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

B DECAY MODES

The branching fraction measurements are for an admixture of B mesons at the $\Upsilon(4S)$. The values quoted assume that B($\Upsilon(4S) \to B\overline{B}$) = 100%.

For inclusive branching fractions, *e.g.*, $B \to D^{\pm}$ *anything*, the treatment of multiple D's in the final state must be defined. One possibility would be to count the number of events with one-or-more D's and divide by the total number of B's. Another possibility would be to count the total number of D's and divide by the total number of B's, which is the definition of average multiplicity. The two definitions are identical if only one D is allowed in the final state. Even though the "one-or-more" definition seems sensible, for practical reasons inclusive branching fractions are almost always measured using the multiplicity definition. For heavy final state particles, authors call their results inclusive branching fractions while for light particles some authors call their results multiplicities. In the B sections, we list all results as inclusive branching fractions, adopting a multiplicity definition. This means that inclusive branching fractions can exceed 100% and that inclusive partial widths can exceed total widths, just as inclusive cross sections can exceed total cross section.

$\overline{B}$ modes are charge conjugates of the modes below. Reactions indicate the weak decay vertex and do not include mixing.

	Mode		Fraction (Γ_i/Γ)	Scale factor/ Confidence level
	Semileptonic and leptonic modes			
Γ_1	$e^+ \nu_e$ anything	[a]		
Γ_2	$\mu^+ \nu_\mu$ anything	[a]		
Γ_3	$\ell^+ \nu_\ell$ anything	[a,b]	(10.86 ± 0.16) %	
Γ_4	$D^- \ell^+ \nu_\ell$ anything	[b]	(2.8 ± 0.9) %	
Γ_5	$\overline{D}^0 \ell^+ \nu_\ell$ anything	[b]	(7.3 ± 1.5) %	
Γ_6	$\overline{D} \ell^+ \nu_\ell$		(2.42 ± 0.12) %	
Γ_7	$D^{*-} \ell^+ \nu_\ell$ anything	[c]	$(6.7 \pm 1.3) \times 10^{-3}$	
Γ_8	$D^{*0} \ell^+ \nu_\ell$ anything			
Γ_9	$D^* \ell^+ \nu_\ell$	[d]	(4.95 ± 0.11) %	
Γ_{10}	$\overline{D}^{**} \ell^+ \nu_\ell$	[b,e]	(2.7 ± 0.7) %	
Γ_{11}	$\overline{D}_1(2420) \ell^+ \nu_\ell$ anything		$(3.8 \pm 1.3) \times 10^{-3}$	S=2.4
Γ_{12}	$D \pi \ell^+ \nu_\ell$ anything + $D^* \pi \ell^+ \nu_\ell$ anything		(2.6 ± 0.5) %	S=1.5
Γ_{13}	$D \pi \ell^+ \nu_\ell$ anything		(1.5 ± 0.6) %	
Γ_{14}	$D^* \pi \ell^+ \nu_\ell$ anything		(1.9 ± 0.4) %	
Γ_{15}	$\overline{D}^*_2(2460) \ell^+ \nu_\ell$ anything		$(4.4 \pm 1.6) \times 10^{-3}$	
Γ_{16}	$D^{*-} \pi^+ \ell^+ \nu_\ell$ anything		(1.00 ± 0.34) %	

Γ_{17}	$\overline{D}\pi^+\pi^-\ell^+\nu_\ell$			$(1.62 \pm 0.32) \times 10^{-3}$	
Γ_{18}	$\overline{D}^*\pi^+\pi^-\ell^+\nu_\ell$			$(9.4 \pm 3.2) \times 10^{-4}$	
Γ_{19}	$D_s^-\ell^+\nu_\ell$ anything	[b]	<	7×10^{-3}	CL=90%
Γ_{20}	$D_s^-\ell^+\nu_\ell K^+$ anything	[b]	<	5×10^{-3}	CL=90%
Γ_{21}	$D_s^-\ell^+\nu_\ell K^0$ anything	[b]	<	7×10^{-3}	CL=90%
Γ_{22}	$X_c\ell^+\nu_\ell$			(10.65 ± 0.16) %	
Γ_{23}	$X_u\ell^+\nu_\ell$			$(2.14 \pm 0.31) \times 10^{-3}$	
Γ_{24}	$K^+\ell^+\nu_\ell$ anything	[b]		(6.3 ± 0.6) %	
Γ_{25}	$K^-\ell^+\nu_\ell$ anything	[b]		$(10 \pm 4) \times 10^{-3}$	
Γ_{26}	$K^0/\overline{K}^0\ell^+\nu_\ell$ anything	[b]		(4.6 ± 0.5) %	
Γ_{27}	$\overline{D}\tau^+\nu_\tau$			$(9.8 \pm 1.3) \times 10^{-3}$	
Γ_{28}	$D^*\tau^+\nu_\tau$			(1.58 ± 0.12) %	

D, D^*, or D_s modes

Γ_{29}	$D^\pm$ anything			(22.9 ± 1.3) %	
Γ_{30}	$D^0/\overline{D}^0$ anything			(61.8 ± 2.9) %	S=1.3
Γ_{31}	$D^*(2010)^\pm$ anything			(22.5 ± 1.5) %	
Γ_{32}	$D^*(2007)^0$ anything			(26.0 ± 2.7) %	
Γ_{33}	$D_s^\pm$ anything	[f]		(8.3 ± 0.8) %	
Γ_{34}	$D_s^{*\pm}$ anything			(6.3 ± 1.0) %	
Γ_{35}	$D_s^{*\pm}\overline{D}^{(*)}$			(3.4 ± 0.6) %	
Γ_{36}	$\overline{D}D_{s0}(2317)$			seen	
Γ_{37}	$\overline{D}D_{sJ}(2457)$			seen	
Γ_{38}	$D^{(*)}\overline{D}^{(*)}K^0 + D^{(*)}\overline{D}^{(*)}K^\pm$	[f,g]		$(7.1 {}^{+2.7}_{-1.7})$ %	
Γ_{39}	$b \to c\overline{c}s$			(22 ± 4) %	
Γ_{40}	$D_s^{(*)}\overline{D}^{(*)}$	[f,g]		(3.9 ± 0.4) %	
Γ_{41}	$D^*D^*(2010)^\pm$	[f]	<	5.9×10^{-3}	CL=90%
Γ_{42}	$DD^*(2010)^\pm + D^*D^\pm$	[f]	<	5.5×10^{-3}	CL=90%
Γ_{43}	$DD^\pm$	[f]	<	3.1×10^{-3}	CL=90%
Γ_{44}	$D_s^{(*)\pm}\overline{D}^{(*)}X(n\pi^\pm)$	[f,g]		$(9 {}^{+5}_{-4})$ %	
Γ_{45}	$D^*(2010)\gamma$		<	1.1×10^{-3}	CL=90%
Γ_{46}	$D_s^+\pi^-$, $D_s^{*+}\pi^-$, $D_s^+\rho^-$, $D_s^{*+}\rho^-$, $D_s^+\pi^0$, $D_s^{*+}\pi^0$, $D_s^+\eta$, $D_s^{*+}\eta$, $D_s^+\rho^0$, $D_s^{*+}\rho^0$, $D_s^+\omega$, $D_s^{*+}\omega$	[f]	<	4×10^{-4}	CL=90%
Γ_{47}	$D_{s1}(2536)^+$ anything		<	9.5×10^{-3}	CL=90%

Charmonium modes

Γ_{48}	$J/\psi(1S)$ anything			(1.094 ± 0.032) %	S=1.1
Γ_{49}	$J/\psi(1S)$ (direct) anything			$(7.8 \pm 0.4) \times 10^{-3}$	S=1.1
Γ_{50}	$\psi(2S)$ anything			$(3.07 \pm 0.21) \times 10^{-3}$	
Γ_{51}	$\chi_{c1}(1P)$ anything			$(3.86 \pm 0.27) \times 10^{-3}$	

Γ_{52}	$\chi_{c1}(1P)$(direct) anything		(3.24 ± 0.25) $\times 10^{-3}$		
Γ_{53}	$\chi_{c2}(1P)$anything		(1.4 ± 0.4) $\times 10^{-3}$	S=1.9	
Γ_{54}	$\chi_{c2}(1P)$(direct) anything		(1.65 ± 0.31) $\times 10^{-3}$		
Γ_{55}	$\eta_c(1S)$anything		$< 9 \times 10^{-3}$	CL=90%	
Γ_{56}	$K X(3872)$, $X \to D^0 \overline{D}{}^0 \pi^0$		(1.2 ± 0.4) $\times 10^{-4}$		
Γ_{57}	$K X(3872)$, $X \to D^{*0} D^0$		(8.0 ± 2.2) $\times 10^{-5}$		
Γ_{58}	$K X(3940)$, $X \to D^{*0} D^0$		$< 6.7 \times 10^{-5}$	CL=90%	
Γ_{59}	$K X(3915)$, $X \to \omega J/\psi$	[h]	(7.1 ± 3.4) $\times 10^{-5}$		

K or K^* modes

Γ_{60}	$K^\pm$ anything	[f]	(78.9 ± 2.5) %	
Γ_{61}	K^+ anything		(66 ± 5) %	
Γ_{62}	K^- anything		(13 ± 4) %	
Γ_{63}	$K^0/\overline{K}{}^0$ anything	[f]	(64 ± 4) %	
Γ_{64}	$K^*(892)^\pm$ anything		(18 ± 6) %	
Γ_{65}	$K^*(892)^0/\overline{K}{}^*(892)^0$ anything	[f]	(14.6 ± 2.6) %	
Γ_{66}	$K^*(892)\gamma$		(4.2 ± 0.6) $\times 10^{-5}$	
Γ_{67}	$\eta K \gamma$		($8.5 \, {}^{+1.8}_{-1.6}$) $\times 10^{-6}$	
Γ_{68}	$K_1(1400)\gamma$		$< 1.27 \times 10^{-4}$	CL=90%
Γ_{69}	$K_2^*(1430)\gamma$		($1.7 \, {}^{+0.6}_{-0.5}$) $\times 10^{-5}$	
Γ_{70}	$K_2(1770)\gamma$		$< 1.2 \times 10^{-3}$	CL=90%
Γ_{71}	$K_3^*(1780)\gamma$		$< 3.7 \times 10^{-5}$	CL=90%
Γ_{72}	$K_4^*(2045)\gamma$		$< 1.0 \times 10^{-3}$	CL=90%
Γ_{73}	$K \eta'(958)$		(8.3 ± 1.1) $\times 10^{-5}$	
Γ_{74}	$K^*(892)\eta'(958)$		(4.1 ± 1.1) $\times 10^{-6}$	
Γ_{75}	$K \eta$		$< 5.2 \times 10^{-6}$	CL=90%
Γ_{76}	$K^*(892)\eta$		(1.8 ± 0.5) $\times 10^{-5}$	
Γ_{77}	$K \phi \phi$		(2.3 ± 0.9) $\times 10^{-6}$	
Γ_{78}	$\overline{b} \to \overline{s}\gamma$		(3.49 ± 0.19) $\times 10^{-4}$	
Γ_{79}	$\overline{b} \to \overline{d}\gamma$		(9.2 ± 3.0) $\times 10^{-6}$	
Γ_{80}	$\overline{b} \to \overline{s}$ gluon		< 6.8 %	CL=90%
Γ_{81}	η anything		($2.6 \, {}^{+0.5}_{-0.8}$) $\times 10^{-4}$	
Γ_{82}	η' anything		(4.2 ± 0.9) $\times 10^{-4}$	
Γ_{83}	K^+ gluon (charmless)		$< 1.87 \times 10^{-4}$	CL=90%
Γ_{84}	K^0 gluon (charmless)		(1.9 ± 0.7) $\times 10^{-4}$	

Light unflavored meson modes

Γ_{85}	$\rho\gamma$		(1.39 ± 0.25) $\times 10^{-6}$	S=1.2
Γ_{86}	$\rho/\omega\gamma$		(1.30 ± 0.23) $\times 10^{-6}$	S=1.2
Γ_{87}	$\pi^\pm$ anything	[f,i]	(358 ± 7) %	
Γ_{88}	π^0 anything		(235 ± 11) %	
Γ_{89}	η anything		(17.6 ± 1.6) %	

Γ_{90}	ρ^0 anything		(21 $\pm$ 5) %		
Γ_{91}	ω anything		< 81 %		CL=90%
Γ_{92}	ϕ anything		(3.43 $\pm$ 0.12) %		
Γ_{93}	$\phi K^*(892)$		< 2.2 $\times 10^{-5}$		CL=90%
Γ_{94}	$\overline{b} \to \overline{d}$ gluon				
Γ_{95}	π^+ gluon (charmless)		(3.7 $\pm$ 0.8) $\times 10^{-4}$		

Baryon modes

Γ_{96}	Λ_c^+ / $\overline{\Lambda}_c^-$ anything		(3.5 $\pm$ 0.4) %		
Γ_{97}	Λ_c^+ anything		< 1.3 %		CL=90%
Γ_{98}	$\overline{\Lambda}_c^-$ anything		< 7 %		CL=90%
Γ_{99}	$\overline{\Lambda}_c^- \ell^+$ anything		< 9 $\times 10^{-4}$		CL=90%
Γ_{100}	$\overline{\Lambda}_c^- e^+$ anything		< 1.8 $\times 10^{-3}$		CL=90%
Γ_{101}	$\overline{\Lambda}_c^- \mu^+$ anything		< – 1.4 $\times 10^{-3}$		CL=90%
Γ_{102}	$\overline{\Lambda}_c^- p$ anything		(2.02 $\pm$ 0.33) %		
Γ_{103}	$\overline{\Lambda}_c^- p e^+ \nu_e$		< 8 $\times 10^{-4}$		CL=90%
Γ_{104}	$\overline{\Sigma}_c^{--}$ anything		(3.3 $\pm$ 1.7) $\times 10^{-3}$		
Γ_{105}	$\overline{\Sigma}_c^-$ anything		< 8 $\times 10^{-3}$		CL=90%
Γ_{106}	$\overline{\Sigma}_c^0$ anything		(3.6 $\pm$ 1.7) $\times 10^{-3}$		
Γ_{107}	$\overline{\Sigma}_c^0 N (N = p$ or $n)$		< 1.2 $\times 10^{-3}$		CL=90%
Γ_{108}	Ξ_c^0 anything, $\Xi_c^0 \to \Xi^- \pi^+$		(1.93 $\pm$ 0.30) $\times 10^{-4}$		S=1.1
Γ_{109}	Ξ_c^+, $\Xi_c^+ \to \Xi^- \pi^+ \pi^+$		(4.5 $^{+1.3}_{-1.2}$) $\times 10^{-4}$		
Γ_{110}	$p/\overline{p}$ anything	[f]	(8.0 $\pm$ 0.4) %		
Γ_{111}	$p/\overline{p}$ (direct) anything	[f]	(5.5 $\pm$ 0.5) %		
Γ_{112}	$\overline{p} e^+ \nu_e$ anything		< 5.9 $\times 10^{-4}$		CL=90%
Γ_{113}	$\Lambda/\overline{\Lambda}$ anything	[f]	(4.0 $\pm$ 0.5) %		
Γ_{114}	Λ anything		seen		
Γ_{115}	$\overline{\Lambda}$ anything		seen		
Γ_{116}	$\Xi^- / \overline{\Xi}^+$ anything	[f]	(2.7 $\pm$ 0.6) $\times 10^{-3}$		
Γ_{117}	baryons anything		(6.8 $\pm$ 0.6) %		
Γ_{118}	$p\overline{p}$ anything		(2.47 $\pm$ 0.23) %		
Γ_{119}	$\Lambda\overline{p}/\overline{\Lambda}p$ anything	[f]	(2.5 $\pm$ 0.4) %		
Γ_{120}	$\Lambda\overline{\Lambda}$ anything		< 5 $\times 10^{-3}$		CL=90%

Lepton Family number (*LF*) violating modes or $\Delta B = 1$ weak neutral current (*B1*) modes

Γ_{121}	$s e^+ e^-$	B1		(6.7 $\pm$ 1.7) $\times 10^{-6}$	S=2.0
Γ_{122}	$s \mu^+ \mu^-$	B1		(4.3 $\pm$ 1.0) $\times 10^{-6}$	
Γ_{123}	$s \ell^+ \ell^-$	B1	[b]	(5.8 $\pm$ 1.3) $\times 10^{-6}$	S=1.8
Γ_{124}	$\pi \ell^+ \ell^-$	B1		< 5.9 $\times 10^{-8}$	CL=90%
Γ_{125}	$\pi e^+ e^-$	B1		< 1.10 $\times 10^{-7}$	CL=90%
Γ_{126}	$\pi \mu^+ \mu^-$	B1		< 5.0 $\times 10^{-8}$	CL=90%
Γ_{127}	$K e^+ e^-$	B1		(4.4 $\pm$ 0.6) $\times 10^{-7}$	

Γ_{128}	$K^*(892)e^+e^-$	B1		(1.19 ± 0.20)	$\times 10^{-6}$	S=1.2
Γ_{129}	$K\mu^+\mu^-$	B1		(4.4 ± 0.4)	$\times 10^{-7}$	
Γ_{130}	$K^*(892)\mu^+\mu^-$	B1		(1.06 ± 0.09)	$\times 10^{-6}$	
Γ_{131}	$K\ell^+\ell^-$	B1		(4.8 ± 0.4)	$\times 10^{-7}$	
Γ_{132}	$K^*(892)\ell^+\ell^-$	B1		(1.05 ± 0.10)	$\times 10^{-6}$	
Γ_{133}	$K\nu\overline{\nu}$	B1		$<$ 1.7	$\times 10^{-5}$	CL=90%
Γ_{134}	$K^*\nu\overline{\nu}$	B1		$<$ 7.6	$\times 10^{-5}$	CL=90%
Γ_{135}	$s e^\pm\mu^\mp$	LF	[f]	$<$ 2.2	$\times 10^{-5}$	CL=90%
Γ_{136}	$\pi e^\pm\mu^\mp$	LF		$<$ 9.2	$\times 10^{-8}$	CL=90%
Γ_{137}	$\rho e^\pm\mu^\mp$	LF		$<$ 3.2	$\times 10^{-6}$	CL=90%
Γ_{138}	$K e^\pm\mu^\mp$	LF		$<$ 3.8	$\times 10^{-8}$	CL=90%
Γ_{139}	$K^*(892)e^\pm\mu^\mp$	LF		$<$ 5.1	$\times 10^{-7}$	CL=90%

[a] These values are model dependent.

[b] An ℓ indicates an e or a μ mode, not a sum over these modes.

[c] Here "anything" means at least one particle observed.

[d] This is a B($B^0 \rightarrow D^{*-}\ell^+\nu_\ell$) value.

[e] D^{**} stands for the sum of the $D(1\,^1P_1)$, $D(1\,^3P_0)$, $D(1\,^3P_1)$, $D(1\,^3P_2)$, $D(2\,^1S_0)$, and $D(2\,^1S_1)$ resonances.

[f] The value is for the sum of the charge states or particle/antiparticle states indicated.

[g] $D^{(*)}\overline{D}^{(*)}$ stands for the sum of $D^*\overline{D}^*$, $D^*\overline{D}$, $D\overline{D}^*$, and $D\overline{D}$.

[h] $X(3915)$ denotes a near-threshold enhancement in the $\omega J/\psi$ mass spectrum.

[i] Inclusive branching fractions have a multiplicity definition and can be greater than 100%.

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

$\Gamma(\ell^+\nu_\ell\,\text{anything})/\Gamma_{\text{total}}$ — Γ_3/Γ

These branching fraction values are model dependent.

"OUR EVALUATION" assumes lepton universality and 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
0.1086±0.0016 OUR EVALUATION				
0.1044±0.0025 OUR AVERAGE Error includes scale factor of 1.5. See the ideogram below.				
0.1028±0.0018±0.0024	[1] URQUIJO	07	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
0.0996±0.0019±0.0032	[2] AUBERT,B	06Y	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
0.1091±0.0009±0.0024	[3] MAHMOOD	04	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
0.097 ±0.005 ±0.004	[4] ALBRECHT	93H	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.1085 \pm 0.0021 \pm 0.0036$	[5] OKABE	05	BELL	Repl. by URQUIJO 07
$0.1083 \pm 0.0016 \pm 0.0006$	[6] AUBERT	04X	BABR	Repl. by AUBERT,B 06Y
$0.1036 \pm 0.0006 \pm 0.0023$	[7] AUBERT,B	04A	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.1087 \pm 0.0018 \pm 0.0030$	[8] AUBERT	03	BABR	Repl. by AUBERT 04X
$0.109 \pm 0.0012 \pm 0.0049$	[9] ABE	02Y	BELL	Repl. by OKABE 05
$0.1049 \pm 0.0017 \pm 0.0043$	[10] BARISH	96B	CLE2	Repl. by MAHMOOD 04
$0.108 \pm 0.002 \pm 0.0056$	[11] HENDERSON	92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.100 \pm 0.004 \pm 0.003$	[12] YANAGISAWA	91	CSB2	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.103 \pm 0.006 \pm 0.002$	[13] ALBRECHT	90H	ARG	Direct e at $\Upsilon(4S)$
$0.100 \pm 0.006 \pm 0.002$	[14] ALBRECHT	90H	ARG	Direct μ at $\Upsilon(4S)$
$0.117 \pm 0.004 \pm 0.010$	[15] WACHS	89	CBAL	Direct e at $\Upsilon(4S)$
$0.120 \pm 0.007 \pm 0.005$	CHEN	84	CLEO	Direct e at $\Upsilon(4S)$
$0.108 \pm 0.006 \pm 0.01$	CHEN	84	CLEO	Direct μ at $\Upsilon(4S)$
$0.112 \pm 0.009 \pm 0.01$	LEVMAN	84	CUSB	Direct μ at $\Upsilon(4S)$
$0.132 \pm 0.008 \pm 0.014$	[16] KLOPFEN...	83B	CUSB	Direct e at $\Upsilon(4S)$

[1] URQUIJO 07 report a measurement of $(10.07 \pm 0.18 \pm 0.21)\%$ for the partial branching fraction of $B \rightarrow e \nu_e X_c$ decay with electron energy above 0.6 GeV. We converted the result to $B \rightarrow e \nu_e X$ branching fraction.

[2] The measurements are obtained for charged and neutral B mesons partial rates of semileptonic decay to electrons with momentum above 0.6 GeV/c in the B rest frame. The best precision on the ratio is achieved for a momentum threshold of 1.0 GeV: $\mathrm{B}(B^+ \rightarrow e^+ \nu_e X)$ / $\mathrm{B}(B^0 \rightarrow e^+ \nu_e X) = 1.074 \pm 0.041 \pm 0.026$.

[3] Uses charge and angular correlations in $\Upsilon(4S)$ events with a high-momentum lepton and an additional electron.

[4] ALBRECHT 93H analysis performed using tagged semileptonic decays of the B. This technique is almost model independent for the lepton branching ratio.

[5] The measurements are obtained for charged and neutral B mesons partial rates of semileptonic decay to electrons with momentum above 0.6 GeV/c in the B rest frame, and their ratio of $\mathrm{B}(B^+ \rightarrow e^+ \nu_e X)/\mathrm{B}(B^0 \rightarrow e^+ \nu_e X) = 1.08 \pm 0.05 \pm 0.02$.

[6] The semileptonic branching ratio, $|V_{cb}|$ and other heavy-quark parameters are determined from a simultaneous fit to moments of the hadronic-mass and lepton-energy distribution.

[7] Uses the high-momentum lepton tag method and requires the electron energy above 0.6 GeV.

[8] Uses the high-momentum lepton tag method. They also report $|V_{cb}| = 0.0423 \pm 0.0007(\mathrm{exp}) \pm 0.0020(\mathrm{theo.})$.

[9] Uses the high-momentum lepton tag method. ABE 02Y also reports $|V_{cb}| = 0.0408 \pm 0.0010(\mathrm{exp}) \pm 0.0025(\mathrm{theo.})$. The second error is due to uncertainties of theoretical inputs.

[10] BARISH 96B analysis performed using tagged semileptonic decays of the B. This technique is almost model independent for the lepton branching ratio.

