on 110.2 ± 5.8 pb^{-1} at $\sqrt{s}$ = 1.8 TeV. NODE=Q007TP;LINKAGE=AA

[53] Based on the all hadronic decays of $t\bar{t}$ pairs. Single b-quark tagging via the decay chain $b \rightarrow c \rightarrow \mu$ was used to select signal enriched multijet events. The result was obtained by the maximum likelihood method after bias correction. NODE=Q007TP;LINKAGE=AZ

[54] Obtained by combining the measurements in the lepton + jets [AFFOLDER 01], all-jets [ABE 97R, ABE 99B], and dilepton [ABE 99B] decay topologies. NODE=Q007TP;LINKAGE=F2

[55] Obtained by combining the D0 result m_t (GeV) = 168.4 ± 12.3 ± 3.6 from 6 di-lepton events (see also ABBOTT 98D) and m_t (GeV) = 173.3 ± 5.6 ± 5.5 from lepton+jet events (ABBOTT 98F). NODE=Q007TP;LINKAGE=DG

[56] Obtained by combining the CDF results of m_t (GeV)=167.4 ± 10.3 ± 4.8 from 8 dilepton events, m_t (GeV)=175.9 ± 4.8 ± 5.3 from lepton+jet events (ABE 98E), and m_t (GeV)=186.0 ± 10.0 ± 5.7 from all-jet events (ABE 97R). The systematic errors in the latter two measurements are changed in this paper. NODE=Q007TP;LINKAGE=BG

[57] See ABAZOV 04G. NODE=Q007TP;LINKAGE=AT

[58] The updated systematic error is listed. See AFFOLDER 01, appendix C. NODE=Q007TP;LINKAGE=XY

[59] Obtained by combining the DØ results of m_t(GeV)=168.4 ± 12.3 ± 3.6 from 6 dilepton events and m_t(GeV)=173.3 ± 5.6 ± 5.5 from 77 lepton+jet events. NODE=Q007TP;LINKAGE=BE

[60] Obtained by combining the DØ results from dilepton and lepton+jet events, and the CDF results (ABE 99B) from dilepton, lepton+jet events, and all-jet events. NODE=Q007TP;LINKAGE=BF

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