[11] HENDERSON 92 measurement employs e and μ. The systematic error contains 0.004 in quadrature from model dependence. The authors average a variation of the Isgur, Scora, Grinstein, and Wise model with that of the Altarelli-Cabibbo-Corbò-Maiani-Martinelli model for semileptonic decays to correct the acceptance.

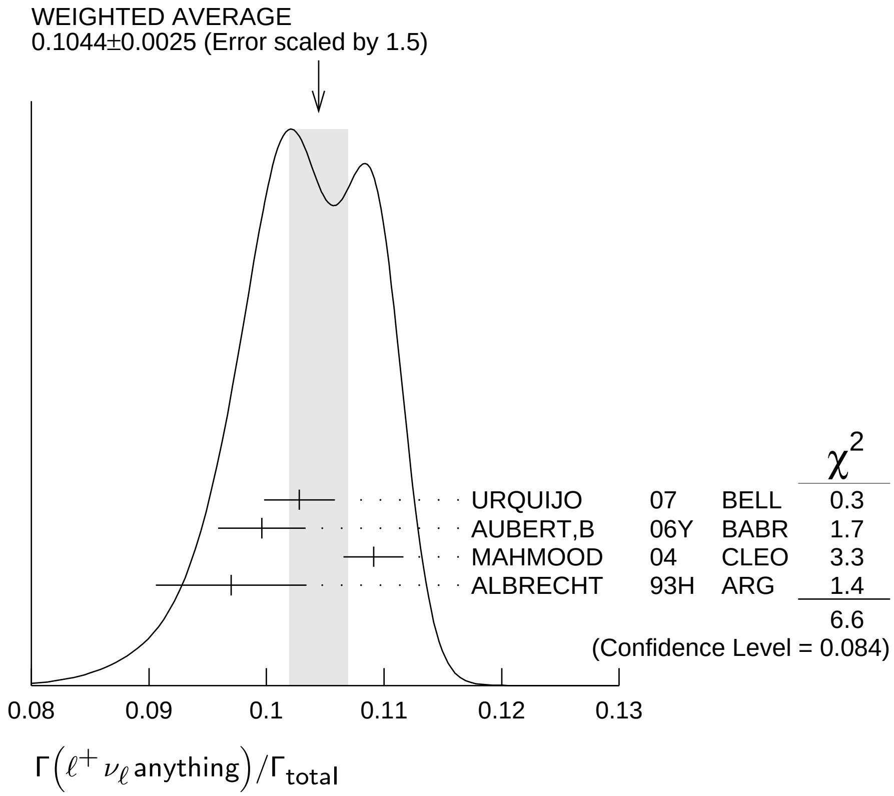
[12] YANAGISAWA 91 also measures an average semileptonic branching ratio at the $\Upsilon(5S)$ of 9.6–10.5% depending on assumptions about the relative production of different B meson species.

[13] ALBRECHT 90H uses the model of ALTARELLI 82 to correct over all lepton momenta. 0.099 ± 0.006 is obtained using ISGUR 89B.

[14] ALBRECHT 90H uses the model of ALTARELLI 82 to correct over all lepton momenta. 0.097 ± 0.006 is obtained using ISGUR 89B.

[15] Using data above $p(e) = 2.4$ GeV, WACHS 89 determine $\sigma(B \rightarrow e\nu \text{up})/\sigma(B \rightarrow e\nu \text{charm}) < 0.065$ at 90% CL.

[16] Ratio $\sigma(b \rightarrow e\nu \text{up})/\sigma(b \rightarrow e\nu \text{charm}) < 0.055$ at CL = 90%.



$\Gamma\left(D^- \ell^+ \nu_\ell \text{anything}\right)/\Gamma\left(\ell^+ \nu_\ell \text{anything}\right)$ Γ_4/Γ_3

$\ell = e$ or μ.

VALUE	DOCUMENT ID		TECN	COMMENT
0.26±0.07±0.04	[1] FULTON	91	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] FULTON 91 uses B($D^+ \rightarrow K^- \pi^+ \pi^+$) = $(9.1 \pm 1.3 \pm 0.4)$% as measured by MARK III.

$\Gamma\left(\overline{D}^0 \ell^+ \nu_\ell \text{anything}\right)/\Gamma\left(\ell^+ \nu_\ell \text{anything}\right)$ Γ_5/Γ_3

$\ell = e$ or μ.

VALUE	DOCUMENT ID		TECN	COMMENT
0.67±0.09±0.10	[1] FULTON	91	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] FULTON 91 uses B($D^0 \rightarrow K^- \pi^+$) = $(4.2 \pm 0.4 \pm 0.4)$% as measured by MARK III.

$\Gamma\left(\overline{D} \ell^+ \nu_\ell\right)/\Gamma\left(\ell^+ \nu_\ell \text{anything}\right)$ Γ_6/Γ_3

VALUE	DOCUMENT ID		TECN	COMMENT
0.223±0.006±0.009	[1] AUBERT	10	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

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

$\Gamma\left(D^{*-} \ell^+ \nu_\ell \text{anything}\right)/\Gamma_{\text{total}}$ Γ_7/Γ

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
0.67±0.08±0.10	ABDALLAH	04D	DLPH	$e^+ e^- \rightarrow Z^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.6 ±0.3 ±0.1	[1] BARISH	95	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] BARISH 95 use B($D^0 \to K^- \pi^+$) = (3.91 ± 0.08 ± 0.17)% and B($D^{*+} \to D^0 \pi^+$) = (68.1 ± 1.0 ± 1.3)%.

$\Gamma(D^{*0} \ell^+ \nu_\ell \text{anything})/\Gamma_{\text{total}}$ Γ_8/Γ

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.6±0.6±0.1	[1] BARISH	95	CLE2	$e^+ e^- \to \Upsilon(4S)$

[1] BARISH 95 use B($D^0 \to K^- \pi^+$) = (3.91 ± 0.08 ± 0.17)%, B($D^{*+} \to D^0 \pi^+$) = (68.1 ± 1.0 ± 1.3)%, B($D^{*0} \to D^0 \pi^0$) = (63.6 ± 2.3 ± 3.3)%.

$\Gamma(\overline{D}^{**} \ell^+ \nu_\ell)/\Gamma_{\text{total}}$ Γ_{10}/Γ

D^{**} stands for the sum of the $D(1\,^1P_1)$, $D(1\,^3P_0)$, $D(1\,^3P_1)$, $D(1\,^3P_2)$, $D(2\,^1S_0)$, and $D(2\,^1S_1)$ resonances. $\ell = e$ or μ, not sum over e and μ modes.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.027±0.005±0.005		63	[1] ALBRECHT	93	ARG	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.028	95		[2] BARISH	95	CLE2	$e^+ e^- \to \Upsilon(4S)$

[1] ALBRECHT 93 assumes the GISW model to correct for unseen modes. Using the BHKT model, the result becomes 0.023 ± 0.006 ± 0.004. Assumes B($D^{*+} \to D^0 \pi^+$) = 68.1%, B($D^0 \to K^- \pi^+$) = 3.65%, B($D^0 \to K^- \pi^+ \pi^- \pi^+$) = 7.5%. We have taken their average e and μ value.

[2] BARISH 95 use B($D^0 \to K^- \pi^+$) = (3.91 ± 0.08 ± 0.17)%, assume all nonresonant channels are zero, and use GISW model for relative abundances of D^{**} states.

$\Gamma(\overline{D}_1(2420) \ell^+ \nu_\ell \text{anything})/\Gamma_{\text{total}}$ Γ_{11}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.0038±0.0013 OUR AVERAGE	Error includes scale factor of 2.4.			
0.0033±0.0006	[1] ABAZOV	05O	D0	$p\overline{p}$ at 1.96 TeV
0.0074±0.0016	[2] BUSKULIC	97B	ALEP	$e^+ e^- \to Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
seen	[3] BUSKULIC	95B	ALEP	Repl. by BUSKULIC 97B

[1] Assumes B($D_1 \to D^* \pi$) = 1, B($D_1 \to D^* \pi^\pm$) = 2/3, and B($b \to B$) =0.397.

[2] BUSKULIC 97B assumes B($D_1(2420) \to D^* \pi$) = 1, B($D_1(2420) \to D^* \pi^\pm$) = 2/3, and B($b \to B$) = 0.378 ± 0.022.

[3] BUSKULIC 95B reports f_B × B($B \to \overline{D}_1(2420)^0 \ell^+ \nu_\ell$ anything) × B($\overline{D}_1(2420)^0 \to \overline{D}^*(2010)^- \pi^+$) = (2.04 ± 0.58 ± 0.34)$10^{-3}$, where f_B is the production fraction for a single B charge state.

$[\Gamma(D \pi \ell^+ \nu_\ell \text{anything}) + \Gamma(D^* \pi \ell^+ \nu_\ell \text{anything})]/\Gamma_{\text{total}}$ Γ_{12}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.026 ±0.005 OUR AVERAGE	Error includes scale factor of 1.5.			
0.0340±0.0052±0.0032	[1] ABREU	00R	DLPH	$e^+ e^- \to Z$
0.0226±0.0029±0.0033	[2] BUSKULIC	97B	ALEP	$e^+ e^- \to Z$

[1] Assumes no contribution from B_s and b baryons. Further assumes contributions from single pion ($D\pi$ and $D^* \pi$) states only, allowing isospin conservation to relate the relative π^0 and π^+ rates.

[2] BUSKULIC 97B assumes B($b \to B$) = 0.378 ± 0.022 and uses isospin invariance by assuming that all observed $D^0 \pi^+$, $D^{*0} \pi^+$, $D^+ \pi^-$, and $D^{*+} \pi^-$ are from D^{**} states. A correction has been applied to account for the production of B_s^0 and Λ_b^0.

$\Gamma(D\pi\ell^+\nu_\ell \text{anything})/\Gamma_{total}$ — Γ_{13}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.0154±0.0061	ABREU	00R	DLPH	$e^+e^- \to Z$

$\Gamma(D^*\pi\ell^+\nu_\ell \text{anything})/\Gamma_{total}$ — Γ_{14}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.0186±0.0038	ABREU	00R	DLPH	$e^+e^- \to Z$

$\Gamma(\overline{D}_2^*(2460)\ell^+\nu_\ell \text{anything})/\Gamma_{total}$ — Γ_{15}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
0.0044±0.0016		[1] ABAZOV	05O	D0	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0065	95	[2] BUSKULIC	97B	ALEP	$e^+e^- \to Z$
not seen		[3] BUSKULIC	95B	ALEP	$e^+e^- \to Z$

[1] Assumes B($D_2^* \to D^*\pi^\pm$) = 0.30 ± 0.06 and B($b \to B$) =0.397.

[2] A revised number based on BUSKULIC 97B which assumes B($D_2^*(2460) \to D^*\pi^\pm$) = 0.20 and B($b \to B$) = 0.378 ± 0.022.

[3] BUSKULIC 95B reports $f_B \times$ B($B \to \overline{D}_2^*(2460)^0 \ell^+\nu_\ell$ anything) $\times$ B($\overline{D}_2^*(2460)^0 \to \overline{D}^*(2010)^-\pi^+$) $\leq 0.81 \times 10^{-3}$ at CL=95%, where f_B is the production fraction for a single B charge state.

$\Gamma(B \to \overline{D}_2^*(2460)\ell^+\nu_\ell\, anything) \times B(D_2^*(2460) \to D^{*-}\pi^+)$ / $\Gamma(B \to \overline{D}_1(2420)\ell^+\nu_\ell\, anything) \times B(\overline{D}_1(2420) \to D^{*-}\pi^+)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.39±0.09±0.12	ABAZOV	05O	D0	$p\overline{p}$ at 1.96 TeV

$\Gamma(D^{*-}\pi^+\ell^+\nu_\ell \text{anything})/\Gamma_{total}$ — Γ_{16}/Γ

Includes resonant and nonresonant contributions.

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
10.0±2.7±2.1	[1] BUSKULIC	95B	ALEP	$e^+e^- \to Z$

[1] BUSKULIC 95B reports $f_B \times$ B($B \to \overline{D}^*(2010)^-\pi^+\ell^+\nu_\ell$ anything) = (3.7 ± 1.0 ± 0.7)10^{-3}. Above value assumes f_B = 0.37 ± 0.03.

$\Gamma(\overline{D}\pi^+\pi^-\ell^+\nu_\ell)/\Gamma(\overline{D}\ell^+\nu_\ell)$ — Γ_{17}/Γ_6

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
6.7±1.0±0.8	[1] LEES	16	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Measurement used electrons and muons as leptons.

$\Gamma(\overline{D}^*\pi^+\pi^-\ell^+\nu_\ell)/\Gamma(D^*\ell^+\nu_\ell)$ — Γ_{18}/Γ_9

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
1.9±0.5±0.4	[1] LEES	16	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Measurement used electrons and muons as leptons.

$\Gamma(D_s^-\ell^+\nu_\ell \text{anything})/\Gamma_{total}$ — Γ_{19}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<7 × 10⁻³	90	[1] ALBRECHT	93E	ARG	$e^+e^- \to \Upsilon(4S)$

[1] ALBRECHT 93E reports < 0.012 from a measurement of $[\Gamma(B \to D_s^- \ell^+ \nu_\ell \text{anything})/\Gamma_{\text{total}}] \times [\text{B}(D_s^+ \to \phi\pi^+)]$ assuming $\text{B}(D_s^+ \to \phi\pi^+) = 0.027$, which we rescale to our best value $\text{B}(D_s^+ \to \phi\pi^+) = 4.5 \times 10^{-2}$.

$\Gamma(D_s^- \ell^+ \nu_\ell K^+ \text{anything})/\Gamma_{\text{total}}$ Γ_{20}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5 \times 10^{-3}$	90	[1] ALBRECHT	93E	ARG	$e^+e^- \to \Upsilon(4S)$

[1] ALBRECHT 93E reports < 0.008 from a measurement of $[\Gamma(B \to D_s^- \ell^+ \nu_\ell K^+ \text{anything})/\Gamma_{\text{total}}] \times [\text{B}(D_s^+ \to \phi\pi^+)]$ assuming $\text{B}(D_s^+ \to \phi\pi^+) = 0.027$, which we rescale to our best value $\text{B}(D_s^+ \to \phi\pi^+) = 4.5 \times 10^{-2}$.

$\Gamma(D_s^- \ell^+ \nu_\ell K^0 \text{anything})/\Gamma_{\text{total}}$ Γ_{21}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<7 \times 10^{-3}$	90	[1] ALBRECHT	93E	ARG	$e^+e^- \to \Upsilon(4S)$

[1] ALBRECHT 93E reports $<$ 0.012 from a measurement of $[\Gamma(B \to D_s^- \ell^+ \nu_\ell K^0 \text{anything})/\Gamma_{\text{total}}] \times [\text{B}(D_s^+ \to \phi\pi^+)]$ assuming $\text{B}(D_s^+ \to \phi\pi^+) = 0.027$, which we rescale to our best value $\text{B}(D_s^+ \to \phi\pi^+) = 4.5 \times 10^{-2}$.

$\Gamma(X_c \ell^+ \nu_\ell)/\Gamma_{\text{total}}$ Γ_{22}/Γ

"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
0.1065±0.0016 OUR EVALUATION				
0.1058±0.0015 OUR AVERAGE				
0.1064±0.0017±0.0006	[1] AUBERT	10A	BABR	$e^+e^- \to \Upsilon(4S)$
0.1044±0.0019±0.0022	[2] URQUIJO	07	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.1061±0.0016±0.0006	[3] AUBERT	04X	BABR	Repl. by AUBERT 10A

[1] Obtained from a combined fit to the moments of observed spectra in inclusive $B \to X_c \ell^+ \nu_\ell$ decay.

[2] Measured the independent B^+ and B^0 partial branching fractions with electron energy above 0.4 GeV.

[3] The semileptonic branching ratio, $|V_{cb}|$ and other heavy-quark parameters are determined from a simultaneous fit to moments of the hadronic-mass and lepton-energy distribution.

$\Gamma(X_u \ell^+ \nu_\ell)/\Gamma_{\text{total}}$ Γ_{23}/Γ

"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 (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
2.14 ±0.31 OUR EVALUATION				
2.01 ±0.15 ±0.25	[1] LEES	12R	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
2.27 ±0.26 $^{+0.37}_{-0.33}$	[2] AUBERT	06H	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
2.53 ±0.24 ±0.24	[3] AUBERT,B	05X	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
2.80 ±0.52 ±0.41	[4] LIMOSANI	05	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
1.77 ±0.29 ±0.38	[5] BORNHEIM	02	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.963±0.173±0.159	[6] URQUIJO	10	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
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.

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

[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 $(4.41 \pm 0.30^{+0.65}_{-0.47} \pm 0.28) \times 10^{-3}$.

[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 $(5.08 \pm 0.47^{+0.49}_{-0.48}) \times 10^{-3}$.

[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 $B \rightarrow X_s \gamma$. The V_{ub} is found to be $(4.08 \pm 0.34 \pm 0.53) \times 10^{-3}$.

[6] Uses a multivariate analysis method and requires lepton momentum in the B rest frame, $p^{*B}_l > 1.0$ GeV/c.

[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.

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

[9] The third error includes the systematics and theoretical errors summed in quadrature.

$\Gamma(X_u \ell^+ \nu_\ell)/\Gamma(\ell^+ \nu_\ell \text{anything})$ $\qquad \Gamma_{23}/\Gamma_3$

ℓ denotes e or μ, not the sum. These experiments measure this ratio in very limited momentum intervals.

VALUE (units 10^{-2})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
2.06±0.25±0.42			[1] AUBERT	04I	BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

			[2] ALBRECHT	94C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
		107	[3] BARTELT	93B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
		77	[4] ALBRECHT	91C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
		41	[5] ALBRECHT	90	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
		76	[6] FULTON	90	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
<4.0	90		[7] BEHRENDS	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
<4.0	90		CHEN	84	CLEO	Direct e at $\Upsilon(4S)$
<5.5	90		KLOPFEN...	83B	CUSB	Direct e at $\Upsilon(4S)$

[1] The third error includes the systematics and theoretical errors summed in quadrature.

[2] ALBRECHT 94C find $\Gamma(b \rightarrow c)/\Gamma(b \rightarrow \text{all}) = 0.99 \pm 0.02 \pm 0.04$.

[3] BARTELT 93B (CLEO II) measures an excess of $107 \pm 15 \pm 11$ leptons in the lepton momentum interval 2.3–2.6 GeV/c which is attributed to $b \rightarrow u \ell \nu_\ell$. This corresponds to a model-dependent partial branching ratio ΔB_{ub} between $(1.15 \pm 0.16 \pm 0.15) \times 10^{-4}$, as evaluated using the KS model (KOERNER 88), and $(1.54 \pm 0.22 \pm 0.20) \times 10^{-4}$ using the ACCMM model (ARTUSO 93). The corresponding values of $|V_{ub}|/|V_{cb}|$ are 0.056 ± 0.006 and 0.076 ± 0.008, respectively.

[4] ALBRECHT 91C result supersedes ALBRECHT 90. Two events are fully reconstructed providing evidence for the $b \rightarrow u$ transition. Using the model of ALTARELLI 82, they obtain $|V_{ub}/V_{cb}| = 0.11 \pm 0.012$ from 77 leptons in the 2.3–2.6 GeV momentum range.

[5] ALBRECHT 90 observes 41 ± 10 excess e and μ (lepton) events in the momentum interval $p =$ 2.3–2.6 GeV signaling the presence of the $b \rightarrow u$ transition. The events correspond to a model-dependent measurement of $|V_{ub}/V_{cb}| = 0.10 \pm 0.01$.

[6] FULTON 90 observe 76 ± 20 excess e and μ (lepton) events in the momentum interval $p =$ 2.4–2.6 GeV signaling the presence of the $b \rightarrow u$ transition. The average branching ratio, $(1.8 \pm 0.4 \pm 0.3) \times 10^{-4}$, corresponds to a model-dependent measurement of approximately $|V_{ub}/V_{cb}| = 0.1$ using $B(b \rightarrow c \ell \nu) = 10.2 \pm 0.2 \pm 0.7\%$.

[7] The quoted possible limits range from 0.018 to 0.04 for the ratio, depending on which model or momentum range is chosen. We select the most conservative limit they have calculated. This corresponds to a limit on $|V_{ub}|/|V_{cb}| < 0.20$. While the endpoint technique employed is more robust than their previous results in CHEN 84, these results do not provide a numerical improvement in the limit.

$\Gamma(K^+ \ell^+ \nu_\ell \text{anything})/\Gamma(\ell^+ \nu_\ell \text{anything})$ $\qquad \Gamma_{24}/\Gamma_3$

ℓ denotes e or μ, not the sum.

VALUE	DOCUMENT ID		TECN	COMMENT
0.58 ±0.05 OUR AVERAGE				
0.594±0.021±0.056	ALBRECHT	94C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.54 ±0.07 ±0.06	[1] ALAM	87B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[1] ALAM 87B measurement relies on lepton-kaon correlations.

$\Gamma(K^- \ell^+ \nu_\ell \text{anything})/\Gamma(\ell^+ \nu_\ell \text{anything})$ $\qquad \Gamma_{25}/\Gamma_3$

ℓ denotes e or μ, not the sum.

VALUE	DOCUMENT ID		TECN	COMMENT
0.092±0.035 OUR AVERAGE				
0.086±0.011±0.044	ALBRECHT	94C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.10 ±0.05 ±0.02	[1] ALAM	87B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[1] ALAM 87B measurement relies on lepton-kaon correlations.

$\Gamma(K^0/\overline{K}^0 \ell^+ \nu_\ell \text{anything})/\Gamma(\ell^+ \nu_\ell \text{anything})$ — Γ_{26}/Γ_3

ℓ denotes e or μ, not the sum. Sum over K^0 and $\overline{K}^0$ states.

VALUE	DOCUMENT ID		TECN	COMMENT
0.42 ±0.05 OUR AVERAGE				
0.452±0.038±0.056	[1] ALBRECHT	94C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.39 ±0.06 ±0.04	[2] ALAM	87B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[1] ALBRECHT 94C assume a $K^0/\overline{K}^0$ multiplicity twice that of K^0_S.

[2] ALAM 87B measurement relies on lepton-kaon correlations.

$\Gamma(\overline{D}\tau^+\nu_\tau)/\Gamma(\overline{D}\ell^+\nu_\ell)$ — Γ_{27}/Γ_6

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
41 ± 5 OUR AVERAGE				
37.5 ± 6.4±2.6	[1,2] HUSCHLE	15	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
44.0 ± 5.8±4.2	[1,2] LEES	12D	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
• • • 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.

[2] Uses $\tau^+ \rightarrow e^+\nu_e\overline{\nu}_\tau$ and $\tau^+ \rightarrow \mu^+\nu_\mu\overline{\nu}_\tau$ and e^+ or μ^+ as ℓ^+. Obtained from simultaneous fit to B+ and B0 assuming isospin symmetry.

$\Gamma(D^*\tau^+\nu_\tau)/\Gamma(D^*\ell^+\nu_\ell)$ — Γ_{28}/Γ_9

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
31.8±2.4 OUR AVERAGE				
29.3±3.8±1.5	[1] HUSCHLE	15	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
33.2±2.4±1.8	[1] LEES	12D	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
• • • 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 $\tau^+ \rightarrow e^+\nu_e\overline{\nu}_\tau$ and $\tau^+ \rightarrow \mu^+\nu_\mu\overline{\nu}_\tau$ 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.

[2] Uses a fully reconstructed B meson as a tag on the recoil side. The results are normalized to the B^+ decay rate.

$\langle n_c \rangle$

VALUE	DOCUMENT ID		TECN	COMMENT
1.10±0.05	[1] GIBBONS	97B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.98±0.16±0.12	[2] ALAM	87B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[1] GIBBONS 97B from charm counting using B($D^+_s \rightarrow \phi\pi$) = 0.036 ± 0.009 and B($\Lambda^+_c \rightarrow pK^-\pi^+$) = 0.044 ± 0.006.

[2] From the difference between K^- and K^+ widths. ALAM 87B measurement relies on lepton-kaon correlations. It does not consider the possibility of $B\overline{B}$ mixing. We have thus removed it from the average.

$\Gamma(D^{\pm}\text{anything})/\Gamma_{\text{total}}$ Γ_{29}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.229±0.013 OUR AVERAGE					
$0.228 \pm 0.012 \pm 0.006$		[1] GIBBONS	97B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
$0.24 \pm 0.04 \pm 0.01$		[2] BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
$0.22 \pm 0.05 \pm 0.01$		[3] ALBRECHT	91H	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.20 \pm 0.05 \pm 0.01$	20k	[4] BORTOLETTO	87	CLEO	Sup. by BORTOLETTO 92

[1] GIBBONS 97B reports $[\Gamma(B \rightarrow D^{\pm}\text{anything})/\Gamma_{\text{total}}] \times [B(D^+ \rightarrow K^- 2\pi^+)] = 0.0216 \pm 0.0008 \pm 0.00082$ which we divide by our best value $B(D^+ \rightarrow K^- 2\pi^+) = (9.46 \pm 0.24) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] BORTOLETTO 92 reports $[\Gamma(B \rightarrow D^{\pm}\text{anything})/\Gamma_{\text{total}}] \times [B(D^+ \rightarrow K^- 2\pi^+)] = 0.0226 \pm 0.0030 \pm 0.0018$ which we divide by our best value $B(D^+ \rightarrow K^- 2\pi^+) = (9.46 \pm 0.24) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[3] ALBRECHT 91H reports $[\Gamma(B \rightarrow D^{\pm}\text{anything})/\Gamma_{\text{total}}] \times [B(D^+ \rightarrow K^- 2\pi^+)] = 0.0209 \pm 0.0027 \pm 0.0040$ which we divide by our best value $B(D^+ \rightarrow K^- 2\pi^+) = (9.46 \pm 0.24) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[4] BORTOLETTO 87 reports $[\Gamma(B \rightarrow D^{\pm}\text{anything})/\Gamma_{\text{total}}] \times [B(D^+ \rightarrow K^- 2\pi^+)] = 0.019 \pm 0.004 \pm 0.002$ which we divide by our best value $B(D^+ \rightarrow K^- 2\pi^+) = (9.46 \pm 0.24) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(D^0/\overline{D}^0\text{anything})/\Gamma_{\text{total}}$ Γ_{30}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.618±0.029 OUR AVERAGE		Error includes scale factor of 1.3. See the ideogram below.			
$0.639 \pm 0.024 {}^{+0.006}_{-0.007}$		[1] GIBBONS	97B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
$0.59 \pm 0.05 \pm 0.01$		[2] BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
$0.494 \pm 0.074 \pm 0.005$		[3] ALBRECHT	91H	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.53 \pm 0.07 \pm 0.01$	21k	[4] BORTOLETTO	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
$0.61 \pm 0.18 \pm 0.01$		[5] GREEN	83	CLEO	Repl. by BORTOLETTO 87

[1] GIBBONS 97B reports $[\Gamma(B \rightarrow D^0/\overline{D}^0\text{anything})/\Gamma_{\text{total}}] \times [B(D^0 \rightarrow K^-\pi^+)] = 0.0251 \pm 0.0006 \pm 0.00075$ which we divide by our best value $B(D^0 \rightarrow K^-\pi^+) = (3.93 \pm 0.04) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

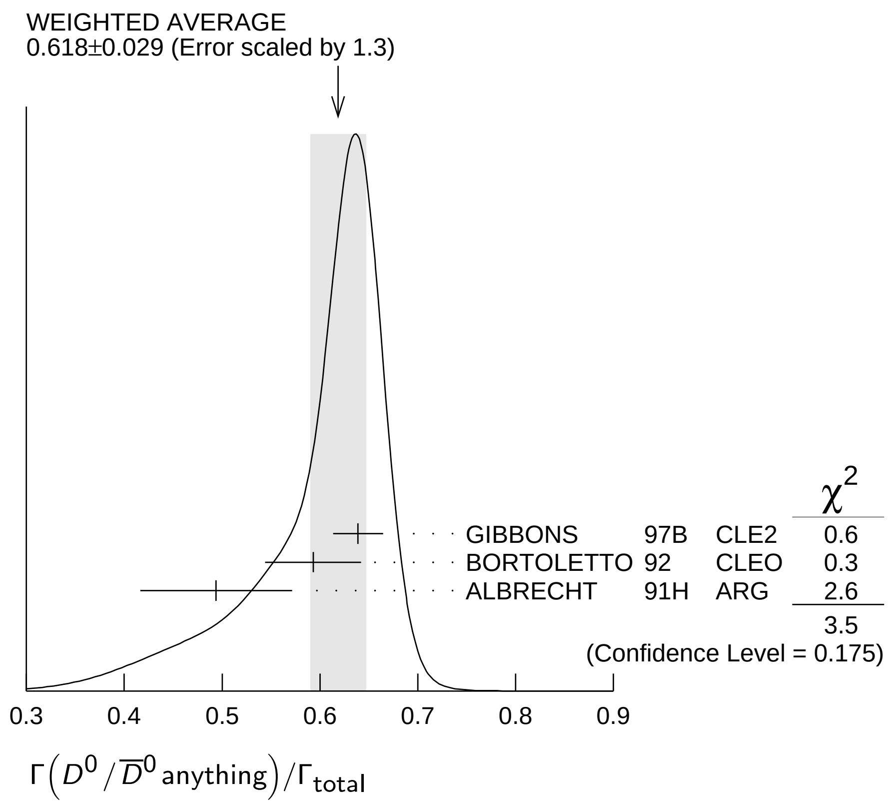
[2] BORTOLETTO 92 reports $[\Gamma(B \rightarrow D^0/\overline{D}^0\text{anything})/\Gamma_{\text{total}}] \times [B(D^0 \rightarrow K^-\pi^+)] = 0.0233 \pm 0.0012 \pm 0.0014$ which we divide by our best value $B(D^0 \rightarrow K^-\pi^+) = (3.93 \pm 0.04) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[3] ALBRECHT 91H reports $[\Gamma(B \rightarrow D^0/\overline{D}^0\text{anything})/\Gamma_{\text{total}}] \times [B(D^0 \rightarrow K^-\pi^+)] = 0.0194 \pm 0.0015 \pm 0.0025$ which we divide by our best value $B(D^0 \rightarrow K^-\pi^+) = (3.93 \pm 0.04) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[4] BORTOLETTO 87 reports $[\Gamma(B \rightarrow D^0/\overline{D}^0\text{anything})/\Gamma_{\text{total}}] \times [B(D^0 \rightarrow K^-\pi^+)] = 0.0210 \pm 0.0015 \pm 0.0021$ which we divide by our best value $B(D^0 \rightarrow K^-\pi^+) =$

$(3.93 \pm 0.04) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[5] GREEN 83 reports $[\Gamma(B \to D^0/\overline{D}^0 \text{anything})/\Gamma_{total}] \times [B(D^0 \to K^- \pi^+)] = 0.024 \pm 0.006 \pm 0.004$ which we divide by our best value $B(D^0 \to K^- \pi^+) = (3.93 \pm 0.04) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.



$\Gamma\left(D^*(2010)^{\pm} \text{anything}\right)/\Gamma_{total}$ Γ_{31}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.225±0.015 OUR AVERAGE					
$0.247 \pm 0.019 \pm 0.01$		[1] GIBBONS	97B	CLE2	$e^+ e^- \to \Upsilon(4S)$
$0.205 \pm 0.019 \pm 0.007$		[2] ALBRECHT	96D	ARG	$e^+ e^- \to \Upsilon(4S)$
$0.230 \pm 0.028 \pm 0.009$		[3] BORTOLETTO	92	CLEO	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.283 \pm 0.053 \pm 0.002$		[4] ALBRECHT	91H	ARG	Sup. by ALBRECHT 96D
$0.22 \pm 0.04 {}^{+0.07}_{-0.04}$	5200	[5] BORTOLETTO	87	CLEO	$e^+ e^- \to \Upsilon(4S)$
$0.27 \pm 0.06 {}^{+0.08}_{-0.06}$	510	[6] CSORNA	85	CLEO	Repl. by BORTOLETTO 87

[1] GIBBONS 97B reports $B(B \to D^*(2010)^+ \text{anything}) = 0.239 \pm 0.015 \pm 0.014 \pm 0.009$ using CLEO measured D and D^* branching fractions. We rescale to our PDG 96 values of D and D^* branching ratios. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] ALBRECHT 96D reports $B(B \to D^*(2010)^+ \text{anything})$ 0.196 ± 0.019 using CLEO measured $B(D^*(2010)^+ \to D^0 \pi^+) = 0.681 \pm 0.01 \pm 0.013$, $B(D^0 \to K^- \pi^+) = 0.0401 \pm 0.0014$, $B(D^0 \to K^- \pi^+ \pi^+ \pi^-) = 0.081 \pm 0.005.$, We rescale to our PDG 96

values of D and D^* branching ratios. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[3] BORTOLETTO 92 reports B($B \rightarrow D^*(2010)^+$ anything) = 0.25 ± 0.03 ± 0.04 using MARK II B($D^*(2010)^+ \rightarrow D^0\pi^+$) = 0.57 ± 0.06 and B($D^0 \rightarrow K^-\pi^+$) = 0.042 ± 0.008. We rescale to our PDG 96 values of D and D^* branching ratios. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[4] ALBRECHT 91H reports 0.348 ± 0.060 ± 0.035 from a measurement of [$\Gamma(B \rightarrow D^*(2010)^{\pm}$ anything)/Γ_{total}] × [B($D^*(2010)^+ \rightarrow D^0\pi^+$)] assuming B($D^*(2010)^+ \rightarrow D^0\pi^+$) = 0.55 ± 0.04, which we rescale to our best value B($D^*(2010)^+ \rightarrow D^0\pi^+$) = (67.7 ± 0.5) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best value. Uses the PDG 90 B($D^0 \rightarrow K^-\pi^+$) =0.0371 ± 0.0025.

[5] BORTOLETTO 87 uses old MARK III (BALTRUSAITIS 86E) branching ratios B($D^0 \rightarrow K^-\pi^+$) = 0.056 ± 0.004 ± 0.003 and also assumes B($D^*(2010)^+ \rightarrow D^0\pi^+$) = $0.60^{+0.08}_{-0.15}$. The product branching ratio for B($B \rightarrow D^*(2010)^+$) B($D^*(2010)^+ \rightarrow D^0\pi^+$) is 0.13 ± 0.02 ± 0.012. Superseded by BORTOLETTO 92.

[6] $V-A$ momentum spectrum used to extrapolate below p = 1 GeV. We correct the value assuming B($D^0 \rightarrow K^-\pi^+$) = 0.042±0.006 and B($D^{*+} \rightarrow D^0\pi^+$) = $0.6^{+0.08}_{-0.15}$. The product branching fraction is B($B \rightarrow D^{*+}$X)·B($D^{*+} \rightarrow \pi^+ D^0$)·B($D^0 \rightarrow K^-\pi^+$) = (68 ± 15 ± 9) × 10^{-4}.

$\Gamma(D^*(2007)^0$ anything$)/\Gamma_{\text{total}}$ — Γ_{32}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.260±0.023±0.015	[1] GIBBONS	97B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[1] GIBBONS 97B reports B($B \rightarrow D^*(2007)^0$ anything) 0.247 ± 0.012 ± 0.018 ± 0.018 using CLEO measured D and D^* branching fractions. We rescale to our PDG 96 values of D and D^* branching ratios. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(D_s^{\pm}$ anything$)/\Gamma_{\text{total}}$ — Γ_{33}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.083±0.008 OUR AVERAGE					
0.089±0.010±0.008		[1] ARTUSO	05B	CLE2	$e^+e^- \rightarrow \Upsilon(5S)$
0.087±0.005±0.008		[2] AUBERT	02G	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
0.065±0.011±0.006		[3] ALBRECHT	92G	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.068±0.010±0.006	257	[4] BORTOLETTO	90	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
0.085±0.022±0.008		[5] HAAS	86	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.094±0.007±0.008		[6] GIBAUT	96	CLE2	Repl. by ARTUSO 05B
0.094±0.024±0.008		[7] ALBRECHT	87H	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[1] ARTUSO 05B reports 0.0905 ± 0.0025 ± 0.0140 from a measurement of [$\Gamma(B \rightarrow D_s^{\pm}$ anything)/Γ_{total}] × [B($D_s^+ \rightarrow \phi\pi^+$)] assuming B($D_s^+ \rightarrow \phi\pi^+$) = (4.4 ± 0.5) × 10^{-2}, which we rescale to our best value B($D_s^+ \rightarrow \phi\pi^+$) = (4.5 ± 0.4) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] AUBERT 02G reports [$\Gamma(B \rightarrow D_s^{\pm}$ anything)/Γ_{total}] × [B($D_s^+ \rightarrow \phi\pi^+$)] = 0.00393 ± 0.00007 ± 0.00021 which we divide by our best value B($D_s^+ \rightarrow \phi\pi^+$) = (4.5 ± 0.4) ×

10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[3] ALBRECHT 92G reports $[\Gamma(B \to D_s^{\pm}\text{anything})/\Gamma_{\text{total}}] \times [B(D_s^+ \to \phi\pi^+)] = 0.00292 \pm 0.00039 \pm 0.00031$ which we divide by our best value $B(D_s^+ \to \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[4] BORTOLETTO 90 reports $[\Gamma(B \to D_s^{\pm}\text{anything})/\Gamma_{\text{total}}] \times [B(D_s^+ \to \phi\pi^+)] = 0.00306 \pm 0.00047$ which we divide by our best value $B(D_s^+ \to \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[5] HAAS 86 reports $[\Gamma(B \to D_s^{\pm}\text{anything})/\Gamma_{\text{total}}] \times [B(D_s^+ \to \phi\pi^+)] = 0.0038 \pm 0.0010$ which we divide by our best value $B(D_s^+ \to \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. 64 ± 22% decays are 2-body.

[6] GIBAUT 96 reports $0.1211 \pm 0.0039 \pm 0.0088$ from a measurement of $[\Gamma(B \to D_s^{\pm}\text{anything})/\Gamma_{\text{total}}] \times [B(D_s^+ \to \phi\pi^+)]$ assuming $B(D_s^+ \to \phi\pi^+) = 0.035$, which we rescale to our best value $B(D_s^+ \to \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[7] ALBRECHT 87H reports $[\Gamma(B \to D_s^{\pm}\text{anything})/\Gamma_{\text{total}}] \times [B(D_s^+ \to \phi\pi^+)] = 0.0042 \pm 0.0009 \pm 0.0006$ which we divide by our best value $B(D_s^+ \to \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. 46 ± 16% of $B \to D_s X$ decays are 2-body. Superseded by ALBRECHT 92G.

$\Gamma(D_s^{*\pm}\text{anything})/\Gamma_{\text{total}}$ — Γ_{34}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.063±0.009±0.006	[1] AUBERT	02G	BABR	$e^+e^- \to \Upsilon(4S)$

[1] AUBERT 02G reports $[\Gamma(B \to D_s^{*\pm}\text{anything})/\Gamma_{\text{total}}] \times [B(D_s^+ \to \phi\pi^+)] = 0.00284 \pm 0.00029 \pm 0.00025$ which we divide by our best value $B(D_s^+ \to \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(D_s^{*\pm}\overline{D}^{(*)})/\Gamma(D_s^{*\pm}\text{anything})$ — Γ_{35}/Γ_{34}

Sum over modes

VALUE	DOCUMENT ID		TECN	COMMENT
0.533±0.037±0.037	AUBERT	02G	BABR	$e^+e^- \to \Upsilon(4S)$

$\Gamma(\overline{D}D_{s0}(2317))/\Gamma_{\text{total}}$ — Γ_{36}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	[1] KROKOVNY	03B	BELL	$e^+e^- \to \Upsilon(4S)$

[1] The product branching ratio for $B(B \to \overline{D}D_{s0}(2317)^+) \times B(D_{s0}(2317)^+ \to D_s\pi^0)$ is measured to be $(8.5^{+2.1}_{-1.9} \pm 2.6) \times 10^{-4}$.

$\Gamma(\overline{D}D_{sJ}(2457))/\Gamma_{\text{total}}$ — Γ_{37}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	[1] KROKOVNY	03B	BELL	$e^+e^- \to \Upsilon(4S)$

[1] The product branching ratio for B($B \to \overline{D} D_{sJ}(2457)^+$)×B($D_{sJ}(2457)^+ \to D_s^{*+}\pi^0, D_s^+\gamma$) are measured to be $(17.8^{+4.5}_{-3.9} \pm 5.3) \times 10^{-4}$ and $(6.7^{+1.3}_{-1.2} \pm 2.0) \times 10^{-4}$, respectively.

$\left[\Gamma\left(D^{(*)}\overline{D}^{(*)}K^0\right) + \Gamma\left(D^{(*)}\overline{D}^{(*)}K^\pm\right)\right]/\Gamma_{total}$ — Γ_{38}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$0.071^{+0.025+0.010}_{-0.015-0.009}$	[1] BARATE	98Q	ALEP	$e^+e^- \to Z$

[1] The systematic error includes the uncertainties due to the charm branching ratios.

$\Gamma\left(b \to c\overline{c}s\right)/\Gamma_{total}$ — Γ_{39}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.219±0.037	[1] COAN	98	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] COAN 98 uses D-ℓ correlation.

$\Gamma\left(D_s{}^{(*)}\overline{D}^{(*)}\right)/\Gamma\left(D_s^\pm \text{ anything}\right)$ — Γ_{40}/Γ_{33}

Sum over modes.

VALUE	DOCUMENT ID		TECN	COMMENT
0.469±0.017 OUR AVERAGE				
0.464±0.013±0.015	AUBERT	02G	BABR	$e^+e^- \to \Upsilon(4S)$
$0.56\ ^{+0.21}_{-0.15}\ ^{+0.09}_{-0.08}$	[1] BARATE	98Q	ALEP	$e^+e^- \to Z$
0.457±0.019±0.037	GIBAUT	96	CLE2	$e^+e^- \to \Upsilon(4S)$
0.58 ±0.07 ±0.09	ALBRECHT	92G	ARG	$e^+e^- \to \Upsilon(4S)$
0.56 ±0.10	BORTOLETTO	90	CLEO	$e^+e^- \to \Upsilon(4S)$

[1] BARATE 98Q measures B($B \to D_s{}^{(*)}\overline{D}^{(*)}$) $= 0.056^{+0.021}_{-0.015}{}^{+0.009}_{-0.008}{}^{+0.019}_{-0.011}$, where the third error results from the uncertainty on the different D branching ratios and is dominated by the uncertainty on B($D_s^+ \to \phi\pi^+$). We divide B($B \to D_s{}^{(*)}\overline{D}^{(*)}$) by our best value of B($B \to D_s$ anything)= 0.1 ± 0.025.

$\Gamma\left(D^* D^*(2010)^\pm\right)/\Gamma_{total}$ — Γ_{41}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.9 \times 10^{-3}$	90	BARATE	98Q	ALEP	$e^+e^- \to Z$

$\left[\Gamma\left(D D^*(2010)^\pm\right) + \Gamma\left(D^* D^\pm\right)\right]/\Gamma_{total}$ — Γ_{42}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.5 \times 10^{-3}$	90	BARATE	98Q	ALEP	$e^+e^- \to Z$

$\Gamma\left(D D^\pm\right)/\Gamma_{total}$ — Γ_{43}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.1 \times 10^{-3}$	90	BARATE	98Q	ALEP	$e^+e^- \to Z$

$\Gamma\left(D_s{}^{(*)\pm}\overline{D}^{(*)}X(n\pi^\pm)\right)/\Gamma_{total}$ — Γ_{44}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$0.094^{+0.040+0.034}_{-0.031-0.024}$	[1] BARATE	98Q	ALEP	$e^+e^- \to Z$

[1] The systematic error includes the uncertainties due to the charm branching ratios.

$\Gamma(D^*(2010)\gamma)/\Gamma_{total}$ — Γ_{45}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.1 × 10^{-3}	90	[1] LESIAK	92	CBAL	$e^+e^- \to \Upsilon(4S)$

[1] LESIAK 92 set a limit on the inclusive process B($b \to s\gamma$) $< 2.8 \times 10^{-3}$ at 90% CL for the range of masses of 892–2045 MeV, independent of assumptions about s-quark hadronization.

$\Gamma(D_s^+\pi^-, D_s^{*+}\pi^-, D_s^+\rho^-, D_s^{*+}\rho^-, D_s^+\pi^0, D_s^{*+}\pi^0, D_s^+\eta, D_s^{*+}\eta, D_s^+\rho^0, D_s^{*+}\rho^0, D_s^+\omega, D_s^{*+}\omega)/\Gamma_{total}$ — Γ_{46}/Γ

Sum over modes.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<4 × 10^{-4}	90	[1] ALEXANDER	93B	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] ALEXANDER 93B reports $< 4.8 \times 10^{-4}$ from a measurement of $[\Gamma(B \to D_s^+\pi^-, D_s^{*+}\pi^-, D_s^+\rho^-, D_s^{*+}\rho^-, D_s^+\pi^0, D_s^{*+}\pi^0, D_s^+\eta, D_s^{*+}\eta, D_s^+\rho^0, D_s^{*+}\rho^0, D_s^+\omega, D_s^{*+}\omega)/\Gamma_{total}] \times [B(D_s^+ \to \phi\pi^+)]$ assuming $B(D_s^+ \to \phi\pi^+) = 0.037$, which we rescale to our best value $B(D_s^+ \to \phi\pi^+) = 4.5 \times 10^{-2}$. This branching ratio limit provides a model-dependent upper limit $|V_{ub}|/|V_{cb}| < 0.16$ at CL=90%.

$\Gamma(D_{s1}(2536)^+\text{anything})/\Gamma_{total}$ — Γ_{47}/Γ

$D_{s1}(2536)^+$ is the narrow P-wave D_s^+ meson with $J^P = 1^+$.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0095	90	[1] BISHAI	98	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] Assuming factorization, the decay constant $f_{D_{s1}^+}$ is at least a factor of 2.5 times smaller than $f_{D_s^+}$.

$\Gamma(J/\psi(1S)\text{anything})/\Gamma_{total}$ — Γ_{48}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.094±0.032 OUR AVERAGE		Error includes scale factor of 1.1.			
1.057±0.012±0.040		[1] AUBERT	03F	BABR	$e^+e^- \to \Upsilon(4S)$
1.121±0.013±0.042		ANDERSON	02	CLE2	$e^+e^- \to \Upsilon(4S)$
1.29 ±0.45 ±0.01	27	[2] MASCHMANN	90	CBAL	$e^+e^- \to \Upsilon(4S)$
1.24 ±0.27 ±0.01	120	[3] ALBRECHT	87D	ARG	$e^+e^- \to \Upsilon(4S)$
1.35 ±0.24 ±0.01	52	[4] ALAM	86	CLEO	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.12 ±0.06 ±0.01	1489	[5] BALEST	95B	CLE2	$e^+e^- \to \Upsilon(4S)$
1.4 $^{+0.6}_{-0.5}$	7	[6] ALBRECHT	85H	ARG	$e^+e^- \to \Upsilon(4S)$
1.1 ±0.21 ±0.23	46	[7] HAAS	85	CLEO	Repl. by ALAM 86

[1] AUBERT 03F also reports the momentum distribution and helicity of $J/\psi \to \ell^+\ell^-$ in the $\Upsilon(4S)$ center-of-mass frame.

[2] MASCHMANN 90 reports $(1.12 \pm 0.33 \pm 0.25) \times 10^{-2}$ from a measurement of $[\Gamma(B \to J/\psi(1S)\text{anything})/\Gamma_{total}] \times [B(J/\psi(1S) \to e^+e^-)]$ assuming $B(J/\psi(1S) \to e^+e^-) = 0.069 \pm 0.009$, which we rescale to our best value $B(J/\psi(1S) \to e^+e^-) = (5.971 \pm 0.032) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[3] ALBRECHT 87D reports $(1.07 \pm 0.16 \pm 0.22) \times 10^{-2}$ from a measurement of $[\Gamma(B \rightarrow J/\psi(1S)\,\text{anything})/\Gamma_{\text{total}}] \times [\text{B}(J/\psi(1S) \rightarrow e^+e^-)]$ assuming $\text{B}(J/\psi(1S) \rightarrow e^+e^-) = 0.069 \pm 0.009$, which we rescale to our best value $\text{B}(J/\psi(1S) \rightarrow e^+e^-) = (5.971 \pm 0.032) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. ALBRECHT 87D find the branching ratio for J/ψ not from $\psi(2S)$ to be 0.0081 ± 0.0023.

[4] ALAM 86 reports $(1.09 \pm 0.16 \pm 0.21) \times 10^{-2}$ from a measurement of $[\Gamma(B \rightarrow J/\psi(1S)\,\text{anything})/\Gamma_{\text{total}}] \times [\text{B}(J/\psi(1S) \rightarrow \mu^+\mu^-)]$ assuming $\text{B}(J/\psi(1S) \rightarrow \mu^+\mu^-) = 0.074 \pm 0.012$, which we rescale to our best value $\text{B}(J/\psi(1S) \rightarrow \mu^+\mu^-) = (5.961 \pm 0.033) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[5] BALEST 95B reports $(1.12 \pm 0.04 \pm 0.06) \times 10^{-2}$ from a measurement of $[\Gamma(B \rightarrow J/\psi(1S)\,\text{anything})/\Gamma_{\text{total}}] \times [\text{B}(J/\psi(1S) \rightarrow e^+e^-)]$ assuming $\text{B}(J/\psi(1S) \rightarrow e^+e^-) = 0.0599 \pm 0.0025$, which we rescale to our best value $\text{B}(J/\psi(1S) \rightarrow e^+e^-) = (5.971 \pm 0.032) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. They measure $J/\psi(1S) \rightarrow e^+e^-$ and $\mu^+\mu^-$ and use PDG 1994 values for the branching fractions. The rescaling is the same for either mode so we use e^+e^-.

[6] Statistical and systematic errors were added in quadrature. ALBRECHT 85H also report a CL = 90% limit of 0.007 for $B \rightarrow J/\psi(1S) + X$ where $m_X < 1$ GeV.

[7] Dimuon and dielectron events used.

$\Gamma(J/\psi(1S)\,(\text{direct})\,\text{anything})/\Gamma_{\text{total}}$ — Γ_{49}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.0078 ±0.0004 OUR AVERAGE	Error includes scale factor of 1.1.			
0.00740±0.00023±0.00043	[1] AUBERT	03F	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
0.00813±0.00017±0.00037	[2] ANDERSON	02	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.0080 ±0.0008	[3] BALEST	95B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[1] AUBERT 03F also reports the helicity of $J/\psi \rightarrow \ell^+\ell^-$ produced directly in B decay.

[2] Also reports the measurement of $J/\psi \rightarrow \ell^+\ell^-$ polarization produced directly from B decay.

[3] BALEST 95B assume PDG 1994 values for sub mode branching ratios. $J/\psi(1S)$ mesons are reconstructed in $J/\psi(1S) \rightarrow e^+e^-$ and $J/\psi(1S) \rightarrow \mu^+\mu^-$. The $B \rightarrow J/\psi(1S)X$ branching ratio contains $J/\psi(1S)$ mesons directly from B decays and also from feeddown through $\psi(2S) \rightarrow J/\psi(1S)$, $\chi_{c1}(1P) \rightarrow J/\psi(1S)$, or $\chi_{c2}(1P) \rightarrow J/\psi(1S)$. Using the measured inclusive rates, BALEST 95B corrects for the feeddown and finds the $B \rightarrow J/\psi(1S)\,(\text{direct})\,X$ branching ratio.

$\Gamma(\psi(2S)\,\text{anything})/\Gamma_{\text{total}}$ — Γ_{50}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.00307±0.00021 OUR AVERAGE					
0.00297±0.00020±0.00020		AUBERT	03F	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
0.00316±0.00014±0.00028		[1] ANDERSON	02	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
0.0046 ±0.0017 ±0.0011	8	ALBRECHT	87D	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0034 ±0.0004 ±0.0003	240	[2] BALEST	95B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[1] Also reports the measurement of $\psi(2S) \rightarrow \ell^+\ell^-$ polarization produced directly from B decay.

[2] BALEST 95B assume PDG 1994 values for sub mode branching ratios. They find $\text{B}(B \rightarrow \psi(2S)X,\ \psi(2S) \rightarrow \ell^+\ell^-) = 0.30 \pm 0.05 \pm 0.04$ and $\text{B}(B \rightarrow \psi(2S)X,\ \psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) = 0.37 \pm 0.05 \pm 0.05$. Weighted average is quoted for $\text{B}(B \rightarrow \psi(2S)X)$.

$\Gamma(\chi_{c1}(1P)\text{anything})/\Gamma_{total}$ — Γ_{51}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.00386±0.00027 OUR AVERAGE					
0.00367±0.00035±0.00044		AUBERT	03F	BABR	$e^+e^- \to \Upsilon(4S)$
0.00363±0.00022±0.00034		[1] ABE	02L	BELL	$e^+e^- \to \Upsilon(4S)$
0.00435±0.00029±0.00040		ANDERSON	02	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0033 ±0.0004 ±0.0001		[2] CHEN	01	CLE2	$e^+e^- \to \Upsilon(4S)$
0.0040 ±0.0006 ±0.0004	112	[3] BALEST	95B	CLE2	Repl. by CHEN 01
0.0105 ±0.0035 ±0.0025		[4] ALBRECHT	92E	ARG	$e^+e^- \to \Upsilon(4S)$

[1] ABE 02L uses PDG 01 values for B($J/\psi(1S) \to \ell^+\ell^-$) and B($\chi_{c1,c2} \to J/\psi(1S)\gamma$).

[2] CHEN 01 reports 0.00414 ± 0.00031 ± 0.00040 from a measurement of [$\Gamma(B \to \chi_{c1}(1P)\text{anything})/\Gamma_{total}$] × [B($\chi_{c1}(1P) \to \gamma J/\psi(1S)$)] assuming B($\chi_{c1}(1P) \to \gamma J/\psi(1S)$) = 0.273 ± 0.016, which we rescale to our best value B($\chi_{c1}(1P) \to \gamma J/\psi(1S)$) = $(33.9 \pm 1.2) \times 10^{-2}$. 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 $\Upsilon(4S)$.

[3] BALEST 95B assume B($\chi_{c1}(1P) \to J/\psi(1S)\gamma$) = $(27.3 \pm 1.6) \times 10^{-2}$, the PDG 1994 value. Fit to ψ-photon invariant mass distribution allows for a $\chi_{c1}(1P)$ and a $\chi_{c2}(1P)$ component.

[4] ALBRECHT 92E assumes no $\chi_{c2}(1P)$ production.

$\Gamma(\chi_{c1}(1P)(\text{direct})\text{ anything})/\Gamma_{total}$ — Γ_{52}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.00324±0.00025 OUR AVERAGE				
0.00341±0.00035±0.00042	AUBERT	03F	BABR	$e^+e^- \to \Upsilon(4S)$
0.00332±0.00022±0.00034	[1] ABE	02L	BELL	$e^+e^- \to \Upsilon(4S)$
0.0031 ±0.0004 ±0.0001	[2] CHEN	01	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.0037 ±0.0007	[3] BALEST	95B	CLE2	Repl. by CHEN 01

[1] ABE 02L uses PDG 01 values for B($J/\psi(1S) \to \ell^+\ell^-$) and B($\chi_{c1,c2} \to J/\psi(1S)\gamma$).

[2] CHEN 01 reports 0.00383 ± 0.00031 ± 0.00040 from a measurement of [$\Gamma(B \to \chi_{c1}(1P)(\text{direct})\text{ anything})/\Gamma_{total}$] × [B($\chi_{c1}(1P) \to \gamma J/\psi(1S)$)] assuming B($\chi_{c1}(1P) \to \gamma J/\psi(1S)$) = 0.273 ± 0.016, which we rescale to our best value B($\chi_{c1}(1P) \to \gamma J/\psi(1S)$) = $(33.9 \pm 1.2) \times 10^{-2}$. 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 $\Upsilon(4S)$.

[3] BALEST 95B assume PDG 1994 values. $J/\psi(1S)$ mesons are reconstructed in the e^+e^- and $\mu^+\mu^-$ modes. The $B \to \chi_{c1}(1P)X$ branching ratio contains $\chi_{c1}(1P)$ mesons directly from B decays and also from feeddown through $\psi(2S) \to \chi_{c1}(1P)\gamma$. Using the measured inclusive rates, BALEST 95B corrects for the feeddown and finds the $B \to \chi_{c1}(1P)(\text{direct})\,X$ branching ratio.

$\Gamma(\chi_{c2}(1P)\text{anything})/\Gamma_{total}$ — Γ_{53}/Γ

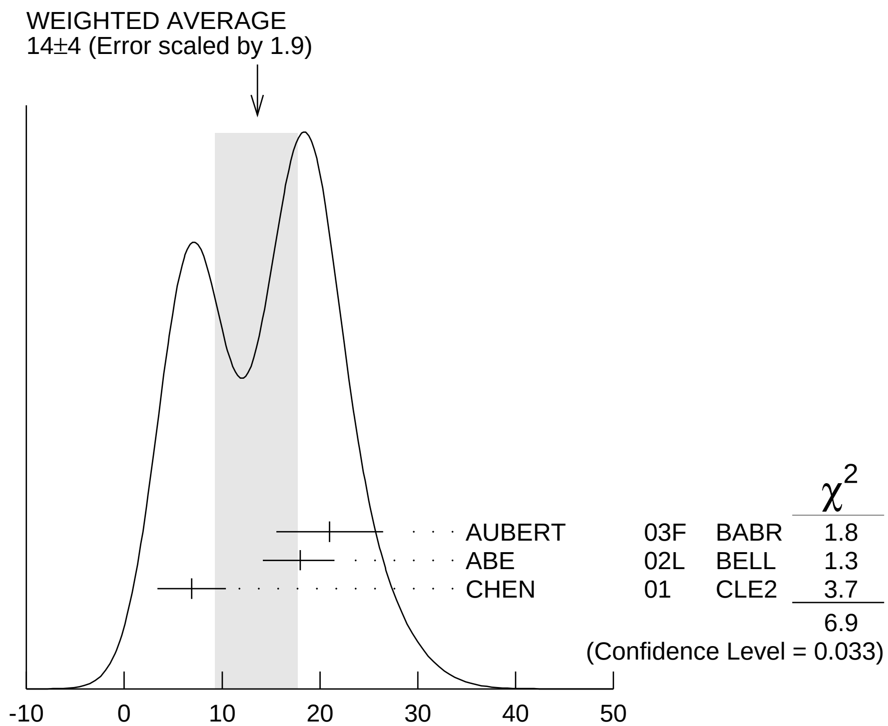
VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
14 ±4 OUR AVERAGE Error includes scale factor of 1.9. See the ideogram below.						
21.0±4.5±3.1			AUBERT	03F	BABR	$e^+e^- \to \Upsilon(4S)$
$18.0^{+2.3}_{-2.8}\pm2.6$			[1] ABE	02L	BELL	$e^+e^- \to \Upsilon(4S)$
6.9±3.5±0.3			[2] CHEN	01	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						

<38	90	35	[3] BALEST	95B	CLE2	Repl. by CHEN 01

[1] ABE 02L uses PDG 01 values for B($J/\psi(1S) \rightarrow \ell^+\ell^-$) and B($\chi_{c1,c2} \rightarrow J/\psi(1S)\gamma$).

[2] CHEN 01 reports $(9.8 \pm 4.8 \pm 1.5) \times 10^{-4}$ from a measurement of $[\Gamma(B \rightarrow \chi_{c2}(1P)\text{anything})/\Gamma_{total}] \times [B(\chi_{c2}(1P) \rightarrow \gamma J/\psi(1S))]$ assuming B($\chi_{c2}(1P) \rightarrow \gamma J/\psi(1S)$) = 0.135 ± 0.011, which we rescale to our best value B($\chi_{c2}(1P) \rightarrow \gamma J/\psi(1S)$) = $(19.2 \pm 0.7) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

[3] BALEST 95B assume B($\chi_{c2}(1P) \rightarrow J/\psi(1S)\gamma$) = $(13.5 \pm 1.1) \times 10^{-2}$, the PDG 1994 value. $J/\psi(1S)$ mesons are reconstructed in the e^+e^- and $\mu^+\mu^-$ modes, and PDG 1994 branching fractions are used. If interpreted as signal, the 35 ± 13 events correspond to B($B \rightarrow \chi_{c2}(1P)X$) =$(0.25 \pm 0.10 \pm 0.03) \times 10^{-2}$.



$\Gamma(\chi_{c2}(1P)\text{anything})/\Gamma_{total}$ Γ_{53}/Γ

$\Gamma(\chi_{c2}(1P)(\text{direct})\text{ anything})/\Gamma_{total}$ Γ_{54}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.00165±0.00031 OUR AVERAGE				
$0.00190 \pm 0.00045 \pm 0.00029$	AUBERT	03F	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$0.00153^{+0.00023}_{-0.00028} \pm 0.00027$	[1] ABE	02L	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

[1] ABE 02L uses PDG 01 values for B($J/\psi(1S) \rightarrow \ell^+\ell^-$) and B($\chi_{c1,c2} \rightarrow J/\psi(1S)\gamma$).

$\Gamma(\eta_c(1S)\text{anything})/\Gamma_{total}$ Γ_{55}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.009	90	[1] BALEST	95B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[1] BALEST 95B assume PDG 1994 values for sub mode branching ratios. $J/\psi(1S)$ mesons are reconstructed in $J/\psi(1S) \to e^+e^-$ and $J/\psi(1S) \to \mu^+\mu^-$. Search region 2960 $< m_{\eta_c(1S)} <$ 3010 MeV/c^2.

$\Gamma(K X(3872),\ X \to D^0 \overline{D}{}^0 \pi^0)/\Gamma_{total}$ — Γ_{56}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
$1.22 \pm 0.31 ^{+0.23}_{-0.30}$	[1] GOKHROO	06	BELL	$e^+e^- \to \Upsilon(4S)$

[1] Measure the near-threshold enhancements in the $(D^0 \overline{D}{}^0 \pi^0)$ system at a mass 3875.2 $\pm$ $0.7 ^{+0.3}_{-1.6} \pm 0.8$ MeV/c^2.

$\Gamma(K X(3872),\ X \to D^{*0} D^0)/\Gamma_{total}$ — Γ_{57}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
$0.80 \pm 0.20 \pm 0.10$	AUSHEV	10	BELL	$e^+e^- \to \Upsilon(4S)$

$\Gamma(K X(3940),\ X \to D^{*0} D^0)/\Gamma_{total}$ — Γ_{58}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<0.67	90	AUSHEV	10	BELL	$e^+e^- \to \Upsilon(4S)$

$\Gamma(K X(3915),\ X \to \omega J/\psi)/\Gamma_{total}$ — Γ_{59}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
$7.1 \pm 1.3 \pm 3.1$	[1] CHOI	05	BELL	$e^+e^- \to \Upsilon(4S)$

[1] CHOI 05 reports the observation of a near-threshold enhancement in the $\omega J/\psi$ mass spectrum in exclusive $B \to K \omega J/\psi$. The new state, denoted as $X(3915)$, is measured to have a mass of 3943 $\pm$ 11 $\pm$ 13 GeV/c^2 and a width Γ = 87 $\pm$ 22 $\pm$ 26 MeV.

$\Gamma(K^\pm \text{ anything})/\Gamma_{total}$ — Γ_{60}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.789 ± 0.025 OUR AVERAGE				
$0.82 \pm 0.01 \pm 0.05$	ALBRECHT	94C	ARG	$e^+e^- \to \Upsilon(4S)$
$0.775 \pm 0.015 \pm 0.025$	[1] ALBRECHT	93I	ARG	$e^+e^- \to \Upsilon(4S)$
$0.85 \pm 0.07 \pm 0.09$	ALAM	87B	CLEO	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
seen	[2] BRODY	82	CLEO	$e^+e^- \to \Upsilon(4S)$
seen	[3] GIANNINI	82	CUSB	$e^+e^- \to \Upsilon(4S)$

[1] ALBRECHT 93I value is not independent of the sum of $B \to K^+$ anything and $B \to K^-$ anything ALBRECHT 94C values.

[2] Assuming $\Upsilon(4S) \to B\overline{B}$, a total of $3.38 \pm 0.34 \pm 0.68$ kaons per $\Upsilon(4S)$ decay is found (the second error is systematic). In the context of the standard B-decay model, this leads to a value for (b-quark $\to$ c-quark)/(b-quark $\to$ all) of $1.09 \pm 0.33 \pm 0.13$.

[3] GIANNINI 82 at CESR-CUSB observed 1.58 ± 0.35 K^0 per hadronic event much higher than 0.82 ± 0.10 below threshold. Consistent with predominant $b \to cX$ decay.

$\Gamma(K^+ \text{ anything})/\Gamma_{total}$ — Γ_{61}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.66 ± 0.05	[1] ALBRECHT	94C	ARG	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.620 \pm 0.013 \pm 0.038$	[2] ALBRECHT	94C	ARG	$e^+e^- \to \Upsilon(4S)$
$0.66 \pm 0.05 \pm 0.07$	[2] ALAM	87B	CLEO	$e^+e^- \to \Upsilon(4S)$

[1] Measurement relies on lepton-kaon correlations. It is for the weak decay vertex and does not include mixing of the neutral B meson. Mixing effects were corrected for by assuming a mixing parameter r of (18.1 ± 4.3)%.
[2] Measurement relies on lepton-kaon correlations. It includes production through mixing of the neutral B meson.

$\Gamma(K^- \text{anything})/\Gamma_{\text{total}}$ — Γ_{62}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.13 ±0.04	[1] ALBRECHT	94C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.165±0.011±0.036	[2] ALBRECHT	94C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.19 ±0.05 ±0.02	[2] ALAM	87B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[1] Measurement relies on lepton-kaon correlations. It is for the weak decay vertex and does not include mixing of the neutral B meson. Mixing effects were corrected for by assuming a mixing parameter r of (18.1 ± 4.3)%.
[2] Measurement relies on lepton-kaon correlations. It includes production through mixing of the neutral B meson.

$\Gamma(K^0/\overline{K}^0 \text{anything})/\Gamma_{\text{total}}$ — Γ_{63}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.64 ±0.04 OUR AVERAGE				
0.642±0.010±0.042	[1] ALBRECHT	94C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.63 ±0.06 ±0.06	ALAM	87B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[1] ALBRECHT 94C assume a $K^0/\overline{K}^0$ multiplicity twice that of K^0_S.

$\Gamma(K^*(892)^\pm \text{anything})/\Gamma_{\text{total}}$ — Γ_{64}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.182±0.054±0.024	ALBRECHT	94J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(K^*(892)^0/\overline{K}^*(892)^0 \text{anything})/\Gamma_{\text{total}}$ — Γ_{65}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.146±0.016±0.020	ALBRECHT	94J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(K^*(892)\gamma)/\Gamma_{\text{total}}$ — Γ_{66}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
4.24±0.54±0.32		[1] COAN	00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<150	90	[2] LESIAK	92	CBAL	$e^+e^- \rightarrow \Upsilon(4S)$
< 24	90	ALBRECHT	88H	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[1] An average of B($B^+ \rightarrow K^*(892)^+\gamma$) and B($B^0 \rightarrow K^*(892)^0\gamma$) measurements reported in COAN 00 by assuming full correlated systematic errors.
[2] LESIAK 92 set a limit on the inclusive process B($b \rightarrow s\gamma$) $< 2.8 \times 10^{-3}$ at 90% CL for the range of masses of 892–2045 MeV, independent of assumptions about s-quark hadronization.

$\Gamma(\eta K\gamma)/\Gamma_{\text{total}}$ — Γ_{67}/Γ

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
$8.5\pm1.3^{+1.2}_{-0.9}$	[1] NISHIDA	05	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

[1] $m_{\eta K} < 2.4$ GeV/c^2

$\Gamma(K_1(1400)\gamma)/\Gamma_{total}$ — Γ_{68}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<12.7 \times 10^{-5}$	90	[1] COAN	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$< 1.6 \times 10^{-3}$	90	[2] LESIAK	92	CBAL	$e^+e^- \to \Upsilon(4S)$
$< 4.1 \times 10^{-4}$	90	ALBRECHT	88H	ARG	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[2] LESIAK 92 set a limit on the inclusive process $B(b \to s\gamma) < 2.8 \times 10^{-3}$ at 90% CL for the range of masses of 892–2045 MeV, independent of assumptions about s-quark hadronization.

$\Gamma(K_2^*(1430)\gamma)/\Gamma_{total}$ — Γ_{69}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
$1.66^{+0.59}_{-0.53}\pm0.13$		[1] COAN	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<83	90	ALBRECHT	88H	ARG	$e^+e^- \to \Upsilon(4S)$

[1] COAN 00 obtains a fitted signal yield of $15.9^{+5.7}_{-5.2}$ events. A search for contamination by $K^*(1410)$ yielded a rate consistent with 0; the central value assumes no contamination.

$\Gamma(K_2(1770)\gamma)/\Gamma_{total}$ — Γ_{70}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.2 \times 10^{-3}$	90	[1] LESIAK	92	CBAL	$e^+e^- \to \Upsilon(4S)$

[1] LESIAK 92 set a limit on the inclusive process $B(b \to s\gamma) < 2.8 \times 10^{-3}$ at 90% CL for the range of masses of 892–2045 MeV, independent of assumptions about s-quark hadronization.

$\Gamma(K_3^*(1780)\gamma)/\Gamma_{total}$ — Γ_{71}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.7 \times 10^{-5}$	90	[1] NISHIDA	05	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<3.0 \times 10^{-3}$	90	ALBRECHT	88H	ARG	$e^+e^- \to \Upsilon(4S)$

[1] Uses $B(K_3^*(1780) \to \eta K) = 0.11^{+0.05}_{-0.04}$.

$\Gamma(K_4^*(2045)\gamma)/\Gamma_{total}$ — Γ_{72}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.0 \times 10^{-3}$	90	[1] LESIAK	92	CBAL	$e^+e^- \to \Upsilon(4S)$

[1] LESIAK 92 set a limit on the inclusive process $B(b \to s\gamma) < 2.8 \times 10^{-3}$ at 90% CL for the range of masses of 892–2045 MeV, independent of assumptions about s-quark hadronization.

$\Gamma(K\eta'(958))/\Gamma_{total}$ — Γ_{73}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$(8.3^{+0.9}_{-0.8}\pm0.7) \times 10^{-5}$	[1] RICHICHI	00	CLE2	$e^+e^- \to \Upsilon(4S)$

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

$\Gamma(K^*(892)\eta'(958))/\Gamma_{total}$ — Γ_{74}/Γ

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
$4.1^{+1.0}_{-0.9}\pm0.5$		[1] AUBERT	07E	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<22	90	[1] RICHICHI	00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(K\eta)/\Gamma_{total}$ — Γ_{75}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.2\times10^{-6}$	90	[1] RICHICHI	00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(K^*(892)\eta)/\Gamma_{total}$ — Γ_{76}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$(1.80^{+0.49}_{-0.43}\pm0.18)\times10^{-5}$	[1] RICHICHI	00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(K\phi\phi)/\Gamma_{total}$ — Γ_{77}/Γ

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
$2.3^{+0.9}_{-0.8}\pm0.3$	[1] HUANG	03	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

[1] Assumes equal production of charged and neutral B meson pairs and isospin symmetry.

$\Gamma(\overline{b}\rightarrow\overline{s}\gamma)/\Gamma_{total}$ — Γ_{78}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
3.49±0.19 OUR AVERAGE				
$3.75\pm0.18\pm0.35$	[1,2] SAITO	15	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$3.52\pm0.20\pm0.51$	[1,3] LEES	12U	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$3.32\pm0.16\pm0.31$	[1,4] LEES	12V	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$3.47\pm0.15\pm0.40$	[1,5] LIMOSANI	09	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$3.90\pm0.91\pm0.64$	[1,6] AUBERT	08O	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$3.29\pm0.44\pm0.29$	[1,7] CHEN	01C	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$2.30\pm0.08\pm0.30$	[8] DEL-AMO-SA...	10M	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$4.3\ \pm0.3\ \pm0.7$	[9] AUBERT	09U	BABR	Repl. by DEL-AMO-SANCHEZ 10M
$3.92\pm0.31\pm0.47$	[1,10] AUBERT,BE	06B	BABR	Repl. by LEES 12V
$3.49\pm0.20^{+0.59}_{-0.46}$	[1,11] AUBERT,B	05R	BABR	Repl. by LEES 12U
$3.50\pm0.32\pm0.31$	[1,12] KOPPENBURG	04	BELL	Repl. by LIMOSANI 09
$3.36\pm0.53^{+0.65}_{-0.68}$	[13] ABE	01F	BELL	Repl. by SAITO 15
$2.32\pm0.57\pm0.35$	ALAM	95	CLE2	Repl. by CHEN 01C

[1] We extrapolate the measured value to $E_\gamma > 1.6$ GeV using the method of BUCHMUELLER 06 (average of three theoretical models).

[2] SAITO 15 measured $(3.51\pm0.17\pm0.33)\times10^{-4}$ using a sum-of-exclusive approach in which 38 of the hadronic final states with $m_{X_s} < 2.8$ GeV/c^2 are reconstructed. The cut of minimum photon energy is $E_\gamma > 1.9$ GeV.

[3] Reports $(3.29 \pm 0.19 \pm 0.48) \times 10^{-4}$ for $E_\gamma > 1.9$ GeV.

[4] Reports $(3.21 \pm 0.15 \pm 0.29 \pm 0.08) \times 10^{-4}$ for $1.8 < E_\gamma < 2.8$ GeV, where the last systematic uncertainty is for model dependency. Results with other cutoffs are also reported.

[5] The measurement reported is $(3.45 \pm 0.15 \pm 0.40) \times 10^{-4}$ for $E_\gamma > 1.7$ GeV.

[6] Uses a fully reconstructed B meson as a tag on the recoil side. The measurement reported is $(3.66 \pm 0.85 \pm 0.60) \times 10^{-4}$ for $E_\gamma > 1.9$ GeV.

[7] The measurement reported is $(3.21 \pm 0.43^{+0.32}_{-0.29}) \times 10^{-4}$ for $E_\gamma > 2.0$ GeV.

[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.

[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.

[10] The measurement reported is $(3.67 \pm 0.29 \pm 0.45) \times 10^{-4}$ for $E_\gamma > 1.9$ GeV.

[11] The measurement reported is $(3.27 \pm 0.18^{+0.55}_{-0.42}) \times 10^{-4}$ for $E_\gamma > 1.9$ GeV.

[12] The measurement reported is $(3.55 \pm 0.32 \pm 0.32) \times 10^{-4}$ for $E_\gamma > 1.8$ GeV.

[13] 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.

$\Gamma(\overline{b} \to \overline{d}\gamma)/\Gamma_{total}$ — Γ_{79}/Γ

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
9.2±2.0±2.3	[1] DEL-AMO-SA...	10M	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
14 ±5 ±4	[2] AUBERT	09U	BABR	Repl. by DEL-AMO-SANCHEZ 10M

[1] 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.

[2] 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.

$\Gamma(\overline{b} \to \overline{d}\gamma)/\Gamma(\overline{b} \to \overline{s}\gamma)$ — Γ_{79}/Γ_{78}

VALUE	DOCUMENT ID		TECN	COMMENT
0.040±0.009±0.010	[1] DEL-AMO-SA...	10M	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.033±0.013±0.009	[2] AUBERT	09U	BABR	Repl. by DEL-AMO-SANCHEZ 10M

[1] 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.

[2] 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.

$\Gamma(\overline{b} \to \overline{s}\,\text{gluon})/\Gamma_{total}$ — Γ_{80}/Γ

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.068	90		[1] COAN	98	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.08		2	[2] ALBRECHT	95D	ARG	$e^+e^- \to \Upsilon(4S)$

[1] COAN 98 uses D-ℓ correlation.
[2] ALBRECHT 95D use full reconstruction of one B decay as tag. Two candidate events for charmless B decay can be interpreted as either $b \to s$gluon or $b \to u$ transition. If interpreted as $b \to s$gluon they find a branching ratio of ~ 0.026 or the upper limit quoted above. Result is highly model dependent.

$\Gamma(\eta \text{ anything})/\Gamma_{\text{total}}$ — Γ_{81}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
$2.61 \pm 0.30^{+0.44}_{-0.74}$		[1] NISHIMURA	10	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.69 \pm 0.29^{+0.36}_{-0.62}$		[2] NISHIMURA	10	BELL	$e^+e^- \to \Upsilon(4S)$
<4.4	90	[3] BROWDER	98	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] Uses $B \to \eta X_s$ with $0.4 < m_{X_s} < 2.6$ GeV/c^2.
[2] Uses $B \to \eta X_s$ with $1.8 < m_{X_s} < 2.6$ GeV/c^2.
[3] BROWDER 98 search for high momentum $B \to \eta X_s$ between 2.1 and 2.7 GeV/c.

$\Gamma(\eta' \text{ anything})/\Gamma_{\text{total}}$ — Γ_{82}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
4.2±0.9 OUR AVERAGE				
$3.9 \pm 0.8 \pm 0.9$	[1] AUBERT,B	04F	BABR	$e^+e^- \to \Upsilon(4S)$
$4.6 \pm 1.1 \pm 0.6$	[2] BONVICINI	03	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$6.2 \pm 1.6^{+1.3}_{-2.0}$	[3] BROWDER	98	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] AUBERT,B 04F reports branching ratio $B \to \eta' X_s$ for high momentum η' between 2.0 and 2.7 GeV/c in the $\Upsilon(4S)$ center-of-mass frame. X_s represents a recoil system consisting of a kaon and zero to four pions.
[2] BONVICINI 03 observed a signal of 61.2 ± 13.9 events in $B \to \eta' X_{nc}$ production for high momentum η' between 2.0 and 2.7 GeV/c in the $\Upsilon(4S)$ center-of-mass frame. The X_{nc} denotes "charmless" hadronic states recoiling against η'. The second error combines systematic and background subtraction uncertainties in quadrature.
[3] BROWDER 98 observed a signal of 39.0 ± 11.6 events in high momentum $B \to \eta' X_s$ production between 2.0 and 2.7 GeV/c. The branching fraction is based on the interpretation of $b \to sg$, where the last error includes additional uncertainties due to the color-suppressed $b \to$ backgrounds.

$\Gamma(K^+ \text{gluon (charmless)})/\Gamma_{\text{total}}$ — Γ_{83}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<1.87	90	[1] DEL-AMO-SA..11	BABR	$e^+e^- \to \Upsilon(4S)$

[1] $B \to K^+ X$ with $m_X < 1.69$ GeV/c^2.

$\Gamma(K^0 \text{gluon (charmless)})/\Gamma_{\text{total}}$ — Γ_{84}/Γ

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
$1.95^{+0.51}_{-0.45} \pm 0.50$	[1] DEL-AMO-SA..11	BABR	$e^+e^- \to \Upsilon(4S)$

[1] $B \to K^0 X$ with $m_X < 1.69$ GeV/c^2.

$\Gamma(\rho\gamma)/\Gamma_{total}$ — Γ_{85}/Γ

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
1.39±0.25 OUR AVERAGE		Error includes scale factor of 1.2.			
$1.73^{+0.34}_{-0.32}\pm0.17$		[1,2] AUBERT	08BH	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$1.21^{+0.24}_{-0.22}\pm0.12$		[1,2] TANIGUCHI	08	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.36^{+0.29}_{-0.27}\pm0.10$		[1,3] AUBERT	07L	BABR	Repl. by AUBERT 08BH
<1.9	90	[1,3] AUBERT	04C	BABR	Repl. by AUBERT 07L
<14	90	[1,4] COAN	00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

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

[2] Assumes $\Gamma(B \rightarrow \rho\gamma) = \Gamma(B^+ \rightarrow \rho^+\gamma) = 2\,\Gamma(B^0 \rightarrow \rho^0\gamma)$ and uses lifetime ratio of $\tau_{B^+}/\tau_{B^0} = 1.071 \pm 0.009$.

[3] Assumes $\Gamma(B \rightarrow \rho\gamma) = \Gamma(B^+ \rightarrow \rho^+\gamma) = 2\,\Gamma(B^0 \rightarrow \rho^0\gamma)$ and uses lifetime ratio of $\tau_{B^+}/\tau_{B^0} = 1.083 \pm 0.017$.

[4] COAN 00 reports $B(B \rightarrow \rho\gamma)/B(B \rightarrow K^*(892)\gamma) < 0.32$ at 90%CL and scaled by the central value of $B(B \rightarrow K^*(892)\gamma)=(4.24 \pm 0.54 \pm 0.32) \times 10^{-5}$.

$\Gamma(\rho\gamma)/\Gamma(K^*(892)\gamma)$ — Γ_{85}/Γ_{66}

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
$\mathbf{3.02^{+0.60+0.26}_{-0.55-0.28}}$	TANIGUCHI	08	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(\rho/\omega\gamma)/\Gamma_{total}$ — Γ_{86}/Γ

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
1.30±0.23 OUR AVERAGE		Error includes scale factor of 1.2.			
$1.63^{+0.30}_{-0.28}\pm0.16$		[1,2,3] AUBERT	08BH	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$1.14\pm0.20^{+0.10}_{-0.12}$		[1,3] TANIGUCHI	08	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.25^{+0.25}_{-0.24}\pm0.09$		[4] AUBERT	07L	BABR	Repl. by AUBERT 08BH
$1.32^{+0.34+0.10}_{-0.31-0.09}$		[4] MOHAPATRA	06	BELL	Repl. by TANIGUCHI 08
$0.6\pm0.3\pm0.1$		[4] AUBERT	05	BABR	Repl. by AUBERT 07L
<1.4	90	[4] MOHAPATRA	05	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

[1] Assumes $\Gamma(B \rightarrow \rho\gamma) = \Gamma(B^+ \rightarrow \rho^+\gamma) = 2\,\Gamma(B^0 \rightarrow \rho^0\gamma)$ and uses lifetime ratio of $\tau_{B^+}/\tau_{B^0} = 1.071 \pm 0.009$.

[2] Also reports $|V_{td}/V_{ts}| = 0.233^{+0.025+0.022}_{-0.024-0.021}$.

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

[4] Assumes $\Gamma(B \rightarrow \rho\gamma) = \Gamma(B^+ \rightarrow \rho^+\gamma) = 2\,\Gamma(B^0 \rightarrow \rho^0\gamma)$ and uses lifetime ratio of $\tau_{B^+}/\tau_{B^0} = 1.083 \pm 0.017$.

$\Gamma(\rho/\omega\gamma)/\Gamma(K^*(892)\gamma)$ — Γ_{86}/Γ_{66}

VALUE (units 10^{-2})	CL%	DOCUMENT ID		TECN	COMMENT
$\mathbf{2.84\pm0.50^{+0.27}_{-0.29}}$		[1] TANIGUCHI	08	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<3.5	90	MOHAPATRA	05	BELL	Repl. by TANIGUCHI 08

[1] Also reports $|V_{td}/V_{ts}|= 0.195^{+0.020}_{-0.019} \pm 0.015$.

$\Gamma(\pi^{\pm}\text{ anything})/\Gamma_{\text{total}}$ — Γ_{87}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
3.585±0.025±0.070	[1] ALBRECHT	93I	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[1] ALBRECHT 93 excludes $\pi^{\pm}$ from K^0_S and Λ decays. If included, they find 4.105 ± 0.025 ± 0.080.

$\Gamma(\pi^0\text{ anything})/\Gamma_{\text{total}}$ — Γ_{88}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
2.35±0.02±0.11	[1] ABE	01J	BELL	$e^+e \rightarrow \Upsilon(4S)$

[1] From fully inclusive π^0 yield with no corrections from decays of K^0_S or other particles.

$\Gamma(\eta\text{ anything})/\Gamma_{\text{total}}$ — Γ_{89}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.176±0.011±0.012	KUBOTA	96	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(\rho^0\text{ anything})/\Gamma_{\text{total}}$ — Γ_{90}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.208±0.042±0.032	ALBRECHT	94J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(\omega\text{ anything})/\Gamma_{\text{total}}$ — Γ_{91}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.81	90	ALBRECHT	94J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(\phi\text{ anything})/\Gamma_{\text{total}}$ — Γ_{92}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.0343±0.0012 OUR AVERAGE				
0.0353±0.0005±0.0030	HUANG	07	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
0.0341±0.0006±0.0012	AUBERT	04S	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
0.0390±0.0030±0.0035	ALBRECHT	94J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.023 ±0.006 ±0.005	BORTOLETTO	86	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(\phi K^*(892))/\Gamma_{\text{total}}$ — Γ_{93}/Γ

VALUE	CL%	DOCUMENT ID		TECN
$<2.2 \times 10^{-5}$	90	[1] BERGFELD	98	CLE2

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

$\Gamma(\pi^+\text{ gluon (charmless)})/\Gamma_{\text{total}}$ — Γ_{95}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
$3.72^{+0.50}_{-0.47}\pm0.59$	[1] DEL-AMO-SA..	11	BABR	$e^+e^- \rightarrow \Upsilon(4S)$

[1] $B \rightarrow \pi^+ X$ with $m_X < 1.71$ GeV/c^2.

$\Gamma(\Lambda_c^+ / \overline{\Lambda}_c^-\text{ anything})/\Gamma_{\text{total}}$ — Γ_{96}/Γ

VALUE (%)	CL%	DOCUMENT ID		TECN	COMMENT
$3.54\pm0.32^{+0.19}_{-0.18}$		[1] AUBERT	07C	BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

6.4 $\pm$0.8 $\pm$0.8		[2] CRAWFORD	92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$
14 $\pm$9		[3] ALBRECHT	88E	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
<11.2	90	[4] ALAM	87	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] AUBERT 07C reports $0.045 \pm 0.003 \pm 0.012$ from a measurement of $[\Gamma(B \rightarrow \Lambda_c^+ \ / \ \overline{\Lambda}_c^- \text{anything})/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow pK^-\pi^+)]$ assuming $B(\Lambda_c^+ \rightarrow pK^-\pi^+) = (5.0 \pm 1.3) \times 10^{-2}$, which we rescale to our best value $B(\Lambda_c^+ \rightarrow pK^-\pi^+) = (6.35 \pm 0.33) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] CRAWFORD 92 result derived from lepton baryon correlations. Assumes all charmed baryons in B^0 and $B^\pm$ decay are Λ_c.

[3] ALBRECHT 88E measured $B(B \rightarrow \Lambda_c^+ X) \cdot B(\Lambda_c^+ \rightarrow pK^-\pi^+) = (0.30 \pm 0.12 \pm 0.06)\%$ and used $B(\Lambda_c^+ \rightarrow pK^-\pi^+) = (2.2 \pm 1.0)\%$ from ABRAMS 80 to obtain above number.

[4] Assuming all baryons result from charmed baryons, ALAM 86 conclude the branching fraction is $7.4 \pm 2.9\%$. The limit given above is model independent.

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.19±0.13±0.04	[1] AMMAR	97	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] AMMAR 97 uses a high-momentum lepton tag ($P_\ell > 1.4$ GeV/c^2).

$\Gamma(\overline{\Lambda}_c^- \mu^+ \text{anything})/\Gamma(\overline{\Lambda}_c^- \text{anything})$ Γ_{101}/Γ_{98}

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
−2.0±2.0±1.9	LEES	12	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

$\Gamma(\overline{\Lambda}_c^- \ell^+ \text{anything})/\Gamma(\Lambda_c^+ \ / \ \overline{\Lambda}_c^- \text{anything})$ Γ_{99}/Γ_{96}

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

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

$\Gamma(\overline{\Lambda}_c^- e^+ \text{anything})/\Gamma(\Lambda_c^+ \ / \ \overline{\Lambda}_c^- \text{anything})$ Γ_{100}/Γ_{96}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.05	90	[1] BONVICINI	98	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] BONVICINI 98 uses the electron with momentum above 0.6 GeV/c.

$\Gamma(\overline{\Lambda}_c^- e^+ \text{anything})/\Gamma(\overline{\Lambda}_c^- \text{anything})$ Γ_{100}/Γ_{98}

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
2.5±1.1±0.6	[1] LEES	12	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] Uses the full reconstruction of the recoiling B in a hadronic decay as a tag.

$\Gamma(\overline{\Lambda}_c^- \ell^+ \text{anything})/\Gamma(\overline{\Lambda}_c^- \text{anything})$ Γ_{99}/Γ_{98}

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

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

$\Gamma(\overline{\Lambda}_c^- p \text{ anything})/\Gamma(\Lambda_c^+ / \overline{\Lambda}_c^- \text{ anything})$ — Γ_{102}/Γ_{96}

VALUE	DOCUMENT ID		TECN	COMMENT
0.57±0.05±0.05	BONVICINI	98	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

$\Gamma(\overline{\Lambda}_c^- p e^+ \nu_e)/\Gamma(\overline{\Lambda}_c^- p \text{ anything})$ — $\Gamma_{103}/\Gamma_{102}$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.04	90	[1] BONVICINI	98	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] BONVICINI 98 uses the electron with momentum above 0.6 GeV/c.

$\Gamma(\overline{\Sigma}_c^{--} \text{ anything})/\Gamma_{\text{total}}$ — Γ_{104}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0033±0.0017±0.0002	77	[1] PROCARIO	94	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] PROCARIO 94 reports $[\Gamma(B \rightarrow \overline{\Sigma}_c^{--} \text{anything})/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow p K^- \pi^+)] = 0.00021 \pm 0.00008 \pm 0.00007$ which we divide by our best value $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = (6.35 \pm 0.33) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\overline{\Sigma}_c^{-} \text{ anything})/\Gamma_{\text{total}}$ — Γ_{105}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<8 \times 10^{-3}$	90	[1] PROCARIO	94	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] PROCARIO 94 reports $[\Gamma(B \rightarrow \overline{\Sigma}_c^{-} \text{anything})/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow p K^- \pi^+)] < 0.00048$ which we divide by our best value $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = 6.35 \times 10^{-2}$.

$\Gamma(\overline{\Sigma}_c^{0} \text{ anything})/\Gamma_{\text{total}}$ — Γ_{106}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0036±0.0017±0.0002	76	[1] PROCARIO	94	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] PROCARIO 94 reports $[\Gamma(B \rightarrow \overline{\Sigma}_c^{0} \text{anything})/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow p K^- \pi^+)] = 0.00023 \pm 0.00008 \pm 0.00007$ which we divide by our best value $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = (6.35 \pm 0.33) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\overline{\Sigma}_c^{0} N (N = p \text{ or } n))/\Gamma_{\text{total}}$ — Γ_{107}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.2 \times 10^{-3}$	90	[1] PROCARIO	94	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] PROCARIO 94 reports < 0.0017 from a measurement of $[\Gamma(B \rightarrow \overline{\Sigma}_c^{0} N(N = p \text{ or } n))/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow p K^- \pi^+)]$ assuming $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = 0.043$, which we rescale to our best value $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = 6.35 \times 10^{-2}$.

$\Gamma(\Xi_c^0 \text{ anything}, \Xi_c^0 \rightarrow \Xi^- \pi^+)/\Gamma_{\text{total}}$ — Γ_{108}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.193±0.030 OUR AVERAGE	Error includes scale factor of 1.1.			
0.211±0.019±0.025	[1] AUBERT,B	05M	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
0.144±0.048±0.021	[2] BARISH	97	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] The yield is obtained by requiring the momentum P < 2.15 GeV/c.

[2] BARISH 97 find 79 ± 27 Ξ_c^0 events.

$\Gamma(\Xi_c^+,\ \Xi_c^+ \to \Xi^- \pi^+ \pi^+)/\Gamma_{total}$ — Γ_{109}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
$0.453 \pm 0.096^{+0.085}_{-0.065}$	[1] BARISH	97	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] BARISH 97 find 125 ± 28 Ξ_c^+ events.

$\Gamma(p/\overline{p}$ anything$)/\Gamma_{total}$ — Γ_{110}/Γ

Includes p and $\overline{p}$ from Λ and $\overline{\Lambda}$ decay.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.080±0.004 OUR AVERAGE					
$0.080 \pm 0.005 \pm 0.005$		ALBRECHT	93I	ARG	$e^+e^- \to \Upsilon(4S)$
$0.080 \pm 0.005 \pm 0.003$		CRAWFORD	92	CLEO	$e^+e^- \to \Upsilon(4S)$
$0.082 \pm 0.005^{+0.013}_{-0.010}$	2163	[1] ALBRECHT	89K	ARG	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
>0.021		[2] ALAM	83B	CLEO	$e^+e^- \to \Upsilon(4S)$

[1] ALBRECHT 89K include direct and nondirect protons.

[2] ALAM 83B reported their result as $> 0.036 \pm 0.006 \pm 0.009$. Data are consistent with equal yields of p and $\overline{p}$. Using assumed yields below cut, $B(B \to p + X) = 0.03$ not including protons from Λ decays.

$\Gamma(p/\overline{p}$ (direct) anything$)/\Gamma_{total}$ — Γ_{111}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.055±0.005 OUR AVERAGE					
$0.055 \pm 0.005 \pm 0.0035$		ALBRECHT	93I	ARG	$e^+e^- \to \Upsilon(4S)$
$0.056 \pm 0.006 \pm 0.005$		CRAWFORD	92	CLEO	$e^+e^- \to \Upsilon(4S)$
0.055 ± 0.016	1220	[1] ALBRECHT	89K	ARG	$e^+e^- \to \Upsilon(4S)$

[1] ALBRECHT 89K subtract contribution of Λ decay from the inclusive proton yield.

$\Gamma(\overline{p} e^+ \nu_e$ anything$)/\Gamma_{total}$ — Γ_{112}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$< 5.9 \times 10^{-4}$	90	[1] ADAM	03B	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<16 \times 10^{-4}$	90	ALBRECHT	90H	ARG	$e^+e^- \to \Upsilon(4S)$

[1] Based on $V-A$ model.

$\Gamma(\Lambda/\overline{\Lambda}$ anything$)/\Gamma_{total}$ — Γ_{113}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.040±0.005 OUR AVERAGE					
$0.038 \pm 0.004 \pm 0.006$	2998	CRAWFORD	92	CLEO	$e^+e^- \to \Upsilon(4S)$
$0.042 \pm 0.005 \pm 0.006$	943	ALBRECHT	89K	ARG	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.022 \pm 0.003 \pm 0.0022$		[1] ACKERSTAFF	97N	OPAL	$e^+e^- \to Z$
>0.011		[2] ALAM	83B	CLEO	$e^+e^- \to \Upsilon(4S)$

[1] ACKERSTAFF 97N assumes $B(b \to B) = 0.868 \pm 0.041$, *i.e.*, an admixture of B^0, $B^\pm$, and B_s.

[2] ALAM 83B reported their result as $> 0.022 \pm 0.007 \pm 0.004$. Values are for $(B(\Lambda X)+B(\overline{\Lambda}X))/2$. Data are consistent with equal yields of p and $\overline{p}$. Using assumed yields below cut, $B(B \to \Lambda X) = 0.03$.

$\Gamma(\Lambda \text{ anything})/\Gamma(\overline{\Lambda} \text{ anything})$ — $\Gamma_{114}/\Gamma_{115}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.43±0.09±0.07	[1] AMMAR	97	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[1] AMMAR 97 uses a high-momentum lepton tag ($P_\ell > 1.4$ GeV/c^2).

$\Gamma(\Xi^-/\overline{\Xi}^+ \text{ anything})/\Gamma_{\text{total}}$ — Γ_{116}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0027±0.0006 OUR AVERAGE					
0.0027±0.0005±0.0004	147	CRAWFORD	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
0.0028±0.0014	54	ALBRECHT	89K	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(\text{baryons anything})/\Gamma_{\text{total}}$ — Γ_{117}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.068±0.005±0.003	[1] ALBRECHT	92O	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.076±0.014	[2] ALBRECHT	89K	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[1] ALBRECHT 92O result is from simultaneous analysis of p and Λ yields, $p\overline{p}$ and $\Lambda\overline{p}$ correlations, and various lepton-baryon and lepton-baryon-antibaryon correlations. Supersedes ALBRECHT 89K.

[2] ALBRECHT 89K obtain this result by adding their their measurements (5.5 ± 1.6)% for direct protons and (4.2 ± 0.5 ± 0.6)% for inclusive Λ production. They then assume (5.5 ± 1.6)% for neutron production and add it in also. Since each B decay has two baryons, they divide by 2 to obtain (7.6 ± 1.4)%.

$\Gamma(p\overline{p} \text{ anything})/\Gamma_{\text{total}}$ — Γ_{118}/Γ

Includes p and $\overline{p}$ from Λ and $\overline{\Lambda}$ decay.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0247±0.0023 OUR AVERAGE					
0.024 ±0.001 ±0.004		CRAWFORD	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
0.025 ±0.002 ±0.002	918	ALBRECHT	89K	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(p\overline{p} \text{ anything})/\Gamma(p/\overline{p} \text{ anything})$ — $\Gamma_{118}/\Gamma_{110}$

Includes p and $\overline{p}$ from Λ and $\overline{\Lambda}$ decay.

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.30±0.02±0.05	[1] CRAWFORD	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[1] CRAWFORD 92 value is not independent of their $\Gamma(p\overline{p}\text{anything})/\Gamma_{\text{total}}$ value.

$\Gamma(\Lambda\overline{p}/\overline{\Lambda}p \text{ anything})/\Gamma_{\text{total}}$ — Γ_{119}/Γ

Includes p and $\overline{p}$ from Λ and $\overline{\Lambda}$ decay.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.025±0.004 OUR AVERAGE					
0.029±0.005±0.005		CRAWFORD	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
0.023±0.004±0.003	165	ALBRECHT	89K	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(\Lambda\overline{p}/\overline{\Lambda}p \text{ anything})/\Gamma(\Lambda/\overline{\Lambda} \text{ anything})$ — $\Gamma_{119}/\Gamma_{113}$

Includes p and $\overline{p}$ from Λ and $\overline{\Lambda}$ decay.

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.76±0.11±0.08	[1] CRAWFORD	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[1] CRAWFORD 92 value is not independent of their $[\Gamma(\Lambda\overline{p}\text{anything})+\Gamma(\overline{\Lambda}p\text{anything})]/\Gamma_{\text{total}}$ value.

$\Gamma(\Lambda\overline{\Lambda}$ anything$)/\Gamma_{total}$ — Γ_{120}/Γ

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.005	90		CRAWFORD	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.0088	90	12	ALBRECHT	89K	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(\Lambda\overline{\Lambda}$ anything$)/\Gamma(\Lambda/\overline{\Lambda}$ anything$)$ — $\Gamma_{120}/\Gamma_{113}$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.13	90	[1] CRAWFORD	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[1] CRAWFORD 92 value is not independent of their $\Gamma(\Lambda\overline{\Lambda}$anything$)/\Gamma_{total}$ value.

$\Gamma(s e^+ e^-)/\Gamma_{total}$ — Γ_{121}/Γ

Test for $\Delta B = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
6.7 ±1.7 OUR AVERAGE		Error includes scale factor of 2.0.			
$7.69^{+0.82}_{-0.77}{}^{+0.71}_{-0.60}$		[1] LEES	14D	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$4.04\pm1.30^{+0.87}_{-0.83}$		[2] IWASAKI	05	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$6.0 \pm1.7 \pm1.3$		[2] AUBERT,B	04I	BABR	Repl. by LEES 14D
$5.0 \pm2.3 {}^{+1.3}_{-1.1}$		[2] KANEKO	03	BELL	Repl. by IWASAKI 05
< 57	90	GLENN	98	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
<50000	90	BEBEK	81	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[1] Measured from sum of exclusive modes through K^+, $K^+\pi^0$, $K^+\pi^-$, $K^+\pi^-\pi^0$, $K^+\pi^-\pi^+$, K^0_S, $K^0_S\pi^0$, $K^0_S\pi^+$, $K^0_S\pi^+\pi^0$, and $K^0_S\pi+\ \pi^-$ corrected for unobserved modes.

[2] Requires $M_{\ell^+\ell^-} > 0.2$ GeV/c^2.

$\Gamma(s\mu^+\mu^-)/\Gamma_{total}$ — Γ_{122}/Γ

Test for $\Delta B = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
4.3 ±1.0 OUR AVERAGE					
$4.41^{+1.31}_{-1.17}{}^{+0.63}_{-0.50}$		[1] LEES	14D	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$4.13\pm1.05^{+0.85}_{-0.81}$		[2] IWASAKI	05	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$5.0 \pm2.8 \pm1.2$		AUBERT,B	04I	BABR	Repl. by LEES 14D
$7.9 \pm2.1 {}^{+2.1}_{-1.5}$		KANEKO	03	BELL	Repl. by IWASAKI 05
< 58	90	GLENN	98	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
<17000	90	CHADWICK	81	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[1] Measured from sum of exclusive modes through K^+, $K^+\pi^0$, $K^+\pi^-$, $K^+\pi^-\pi^0$, $K^+\pi^-\pi^+$, K^0_S, $K^0_S\pi^0$, $K^0_S\pi^+$, $K^0_S\pi^+\pi^0$, and $K^0_S\pi+\ \pi^-$ corrected for unobserved modes.

[2] Requires $M_{\ell^+\ell^-} > 0.2$ GeV/c^2.

$\left[\Gamma(s e^+ e^-) + \Gamma(s \mu^+ \mu^-)\right]/\Gamma_{total}$ — $(\Gamma_{121}+\Gamma_{122})/\Gamma$

Test for $\Delta B = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<4.2 × 10^{-5}	90	GLENN	98	CLEO	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0024	90	[1] BEAN	87	CLEO	Repl. by GLENN 98
<0.0062	90	[2] AVERY	84	CLEO	Repl. by BEAN 87

[1] BEAN 87 reports $\left[(\mu^+ \mu^-)+(e^+ e^-)\right]/2$ and we converted it.
[2] Determine ratio of B^+ to B^0 semileptonic decays to be in the range 0.25–2.9.

$\Gamma(s \ell^+ \ell^-)/\Gamma_{total}$ — Γ_{123}/Γ

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

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
5.8 ±1.3 OUR AVERAGE Error includes scale factor of 1.8.				
$6.73^{+0.70}_{-0.64}{}^{+0.60}_{-0.56}$	[1] LEES	14D	BABR	$e^+ e^- \to \Upsilon(4S)$
$4.11 \pm 0.83^{+0.85}_{-0.81}$	[2] IWASAKI	05	BELL	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$5.6 \pm 1.5 \pm 1.3$	[3] AUBERT,B	04I	BABR	Repl. by LEES 14D
$6.1 \pm 1.4 ^{+1.4}_{-1.1}$	[3] KANEKO	03	BELL	Repl. by IWASAKI 05

[1] Measured from sum of exclusive modes through K^+, $K^+\pi^0$, $K^+\pi^-$, $K^+\pi^-\pi^0$, $K^+\pi^-\pi^+$, K^0_S, $K^0_S\pi^0$, $K^0_S\pi^+$, $K^0_S\pi^+\pi^0$, and $K^0_S\pi + \pi^-$ corrected for unobserved modes.
[2] Requires $M_{\ell^+\ell^-} > 0.2$ GeV/c^2.
[3] Requires $M_{e^+e^-} > 0.2$ GeV/c^2.

$\Gamma(\pi \ell^+ \ell^-)/\Gamma_{total}$ — Γ_{124}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.9 × 10^{-8}	90	[1] LEES	13M	BABR	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<6.2 \times 10^{-8}$	90	[1] WEI	08A	BELL	$e^+ e^- \to \Upsilon(4S)$
$<9.1 \times 10^{-8}$	90	[1] AUBERT	07AG	BABR	$e^+ e^- \to \Upsilon(4S)$

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

$\Gamma(\pi e^+ e^-)/\Gamma_{total}$ — Γ_{125}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<11.0 × 10^{-8}	90	[1] LEES	13M	BABR	$e^+ e^- \to \Upsilon(4S)$

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

$\Gamma(\pi \mu^+ \mu^-)/\Gamma_{total}$ — Γ_{126}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.0 × 10^{-8}	90	[1] LEES	13M	BABR	$e^+ e^- \to \Upsilon(4S)$

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

$\Gamma(K e^+ e^-)/\Gamma_{total}$ Γ_{127}/Γ

Test for $\Delta B = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
4.4±0.6 OUR AVERAGE					
$3.9^{+0.9}_{-0.8}\pm0.2$		[1] AUBERT	09T	BABR	$e^+e^- \to \Upsilon(4S)$
$4.8^{+0.8}_{-0.7}\pm0.3$		[1] WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$3.3^{+0.9}_{-0.8}\pm0.2$		[1] AUBERT,B	06J	BABR	Repl. by AUBERT 09T
$7.4^{+1.8}_{-1.6}\pm0.5$		[1] AUBERT	03U	BABR	Repl. by AUBERT,B 06J
$4.8^{+1.5}_{-1.3}\pm0.3$		[1,2] ISHIKAWA	03	BELL	Repl. by WEI 09A
<13	90	ABE	02	BELL	Repl. by ISHIKAWA 03

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

[2] The second error is a total of systematic uncertainties including model dependence.

$\Gamma(K^*(892) e^+ e^-)/\Gamma_{total}$ Γ_{128}/Γ

Test for $\Delta B = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
11.9±2.0 OUR AVERAGE Error includes scale factor of 1.2.					
$9.9^{+2.3}_{-2.1}\pm0.6$		[1] AUBERT	09T	BABR	$e^+e^- \to \Upsilon(4S)$
$13.9^{+2.3}_{-2.0}\pm1.2$		[1] WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$9.7^{+3.0}_{-2.7}\pm1.4$		[1] AUBERT,B	06J	BABR	Repl. by AUBERT 09T
$9.8^{+5.0}_{-4.2}\pm1.1$		[1] AUBERT	03U	BABR	Repl. by AUBERT,B 06J
$14.9^{+5.2}_{-4.6}{}^{+1.2}_{-1.3}$		[2] ISHIKAWA	03	BELL	Repl. by WEI 09A
<56	90	ABE	02	BELL	Repl. by ISHIKAWA 03

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

[2] Assumes equal production of B^0 and B^+ at $\Upsilon(4S)$. The second error is a total of systematic uncertainties including model dependence.

$\Gamma(K \mu^+ \mu^-)/\Gamma_{total}$ Γ_{129}/Γ

Test for $\Delta B = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
4.4±0.4 OUR AVERAGE				
$4.2\pm0.4\pm0.2$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$4.1^{+1.3}_{-1.2}\pm0.2$	[1] AUBERT	09T	BABR	$e^+e^- \to \Upsilon(4S)$
$5.0\pm0.6\pm0.3$	[1] WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$3.5^{+1.3}_{-1.1}\pm0.3$	[1] AUBERT,B	06J	BABR	Repl. by AUBERT 09T

$4.5^{+2.3}_{-1.9}\pm0.4$	[1] AUBERT	03U	BABR	Repl. by AUBERT,B 06J
$4.8^{+1.2}_{-1.1}\pm0.4$	[1,2] ISHIKAWA	03	BELL	Repl. by WEI 09A
$9.9^{+4.0}_{-3.2}{}^{+1.3}_{-1.0}$	ABE	02	BELL	Repl. by ISHIKAWA 03

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[2] The second error is a total of systematic uncertainties including model dependence.

$\Gamma(K\mu^+\mu^-)/\Gamma(Ke^+e^-)$ — $\Gamma_{129}/\Gamma_{127}$

VALUE	DOCUMENT ID		TECN	COMMENT
1.01±0.15 OUR AVERAGE				
$1.00^{+0.31}_{-0.25}\pm0.07$	[1] LEES	12S	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$0.96^{+0.44}_{-0.34}\pm0.05$	AUBERT	09T	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$1.03\pm0.19\pm0.06$	WEI	09A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • 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

[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 $\Gamma(B \rightarrow K\mu^+\mu^-)/\Gamma(B \rightarrow Ke^+e^-) = 0.74^{+0.40}_{-0.31} \pm 0.06$ for $0.10 < q^2 < 8.12$ GeV^2/c^4 and $\Gamma(B \rightarrow K\mu^+\mu^-)/\Gamma(B \rightarrow Ke^+e^-) = 1.43^{+0.65}_{-0.44} \pm 0.12$ for $q^2 > 10.11$ GeV^2/c^4.

$\Gamma(K^*(892)\mu^+\mu^-)/\Gamma_{total}$ — Γ_{130}/Γ

Test for $\Delta B = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
10.6±0.9 OUR AVERAGE					
$10.1\pm1.0\pm0.5$		AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$13.5^{+3.5}_{-3.3}\pm1.0$		[1] AUBERT	09T	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$11.0^{+1.6}_{-1.4}\pm0.8$		[1] WEI	09A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$8.8^{+3.5}_{-3.0}\pm1.2$		[1] AUBERT,B	06J	BABR	Repl. by AUBERT 09T
$12.7^{+7.6}_{-6.1}\pm1.6$		[1] AUBERT	03U	BABR	Repl. by AUBERT,B 06J
$11.7^{+3.6}_{-3.1}\pm1.0$		[2] ISHIKAWA	03	BELL	Repl. by WEI 09A
<31	90	ABE	02	BELL	Repl. by ISHIKAWA 03

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[2] Assumes equal production of B^0 and B^+ at $\Upsilon(4S)$. The second error is a total of systematic uncertainties including model dependence.

$\Gamma(K^*(892)\mu^+\mu^-)/\Gamma(K^*(892)e^+e^-)$ — $\Gamma_{130}/\Gamma_{128}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.98±0.15 OUR AVERAGE				
$1.13^{+0.34}_{-0.26}\pm0.10$	[1] LEES	12S	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$1.37^{+0.53}_{-0.40}\pm0.09$	AUBERT	09T	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$0.83\pm0.17\pm0.08$	WEI	09A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

• • • 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

[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.

$\Gamma(K\ell^+\ell^-)/\Gamma_{\text{total}}$ — Γ_{131}/Γ

Test for $\Delta B = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
4.8±0.4 OUR AVERAGE					
$4.7 \pm 0.6 \pm 0.2$		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	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[2] Assumes all four $B \to K\ell^+\ell^-$ modes having equal partial widths in the fit.
[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.
[4] Assumes lepton universality.
[5] The result is for di-lepton masses above 0.5 GeV.

$\Gamma(K^*(892)\ell^+\ell^-)/\Gamma_{\text{total}}$ — Γ_{132}/Γ

Test for $\Delta B = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
10.5±1.0 OUR AVERAGE					
$10.2^{+1.4}_{-1.3} \pm 0.5$		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

$11.5^{+2.6}_{-2.4}\pm0.8$		[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	$e^+e^- \rightarrow \Upsilon(4S)$

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

[2] Assumes the partial width ratio of electron and muon modes to be $\Gamma(B \rightarrow K^*(892)e^+e^-)/\Gamma(B \rightarrow K^*(892)\mu^+\mu^-) = 1.33$.

[3] Assumes equal production rate for charge and neutral B meson pairs, isospin invariance, lepton universality for $B \rightarrow K\ell^+\ell^-$, and $B(B \rightarrow K^*(892)\mu^+\mu^-) = 1.33$. The second error is total systematic uncertainties including model dependence.

[4] For averaging $K^*(892)\mu^+\mu^-$ and $K^*(892)e^+e^-$ modes, AUBERT 02L assumed $B(B \rightarrow K^*(892)e^+e^-)/B(B \rightarrow K^*(892)\mu^+\mu^-) = 1.2$.

[5] The result is for di-lepton masses above 0.5 GeV.

$\Gamma(K\nu\overline{\nu})/\Gamma_{\text{total}}$ — Γ_{133}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.7 \times 10^{-5}$	90	[1,2] LEES	13I	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.4 \times 10^{-5}$	90	[1] DEL-AMO-SA..	10Q	BABR	Repl. by LEES 13I

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

[2] Also reported a limit $< 3.2 \times 10^{-5}$ at 90% CL obtained using a fully reconstructed hadronic B-tag evnets.

$\Gamma(K^*\nu\overline{\nu})/\Gamma_{\text{total}}$ — Γ_{134}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<7.6 \times 10^{-5}$	90	[1,2] LEES	13I	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<8 \times 10^{-5}$	90	AUBERT	08BC	BABR	Repl. by LEES 13I

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

[2] Also reported a limit $< 7.9 \times 10^{-5}$ at 90% CL obtained using a fully reconstructed hadronic B-tag evnets.

$\Gamma(se^\pm\mu^\mp)/\Gamma_{\text{total}}$ — Γ_{135}/Γ

Test for lepton family number conservation. Allowed by higher-order electroweak interactions.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.2 \times 10^{-5}$	90	GLENN	98	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(\pi e^\pm\mu^\mp)/\Gamma_{\text{total}}$ — Γ_{136}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<9.2 \times 10^{-8}$	90	[1] AUBERT	07AG	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.6 \times 10^{-6}$	90	[1] EDWARDS	02B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(\rho e^{\pm}\mu^{\mp})/\Gamma_{total}$ — Γ_{137}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.2 × 10^{-6}	90	[1] EDWARDS	02B	CLE2	$e^+e^- \to \Upsilon(4S)$

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

$\Gamma(K e^{\pm}\mu^{\mp})/\Gamma_{total}$ — Γ_{138}/Γ

Test of lepton family number conservation.

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
< 0.38	90	[1] AUBERT,B	06J	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<16	90	[1] EDWARDS	02B	CLE2	$e^+e^- \to \Upsilon(4S)$

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

$\Gamma(K^*(892) e^{\pm}\mu^{\mp})/\Gamma_{total}$ — Γ_{139}/Γ

Test of lepton family number conservation.

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
< 5.1	90	[1] AUBERT,B	06J	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<62	90	[1] EDWARDS	02B	CLE2	$e^+e^- \to \Upsilon(4S)$

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

CP VIOLATION

A_{CP} is defined as

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

the *CP*-violation charge asymmetry of inclusive $B^{\pm}$ and B^0 decay.

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

VALUE	DOCUMENT ID		TECN	COMMENT
−0.003±0.017 OUR AVERAGE				
−0.003±0.017±0.007	[1] AUBERT	09AO	BABR	$e^+e^- \to \Upsilon(4S)$
−0.015±0.044±0.012	[2] NAKAO	04	BELL	$e^+e^- \to \Upsilon(4S)$
+0.08 ±0.13 ±0.03	[2] COAN	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.013±0.036±0.010	[3] AUBERT,BE	04A	BABR	Repl. by AUBERT 09AO
−0.044±0.076±0.012	[4] AUBERT	02C	BABR	Repl. by AUBERT,BE 04A

[1] Corresponds to a 90% CL interval $-0.033 < A_{CP} < 0.028$.

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

[3] Corresponds to a 90% CL allowed region, $-0.074 < A_{CP} < 0.049$.

[4] A 90% CL range is $-0.170 < A_{CP} < 0.082$.

$A_{CP}(b \to s\gamma)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.015±0.020 OUR AVERAGE				
0.017±0.019±0.010	[1] LEES	14K	BABR	$e^+e^- \to \Upsilon(4S)$
0.002±0.050±0.030	[2] NISHIDA	04	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.011±0.030±0.014	[3] AUBERT	08BJ	BABR	Repl. by LEES 14K
0.025±0.050±0.015	[4] AUBERT,B	04E	BABR	Repl. by AUBERT 08BJ

[1] Measured with 16 exclusively reconstructed $B \to X_s\gamma$ decays with $0.6 < m_{X_s} < 2.0$ GeV/c^2 (ten charged and six neutral self-tagging B modes).

[2] This measurement is performed inclusively for recoil mass X_s less than 2.1 GeV, which corresponds to $-0.093 < A_{CP} < 0.096$ at 90% CL.

[3] Uses a sum of exclusively reconstructed $B \to X_s$ decay modes, with X_s mass between 0.6 and 2.8 GeV/c^2.

[4] Corresponds to $-0.06 < A_{CP} < 0.11$ at 90% CL.

$A_{CP}(b \to (s+d)\gamma)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.010±0.031 OUR AVERAGE				
0.022±0.039±0.009	[1] PESANTEZ	15	BELL	$e^+e^- \to \Upsilon(4S)$
0.057±0.060±0.018	LEES	12V	BABR	$e^+e^- \to \Upsilon(4S)$
−0.10 ±0.18 ±0.05	[2] AUBERT	08O	BABR	$e^+e^- \to \Upsilon(4S)$
−0.110±0.115±0.017	AUBERT,BE	06B	BABR	$e^+e^- \to \Upsilon(4S)$
−0.079±0.108±0.022	[3] COAN	01	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. Uses an opposite side lepton tag. Requires center-of-mass frame $E_\gamma > 2.1$ GeV.

[2] Uses a fully reconstructed B meson as a tag on the recoil side. Requires $E_\gamma > 2.2$ GeV.

[3] Corresponds to $-0.27 < A_{CP} < 0.10$ at 90% CL.

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.04±0.11±0.01	[1] LEES	14D	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.22±0.26±0.02	[2] AUBERT,B	04I	BABR	Repl. by LEES 14D

[1] Measured from sum of exclusive modes through K^+, $K^+\pi^0$, $K^+\pi^-$, $K^+\pi^-\pi^0$, $K^+\pi^-\pi^+$, $K^0_S\pi^+$, and $K^0_S\pi^+\pi^0$.

[2] The final state flavor is determined by the kaon and pion charges where modes with $X_s = K^0_S$, $K^0_S\pi^0$ or $K^0_S\pi^+\pi^-$ are not used.

$A_{CP}(B \to X_s\ell^+\ell^-)$ $(1.0 < q^2 < 6.0$ GeV^2/c$^4)$

VALUE	DOCUMENT ID		TECN	COMMENT
−0.06±0.22±0.01	[1] LEES	14D	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Measured from sum of exclusive modes through K^+, $K^+\pi^0$, $K^+\pi^-$, $K^+\pi^-\pi^0$, $K^+\pi^-\pi^+$, $K^0_S\pi^+$, and $K^0_S\pi^+\pi^0$.

$A_{CP}(B \to X_s \ell^+ \ell^-)$ ($10.1 < q^2 < 12.9$ or $q^2 > 14.2$ GeV$^2/c^4$)

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.19^{+0.18}_{-0.17} \pm 0.01}$	[1] LEES	14D	BABR	$e^+ e^- \to \Upsilon(4S)$

[1] Measured from sum of exclusive modes through K^+, $K^+\pi^0$, $K^+\pi^-$, $K^+\pi^-\pi^0$, $K^+\pi^-\pi^+$, $K^0_S\pi^+$, and $K^0_S\pi +\ (pi-)^0$.

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

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{-0.18 \pm 0.15 \pm 0.01}$	WEI	09A	BELL	$e^+ e^- \to \Upsilon(4S)$

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

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{-0.03 \pm 0.13 \pm 0.02}$	WEI	09A	BELL	$e^+ e^- \to \Upsilon(4S)$

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

VALUE	DOCUMENT ID		TECN	COMMENT
-0.04 ± 0.07 OUR AVERAGE				
$0.03 \pm 0.13 \pm 0.01$	[1] LEES	12S	BABR	$e^+ e^- \to \Upsilon(4S)$
$+0.01^{+0.16}_{-0.15} \pm 0.01$	AUBERT	09T	BABR	$e^+ e^- \to \Upsilon(4S)$
$-0.10 \pm 0.10 \pm 0.01$	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$^2/c^4$.

$A_{CP}(B \to \eta\,\text{anything})$

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{-0.13 \pm 0.04^{+0.02}_{-0.03}}$	[1] NISHIMURA	10	BELL	$e^+ e^- \to \Upsilon(4S)$

[1] Uses $B \to \eta X_s$ with $0.4 < m_{X_s} < 2.6$ GeV/c^2.

$\Delta A_{CP}(X_s\gamma) = A_{CP}(B^\pm \to X_s\gamma) - A_{CP}(B^0 \to X_s\gamma)$

This is the isospin difference of the *CP* asymmetries.

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.050 \pm 0.039 \pm 0.015}$	[1] LEES	14K	BABR	$e^+ e^- \to \Upsilon(4S)$

[1] Measured with 16 exclusively reconstructed $B \to X_s\gamma$ decays with $0.6 < m_{X_s} < 2.0$ GeV/c^2 (ten charged and six neutral self-tagging B modes).

POLARIZATION IN *B* DECAY

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 ($\parallel$) or perpendicular ($\perp$) to each other with the parameters Γ_L/Γ, $\Gamma_\perp/\Gamma$, and the relative phases $\phi_\parallel$ and $\phi_\perp$. See the definitions in the note on "Polarization in B Decays" review in the B^0 Particle Listings.

$F_L(B \to K^* \ell^+ \ell^-)$ (q^2 > 0.1 GeV^2/c^4)

VALUE		DOCUMENT ID		TECN	COMMENT
$0.63^{+0.18}_{-0.19}\pm0.05$	[1]	AUBERT,B	06J	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Results with different q^2 cuts are also reported.

$F_L(B \to K^* \ell^+ \ell^-)$ ($m_{\ell\ell}$ < 2.5 GeV/c^2)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.35\pm0.16\pm0.04$	AUBERT	09N	BABR	$e^+e^- \to \Upsilon(4S)$

$F_L(B \to K^* \ell^+ \ell^-)$ ($m_{\ell\ell}$ > 3.2 GeV/c^2)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.71^{+0.20}_{-0.22}\pm0.04$	AUBERT	09N	BABR	$e^+e^- \to \Upsilon(4S)$

$F_L(B \to K^* \ell^+ \ell^-)$ (0.10 < q^2 < 0.98 GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.263^{+0.045}_{-0.044}\pm0.017$	AAIJ	16B	LHCB	pp at 7, 8 TeV

$F_L(B \to K^* \ell^+ \ell^-)$ (1.1 < q^2 < 2.5 GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.660^{+0.083}_{-0.077}\pm0.022$	AAIJ	16B	LHCB	pp at 7, 8 TeV

$F_L(B \to K^* \ell^+ \ell^-)$ (0.1 < q^2 < 2.0 GeV^2/c^4)

VALUE		DOCUMENT ID		TECN	COMMENT
$0.34^{+0.08}_{-0.07}$ OUR AVERAGE					
$0.37^{+0.10}_{-0.09}{}^{+0.04}_{-0.03}$		AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0}\mu^+\mu^-$
$0.30\pm0.16\pm0.02$		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. • • •					
$0.60^{+0.00}_{-0.28}\pm0.19$	[1]	CHATRCHYAN	13BL	CMS	pp at 7 TeV
$0.00^{+0.13}_{-0.00}\pm0.02$		AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.53^{+0.32}_{-0.34}\pm0.07$		AALTONEN	11L	CDF	Repl. by AALTONEN 12I

[1] CHATRCHYAN 13BL uses, for this bin, $1.0 < q^2 < 2.0$ GeV^2/c^4.

$F_L(B \to K^* \ell^+ \ell^-)$ (2.0 < q^2 < 4.3 GeV^2/c^4)

VALUE		DOCUMENT ID		TECN	COMMENT
0.77 ±0.05 OUR AVERAGE					
$0.876^{+0.109}_{-0.097}\pm0.017$	[1]	AAIJ	16B	LHCB	pp at 7, 8 TeV
$0.80\pm0.08\pm0.06$		KHACHATRY...	16D	CMS	pp at 8 TeV
$0.74^{+0.10}_{-0.09}{}^{+0.02}_{-0.03}$		AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0}\mu^+\mu^-$

$0.65 \pm 0.17 \pm 0.03$	CHATRCHYAN	13BL	CMS	pp at 7 TeV
$0.37 {}^{+0.25}_{-0.24} \pm 0.10$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.71 \pm 0.24 \pm 0.05$	WEI	09A	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.77 \pm 0.15 \pm 0.03$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.40 {}^{+0.32}_{-0.33} \pm 0.08$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

[1] Measured in $2.5 < q^2 < 4.0$ GeV^2/c^4.

$F_L(B \rightarrow K^* \ell^+ \ell^-)$ ($4.0 < q^2 < 6.0$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.611 {}^{+0.052}_{-0.053} \pm 0.017$	AAIJ	16B	LHCB	pp at 7, 8 TeV

$F_L(B \rightarrow K^* \ell^+ \ell^-)$ ($6.0 < q^2 < 8.0$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.579 \pm 0.046 \pm 0.015$	AAIJ	16B	LHCB	pp at 7, 8 TeV

$F_L(B \rightarrow K^* \ell^+ \ell^-)$ ($4.3 < q^2 < 8.6$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
0.64 ± 0.06 OUR AVERAGE				
$0.57 \pm 0.07 \pm 0.03$	AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0} \mu^+ \mu^-$
$0.81 {}^{+0.13}_{-0.12} \pm 0.05$	CHATRCHYAN	13BL	CMS	pp at 7 TeV
$0.68 {}^{+0.15}_{-0.17} \pm 0.09$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.64 {}^{+0.23}_{-0.24} \pm 0.07$	WEI	09A	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.60 {}^{+0.06}_{-0.07} \pm 0.01$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.82 {}^{+0.19}_{-0.23} \pm 0.07$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

$F_L(B \rightarrow K^* \ell^+ \ell^-)$ ($10.09 < q^2 < 12.86$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
0.448 ± 0.033 OUR AVERAGE				
$0.493 {}^{+0.049}_{-0.047} \pm 0.013$	[1] AAIJ	16B	LHCB	pp at 7, 8 TeV
$0.39 \pm 0.05 \pm 0.04$	KHACHATRY...	16D	CMS	pp at 8 TeV
$0.48 {}^{+0.08}_{-0.09} \pm 0.03$	AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0} \mu^+ \mu^-$
$0.45 {}^{+0.10}_{-0.11} \pm 0.04$	CHATRCHYAN	13BL	CMS	pp at 7 TeV
$0.47 \pm 0.14 \pm 0.03$	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. • • •				
$0.41 \pm 0.11 \pm 0.03$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.31 {}^{+0.19}_{-0.18} \pm 0.02$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

[1] Measured in $11.0 < q^2 < 12.5$ GeV^2/c^4.

$F_L(B \to K^* \ell^+ \ell^-)$ ($15.0 < q^2 < 17.0$ GeV^2/c^4)

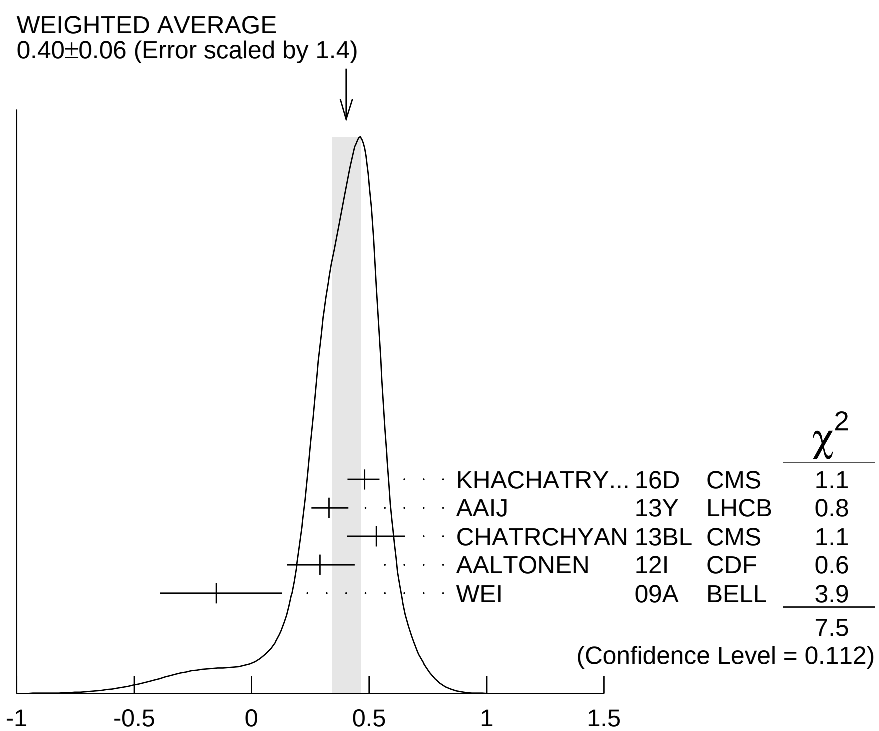
VALUE	DOCUMENT ID		TECN	COMMENT
0.349±0.039±0.009	AAIJ	16B	LHCB	pp at 7, 8 TeV

$F_L(B \to K^* \ell^+ \ell^-)$ ($17.0 < q^2 < 19.0$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.354^{+0.049}_{-0.048}\pm0.025$	AAIJ	16B	LHCB	pp at 7, 8 TeV

$F_L(B \to K^* \ell^+ \ell^-)$ ($14.18 < q^2 < 16.0$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
0.40±0.06 OUR AVERAGE	Error includes scale factor of 1.4. See the ideogram below.			
$0.48^{+0.05}_{-0.06}\pm0.04$	KHACHATRY...	16D	CMS	pp at 8 TeV
$0.33^{+0.08}_{-0.07}{}^{+0.02}_{-0.03}$	AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0}\mu^+\mu^-$
$0.53\pm0.12\pm0.03$	CHATRCHYAN	13BL	CMS	pp at 7 TeV
$0.29^{+0.14}_{-0.13}\pm0.05$	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. • • •				
$0.37\pm0.09\pm0.05$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.55^{+0.17}_{-0.18}\pm0.02$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I



$F_L(B \to K^* \ell^+ \ell^-)$ ($14.18 < q^2 < 16.0$ GeV^2/c^4)

$F_L(B \to K^* \ell^+ \ell^-)$ (16.0 < q^2 < 19.0 GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
0.353±0.024 OUR AVERAGE				
$0.344^{+0.028}_{-0.030}\pm0.008$	[1] AAIJ	16B	LHCB	pp at 7, 8 TeV
$0.38^{+0.05}_{-0.06}\pm0.04$	KHACHATRY...	16D	CMS	pp at 8 TeV
$0.38^{+0.09}_{-0.07}\pm0.03$	AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0}\mu^+\mu^-$
$0.44\pm0.07\pm0.03$	CHATRCHYAN	13BL	CMS	pp at 7 TeV
$0.20^{+0.19}_{-0.17}\pm0.05$	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. • • •				
$0.26^{+0.10}_{-0.08}\pm0.03$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.09^{+0.18}_{-0.14}\pm0.03$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

[1] Measured in $15.0 < q^2 < 19.0$ GeV^2/c^4.

$F_L(B \to K^* \ell^+ \ell^-)$ (1.0 < q^2 < 6.0 GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
0.692±0.030 OUR AVERAGE				
$0.690^{+0.035}_{-0.036}\pm0.017$	[1] AAIJ	16B	LHCB	pp at 7, 8 TeV
0.72 ± 0.06	KHACHATRY...	16D	CMS	pp at 7, 8 TeV
$0.65^{+0.08}_{-0.07}\pm0.03$	AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0}\mu^+\mu^-$
$0.69^{+0.19}_{-0.21}\pm0.08$	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. • • •				
$0.68\pm0.10\pm0.02$	CHATRCHYAN	13BL	CMS	Repl. by KHACHATRYAN 16D
$0.55\pm0.10\pm0.03$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.50^{+0.27}_{-0.30}\pm0.03$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

[1] Measured in $1.1 < q^2 < 6.0$ GeV^2/c^4.

$F_L(B \to K^* \ell^+ \ell^-)$ (0.0 < q^2 < 4.3 GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.33^{+0.14}_{-0.13}\pm0.03}$	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

PARTIAL BRANCHING FRACTIONS IN $B \to K^{(*)}\ell^+\ell^-$

B($B \to K^*\ell^+\ell^-$) ($q^2 < 2.0$ GeV^2/c^4)

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
1.68±0.23 OUR AVERAGE			
$1.89^{+0.52}_{-0.46}\pm0.06$	[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.

B($B \to K^*\ell^+\ell^-$) ($2.0 < q^2 < 4.3$ GeV^2/c^4)

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
0.87±0.17 OUR AVERAGE			
$0.95^{+0.35}_{-0.30}\pm0.04$	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($B \to K^*\ell^+\ell^-$) ($4.3 < q^2 < 8.68$ GeV^2/c^4)

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
1.67±0.29 OUR AVERAGE			
$1.82^{+0.56}_{-0.52}\pm0.09$	[1] LEES 12S	BABR	$e^+e^- \to \Upsilon(4S)$
$1.72\pm0.41\pm0.14$	AALTONEN 11AI	CDF	$p\overline{p}$ at 1.96 TeV
$1.37^{+0.47}_{-0.42}\pm0.39$	WEI 09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$1.69\pm0.57\pm0.15$	AALTONEN 11L	CDF	Repl. by AALTONEN 11AI

[1] The value reported here from LEES 12S refers to $4.3 < q^2 < 8.12$ GeV^2/c^2.

B($B \to K^*\ell^+\ell^-$) ($10.09 < q^2 < 12.86$ GeV^2/c^4)

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
1.93±0.25 OUR AVERAGE			
$1.86^{+0.52}_{-0.48}\pm0.10$	[1] LEES 12S	BABR	$e^+e^- \to \Upsilon(4S)$
$1.77\pm0.34\pm0.11$	AALTONEN 11AI	CDF	$p\overline{p}$ at 1.96 TeV
$2.24^{+0.44}_{-0.40}\pm0.19$	WEI 09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$1.97\pm0.47\pm0.17$	AALTONEN 11L	CDF	Repl. by AALTONEN 11AI

[1] The value reported here from LEES 12S refers to $10.11 < q^2 < 12.89$ GeV^2/c^2.

B($B \to K^*\ell^+\ell^-$) ($14.18 < q^2 < 16.0$ GeV^2/c^4)

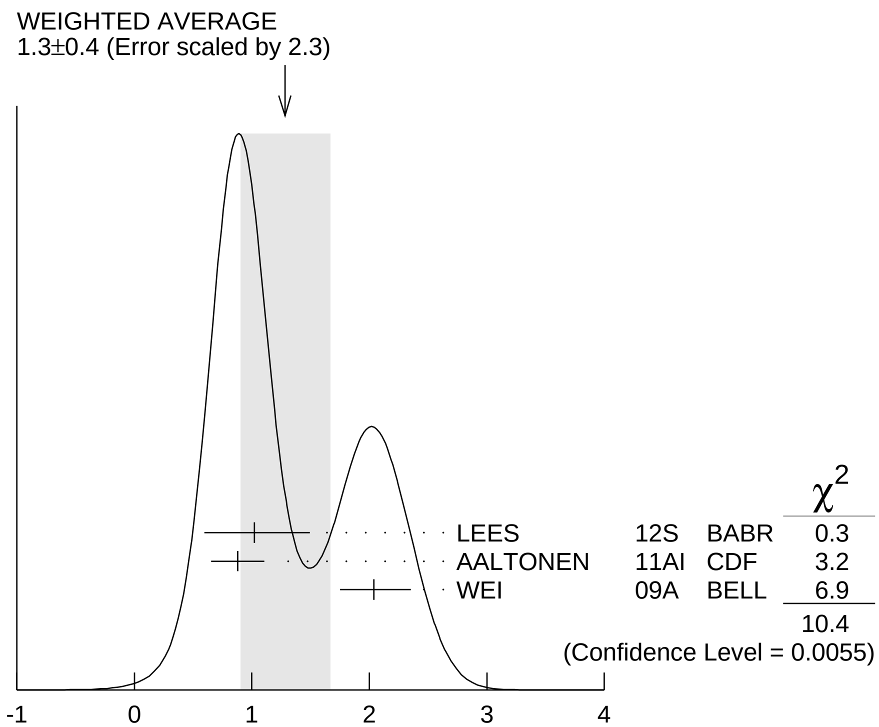
VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
1.21±0.17 OUR AVERAGE			
$1.46^{+0.41}_{-0.36}\pm0.06$	[1] LEES 12S	BABR	$e^+e^- \to \Upsilon(4S)$
$1.21\pm0.24\pm0.07$	AALTONEN 11AI	CDF	$p\overline{p}$ at 1.96 TeV
$1.05^{+0.29}_{-0.26}\pm0.08$	WEI 09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			

$1.51 \pm 0.36 \pm 0.13$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

[1] The value reported here from LEES 12S refers to $14.21 < q^2 < 16.0$ GeV^2/c^2.

B($B \to K^* \ell^+ \ell^-$) (16.0 < q^2 GeV^2/c^4)

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.			
$1.02^{+0.47}_{-0.42} \pm 0.06$	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



B($B \to K^* \ell^+ \ell^-$) (16.0 < q^2 GeV^2/c^4) (units 10^{-7})

B($B \to K^* \ell^+ \ell^-$) (1.0 < q^2 < 6.0 GeV^2/c^4)

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
1.64±0.26 OUR AVERAGE				
$2.05^{+0.53}_{-0.48} \pm 0.07$	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

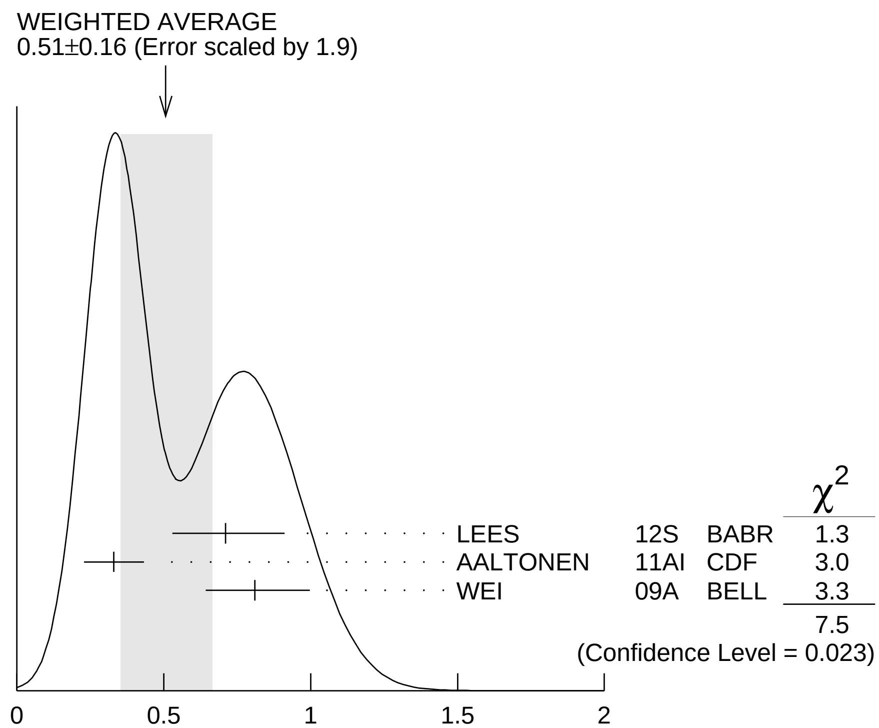
B($B \to K^* \ell^+ \ell^-$) ($0.0 < q^2 < 4.3$ GeV^2/c^4)

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
2.53±0.43±0.15	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.98±0.55±0.18	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

B($B \to K \ell^+ \ell^-$) ($q^2 < 2.0$ GeV^2/c^4)

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.			
$0.71^{+0.20}_{-0.18}\pm0.02$	[1] LEES	12S	BABR	$e^+ e^- \to \Upsilon(4S)$
0.33±0.10±0.02	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±0.16±0.03	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.



B($B \to K \ell^+ \ell^-$) ($q^2 < 2.0$ GeV^2/c^4) (units 10^{-7})

B($B \to K \ell^+ \ell^-$) ($2.0 < q^2 < 4.3$ GeV^2/c^4)

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
$0.57^{+0.10}_{-0.09}$ OUR AVERAGE	Error includes scale factor of 1.2.			
$0.49^{+0.15}_{-0.13}\pm0.01$	LEES	12S	BABR	$e^+ e^- \to \Upsilon(4S)$
0.77±0.14±0.05	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. • • •				

$0.58 \pm 0.19 \pm 0.04$		AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

$B(B \to K \ell^+ \ell^-)$ ($4.3 < q^2 < 8.68$ GeV^2/c^4)

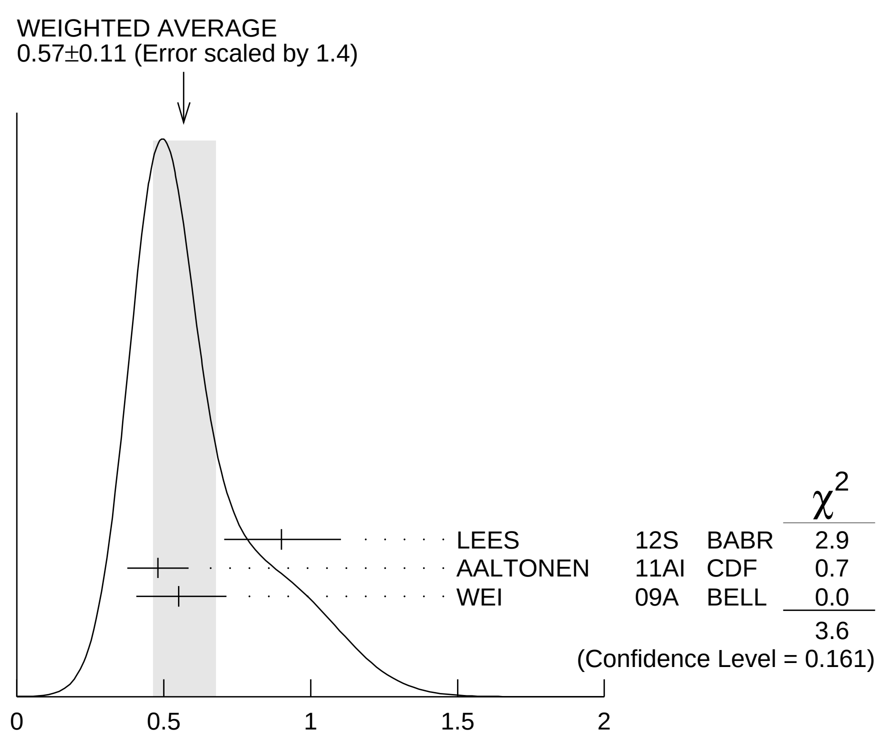
VALUE (units 10^{-7})		DOCUMENT ID		TECN	COMMENT
1.00±0.11 OUR AVERAGE					
$0.94^{+0.20}_{-0.19} \pm 0.02$	[1]	LEES	12S	BABR	$e^+ e^- \to \Upsilon(4S)$
$1.05 \pm 0.17 \pm 0.07$		AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$1.00^{+0.19}_{-0.18} \pm 0.06$		WEI	09A	BELL	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.93 \pm 0.25 \pm 0.06$		AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

[1] The value reported here from LEES 12S refers to $4.3 < q^2 < 8.12$ GeV^2/c^2.

$B(B \to K \ell^+ \ell^-)$ ($10.09 < q^2 < 12.86$ GeV^2/c^4)

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.				
$0.90^{+0.20}_{-0.19} \pm 0.04$	[1]	LEES	12S	BABR	$e^+ e^- \to \Upsilon(4S)$
$0.48 \pm 0.10 \pm 0.03$		AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$0.55^{+0.16}_{-0.14} \pm 0.03$		WEI	09A	BELL	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.72 \pm 0.17 \pm 0.05$		AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

[1] The value reported here from LEES 12S refers to $10.11 < q^2 < 12.89$ GeV^2/c^2.



$B(B \to K \ell^+ \ell^-)$ ($10.09 < q^2 < 12.86$ GeV^2/c^4) (units 10^{-7})

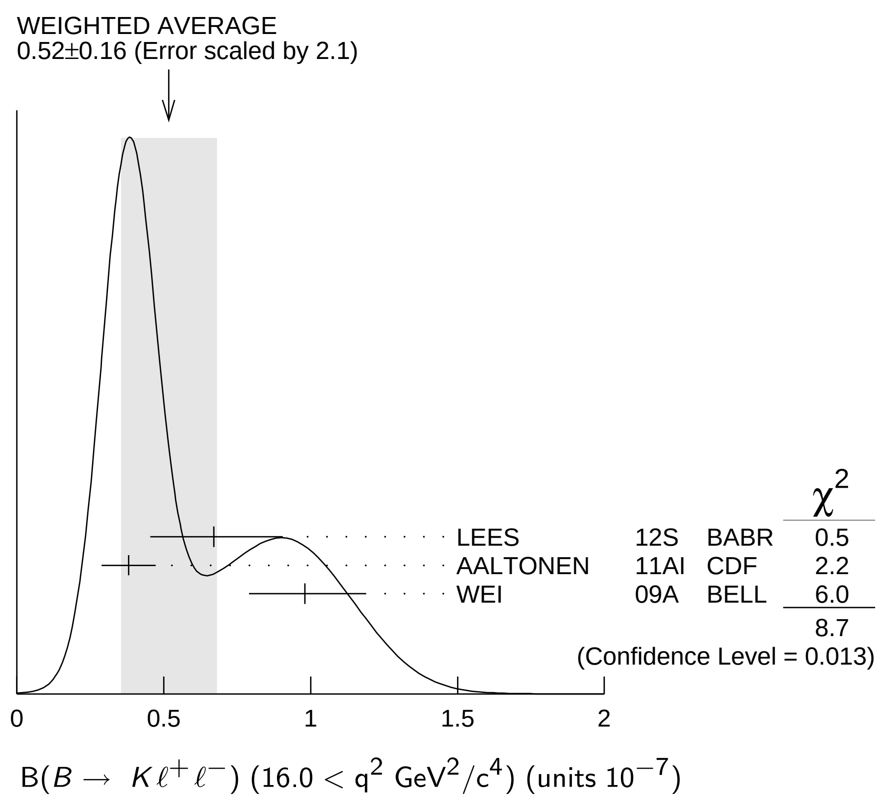
B($B \to K\ell^+\ell^-$) (14.18 < q^2 < 16.0 GeV^2/c^4)

VALUE (units 10^{-7})	*DOCUMENT ID*		*TECN*	*COMMENT*
0.49±0.07 OUR AVERAGE				
$0.49^{+0.15}_{-0.14}\pm0.02$	[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

[1] The value reported here from LEES 12S refers to 14.21 < q^2 < 16.0 GeV^2/c^2.

B($B \to K\ell^+\ell^-$) (16.0 < q^2 GeV^2/c^4)

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.			
$0.67^{+0.23}_{-0.21}\pm0.05$	LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$0.38\pm0.09\pm0.02$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$0.98^{+0.20}_{-0.18}\pm0.06$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.35\pm0.13\pm0.02$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI



B($B \to K\ell^+\ell^-$) ($1.0 < q^2 < 6.0$ GeV^2/c^4)

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
1.33±0.13 OUR AVERAGE				
$1.36^{+0.27}_{-0.24}\pm0.03$	LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$1.29\pm0.18\pm0.08$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$1.36^{+0.23}_{-0.21}\pm0.08$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.01\pm0.26\pm0.07$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

B($B \to K\ell^+\ell^-$) ($0.0 < q^2 < 4.3$ GeV^2/c^4)

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
1.07±0.17±0.07	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.96\pm0.25\pm0.06$	AALTONEN	11L	CDF	Repl. by AALTONEN 11AI

B($B \to X_s\ell^+\ell^-$) ($1.0 < q^2 < 6.0$ GeV^2/c^4)

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
$\mathbf{1.60^{+0.41+0.25}_{-0.39-0.22}}$	[1] LEES	14D	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Measured from sum of exclusive modes through K^+, $K^+\pi^0$, $K^+\pi^-$, $K^+\pi^-\pi^0$, $K^+\pi^-\pi^+$, K^0_S, $K^0_S\pi^0$, $K^0_S\pi^+$, $K^0_S\pi^+\pi^0$, and $K^0_S\pi +\ \pi^-$ corrected for unobserved modes.

B($B \to X_s e^+e^-$) ($1.0 < q^2 < 6.0$ GeV^2/c^4)

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
$\mathbf{1.93^{+0.47+0.28}_{-0.45-0.24}}$	[1] LEES	14D	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Measured from sum of exclusive modes through K^+, $K^+\pi^0$, $K^+\pi^-$, $K^+\pi^-\pi^0$, $K^+\pi^-\pi^+$, K^0_S, $K^0_S\pi^0$, $K^0_S\pi^+$, $K^0_S\pi^+\pi^0$, and $K^0_S\pi +\ \pi^-$ corrected for unobserved modes.

B($B \to X_s\mu^+\mu^-$) ($1.0 < q^2 < 6.0$ GeV^2/c^4)

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.66^{+0.82+0.31}_{-0.76-0.25}}$	[1] LEES	14D	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Measured from sum of exclusive modes through K^+, $K^+\pi^0$, $K^+\pi^-$, $K^+\pi^-\pi^0$, $K^+\pi^-\pi^+$, K^0_S, $K^0_S\pi^0$, $K^0_S\pi^+$, $K^0_S\pi^+\pi^0$, and $K^0_S\pi +\ \pi^-$ corrected for unobserved modes.

B($B \to X_s\ell^+\ell^-$) ($14.2 < q^2$ GeV^2/c^4)

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.57^{+0.16+0.03}_{-0.15-0.02}}$	[1] LEES	14D	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Measured from sum of exclusive modes through K^+, $K^+\pi^0$, $K^+\pi^-$, $K^+\pi^-\pi^0$, $K^+\pi^-\pi^+$, K^0_S, $K^0_S\pi^0$, $K^0_S\pi^+$, $K^0_S\pi^+\pi^0$, and $K^0_S\pi +\ \pi^-$ corrected for unobserved modes.

B($B \to X_s e^+ e^-$) ($14.2 < q^2$ GeV^2/c^4)

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.56^{+0.19}_{-0.18}{}^{+0.03}_{-0.03}}$	[1] LEES	14D	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Measured from sum of exclusive modes through K^+, $K^+\pi^0$, $K^+\pi^-$, $K^+\pi^-\pi^0$, $K^+\pi^-\pi^+$, K^0_S, $K^0_S\pi^0$, $K^0_S\pi^+$, $K^0_S\pi^+\pi^0$, and $K^0_S\pi^+ \pi^-$ corrected for unobserved modes.

B($B \to X_s \mu^+ \mu^-$) ($14.2 < q^2$ GeV^2/c^4)

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.60^{+0.31}_{-0.29}{}^{+0.05}_{-0.04}}$	[1] LEES	14D	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Measured from sum of exclusive modes through K^+, $K^+\pi^0$, $K^+\pi^-$, $K^+\pi^-\pi^0$, $K^+\pi^-\pi^+$, K^0_S, $K^0_S\pi^0$, $K^0_S\pi^+$, $K^0_S\pi^+\pi^0$, and $K^0_S\pi^+ \pi^-$ corrected for unobserved modes.

LEPTON (HADRON) FORWARD-BACKWARD ASYMMETRY IN $B \to K^{(*)}\ell^+\ell^-$ ($B \to K/\pi h^+ h^-$) DECAY

The forward-backward angular asymmetry of the lepton pair in $B \to K^{(*)}\ell^+\ell^-$ ($B \to K/\pi h^+ h^-$) decay is defined as

$$A_{FB}(s) = \frac{N(cos\theta>0)-N(cos\theta<0)}{N(cos\theta>0)+N(cos\theta<0)},$$

where s=q$^2/m^2_B$, and θ is the angle of the ℓ^- (h^-) with respect to the flight direction of the B meson, measured in the dilepton (dihadron) 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.

$A_{FB}(B \to K^*\ell^+\ell^-)$ ($q^2 > 0.1$ GeV^2/c^4)

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
0.50±0.15±0.02		[1] ISHIKAWA	06	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
>0.55	95	[2] AUBERT,B	06J	BABR	$e^+e^- \to \Upsilon(4S)$

[1] Using an unbinned max. likelihood fits to the M$_{bc}$ distribution in five q^2 bins for $\cos\theta > 0$ and $\cos\theta < 0$.
[2] Results with different q^2 cuts are also reported.

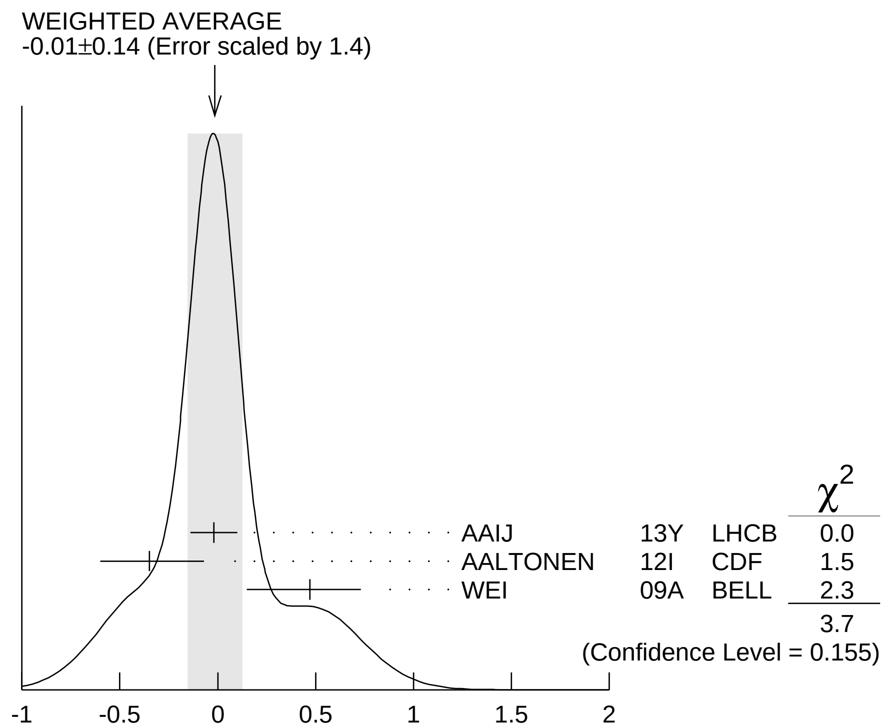
$A_{FB}(B \to K^*\ell^+\ell^-)$ ($0.1 < q^2 < 2.0$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
−0.01±0.14 OUR AVERAGE	Error includes scale factor of 1.4. See the ideogram below.			
−0.02±0.12±0.01	AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0}\mu^+\mu^-$
$-0.35^{+0.26}_{-0.23}\pm0.10$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.47^{+0.26}_{-0.32}\pm0.03$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$-0.29^{+0.37}_{-0.00}\pm0.18$	[1] CHATRCHYAN	13BL	CMS	pp at 7 TeV
$-0.15\pm0.20\pm0.06$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.13^{+1.65}_{-0.75}\pm0.25$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

[1] CHATRCHYAN 13BL uses, for this bin, $1.0 < q^2 < 2.0$ GeV^2/c^4.



$A_{FB}(B \to K^* \ell^+ \ell^-)$ $(0.1 < q^2 < 2.0$ GeV^2/c$^4)$

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($m_{\ell\ell} < 2.5$ GeV/c^2)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.24^{+0.18}_{-0.23}\pm0.05$	AUBERT	09N	BABR	$e^+e^- \to \Upsilon(4S)$

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($m_{\ell\ell} > 3.2$ GeV/c^2)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.76^{+0.52}_{-0.32}\pm0.07$	AUBERT	09N	BABR	$e^+e^- \to \Upsilon(4S)$

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($0.10 < q^2 < 0.98$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$-0.003^{+0.058}_{-0.057}\pm0.009$	AAIJ	16B	LHCB	pp at 7, 8 TeV

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($1.1 < q^2 < 2.5$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$-0.191^{+0.068}_{-0.080}\pm0.012$	AAIJ	16B	LHCB	pp at 7, 8 TeV

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($2.0 < q^2 < 4.3$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
−0.14 ±0.05 OUR AVERAGE				
$-0.118^{+0.082}_{-0.090} \pm 0.007$	[1] AAIJ	16B	LHCB	pp at 7, 8 TeV
$-0.12\ ^{+0.15}_{-0.17}\ \pm 0.05$	KHACHATRY...	16D	CMS	pp at 8 TeV
$-0.20 \pm 0.08 \pm 0.01$	AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0}\mu^+\mu^-$
$-0.07 \pm 0.20 \pm 0.02$	CHATRCHYAN	13BL	CMS	pp at 7 TeV
$0.29\ ^{+0.32}_{-0.35}\ \pm 0.15$	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. • • •				
$0.05\ ^{+0.16}_{-0.20}\ \pm 0.04$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.19\ ^{+0.40}_{-0.41}\ \pm 0.14$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

[1] Measured in $2.5 < q^2 < 4.0$ GeV^2/c^4.

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($0.0 < q^2 < 4.3$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{-0.08^{+0.21}_{-0.20} \pm 0.05}$	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

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($4.0 < q^2 < 6.0$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.025^{+0.051}_{-0.052} \pm 0.004}$	AAIJ	16B	LHCB	pp at 7, 8 TeV

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($6.0 < q^2 < 8.0$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.152^{+0.041}_{-0.040} \pm 0.008}$	AAIJ	16B	LHCB	pp at 7, 8 TeV

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($1.0 < q^2 < 6.0$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
−0.092±0.027 OUR AVERAGE				
$-0.075^{+0.032}_{-0.034} \pm 0.007$	[1] AAIJ	16B	LHCB	pp at 7, 8 TeV
-0.12 ± 0.08	KHACHATRY...	16D	CMS	pp at 7, 8 TeV
$-0.17 \pm 0.06 \pm 0.01$	AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0}\mu^+\mu^-$
$0.29\ ^{+0.20}_{-0.23}\ \pm 0.07$	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. • • •				
$-0.07 \pm 0.12 \pm 0.01$	CHATRCHYAN	13BL	CMS	Repl. by KHACHATRYAN 16D
$-0.06\ ^{+0.13}_{-0.14}\ \pm 0.07$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.43\ ^{+0.36}_{-0.37}\ \pm 0.06$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

[1] Measured in $1.1 < q^2 < 6.0$ GeV^2/c^4.

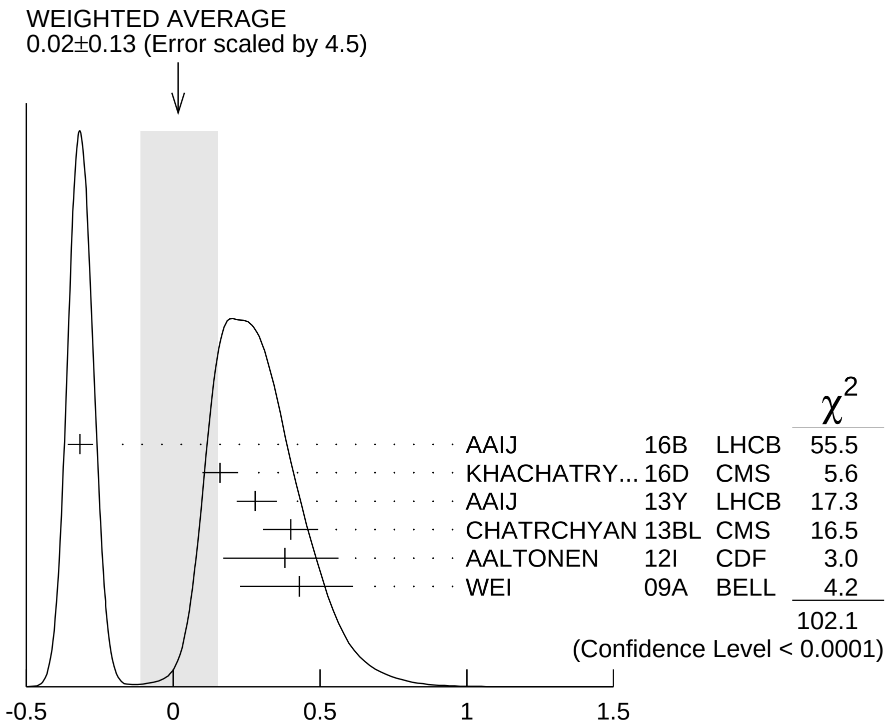
$A_{FB}(B \rightarrow K^* \ell^+ \ell^-)$ ($4.3 < q^2 < 8.6$ GeV^2/c^4)

VALUE	DOCUMENT ID	TECN	COMMENT
$\mathbf{0.13^{+0.06}_{-0.05}}$ **OUR AVERAGE**	Error includes scale factor of 1.1.		
$0.16^{+0.06}_{-0.05} \pm 0.01$	AAIJ 13Y	LHCB	pp at 7 TeV, $K^{*0} \mu^+ \mu^-$
$-0.01 \pm 0.11 \pm 0.03$	CHATRCHYAN 13BL	CMS	pp at 7 TeV
$0.01 \pm 0.20 \pm 0.09$	AALTONEN 12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.45^{+0.15}_{-0.21} \pm 0.15$	WEI 09A	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.27^{+0.06}_{-0.08} \pm 0.02$	AAIJ 12U	LHCB	Repl. by AAIJ 13Y
$-0.06^{+0.30}_{-0.28} \pm 0.05$	AALTONEN 11L	CDF	Repl. by AALTONEN 12I

$A_{FB}(B \rightarrow K^* \ell^+ \ell^-)$ ($10.09 < q^2 < 12.86$ GeV^2/c^4)

VALUE	DOCUMENT ID	TECN	COMMENT
$\mathbf{0.02 \pm 0.13}$ **OUR AVERAGE**	Error includes scale factor of 4.5. See the ideogram below.		
$-0.318^{+0.044}_{-0.040} \pm 0.009$	[1] AAIJ 16B	LHCB	pp at 7, 8 TeV
$0.16 \pm 0.06 \pm 0.01$	KHACHATRY... 16D	CMS	pp at 8 TeV
$0.28^{+0.07}_{-0.06} \pm 0.02$	AAIJ 13Y	LHCB	pp at 7 TeV, $K^{*0} \mu^+ \mu^-$
$0.40 \pm 0.08 \pm 0.05$	CHATRCHYAN 13BL	CMS	pp at 7 TeV
$0.38^{+0.16}_{-0.19} \pm 0.09$	AALTONEN 12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.43^{+0.18}_{-0.20} \pm 0.03$	WEI 09A	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.27^{+0.11}_{-0.13} \pm 0.02$	AAIJ 12U	LHCB	Repl. by AAIJ 13Y
$0.66^{+0.23}_{-0.20} \pm 0.07$	AALTONEN 11L	CDF	Repl. by AALTONEN 12I

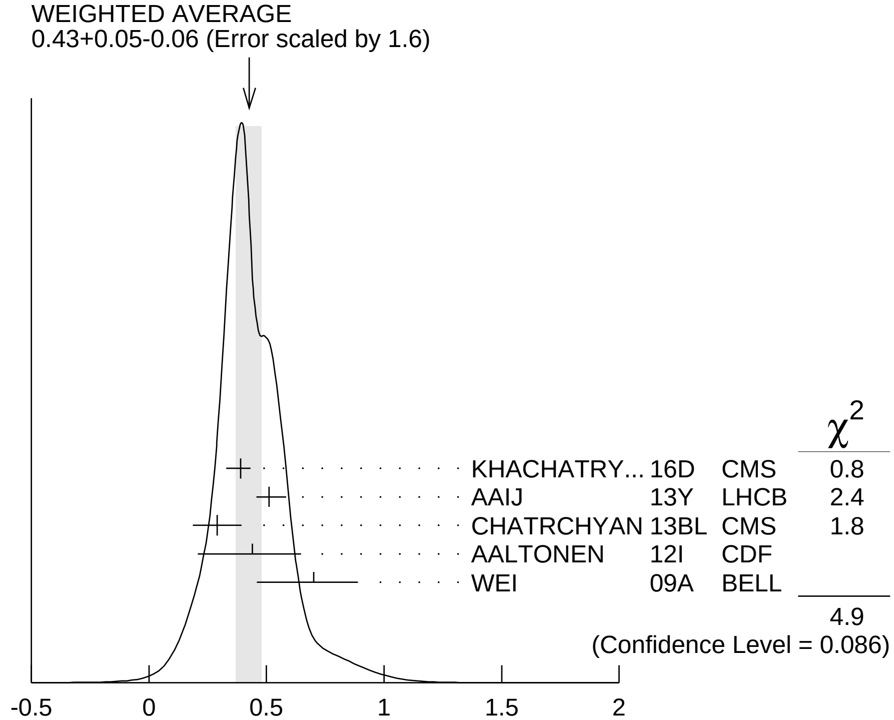
[1] Measured in $11.0 < q^2 < 12.5$ GeV^2/c^4.



$A_{FB}(B \rightarrow K^* \ell^+ \ell^-)$ ($10.09 < q^2 < 12.86$ GeV^2/c^4)

$A_{FB}(B \rightarrow K^* \ell^+ \ell^-)$ ($14.18 < q^2 < 16.0$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.43^{+0.05}_{-0.06}$ OUR AVERAGE	Error includes scale factor of 1.6. See the ideogram below.			
$0.39^{+0.04}_{-0.06} \pm 0.01$	KHACHATRY...	16D	CMS	pp at 8 TeV
$0.51^{+0.07}_{-0.05} \pm 0.02$	AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0} \mu^+ \mu^-$
$0.29 \pm 0.09 \pm 0.05$	CHATRCHYAN	13BL	CMS	pp at 7 TeV
$0.44^{+0.18}_{-0.21} \pm 0.10$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.70^{+0.16}_{-0.22} \pm 0.10$	WEI	09A	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.47^{+0.06}_{-0.08} \pm 0.03$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.42 \pm 0.16 \pm 0.09$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I



$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($14.18 < q^2 < 16.0$ GeV^2/c^4)

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($15.0 < q^2 < 17.0$ GeV^2/c^4)

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
$0.411^{+0.41}_{-0.037} \pm 0.008$	AAIJ	16B	LHCB	pp at 7, 8 TeV

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($17.0 < q^2 < 19.0$ GeV^2/c^4)

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
$0.305^{+0.049}_{-0.048} \pm 0.013$	AAIJ	16B	LHCB	pp at 7, 8 TeV

$A_{FB}(B \to K^* \ell^+ \ell^-)$ ($16.0 < q^2 < 19.0$ GeV^2/c^4)

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
0.367 ± 0.024 OUR AVERAGE	Error includes scale factor of 1.1.			
$0.355 \pm 0.027 \pm 0.009$	[1] AAIJ	16B	LHCB	pp at 7, 8 TeV
$0.35 \pm 0.07 \pm 0.01$	KHACHATRY...	16D	CMS	pp at 8 TeV
$0.30 \pm 0.08 {}^{+0.01}_{-0.02}$	AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0} \mu^+ \mu^-$
$0.41 \pm 0.05 \pm 0.03$	CHATRCHYAN	13BL	CMS	pp at 7 TeV
$0.65 {}^{+0.17}_{-0.18} \pm 0.16$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.66 {}^{+0.11}_{-0.16} \pm 0.04$	WEI	09A	BELL	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.16 {}^{+0.11}_{-0.13} \pm 0.06$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.70 {}^{+0.16}_{-0.25} \pm 0.10$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

[1] Measured in $15.0 < q^2 < 19.0$ GeV^2/c^4.

$A_{FB}(B \to K\ell^+\ell^-)$ ($q^2 > 0.1$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
0.11±0.12 OUR AVERAGE				
$0.15^{+0.21}_{-0.23}\pm0.08$	[1] AUBERT,B	06J	BABR	$e^+e^- \to \Upsilon(4S)$
$0.10\pm0.14\pm0.01$	[2] ISHIKAWA	06	BELL	$e^+e^- \to \Upsilon(4S)$

[1] Results with different q^2 cuts are also reported.
[2] Using an unbinned max. likelihood fits to the M_{bc} distribution in five q^2 bins for $\cos\theta > 0$ and $\cos\theta < 0$.

$A_{FB}(B \to K\ell^+\ell^-)$ ($q^2 < 2.0$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.00^{+0.06}_{-0.05}$ OUR AVERAGE				
$0.00^{+0.06}_{-0.05}{}^{+0.03}_{-0.01}$	AAIJ	13H	LHCB	pp at 7 TeV
$0.13^{+0.42}_{-0.43}\pm0.07$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.06^{+0.32}_{-0.35}\pm0.02$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • 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

$A_{FB}(B \to K\ell^+\ell^-)$ ($2.0 < q^2 < 4.3$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.09^{+0.10}_{-0.07}$ OUR AVERAGE Error includes scale factor of 1.4.				
$0.07^{+0.08}_{-0.05}{}^{+0.02}_{-0.01}$	AAIJ	13H	LHCB	pp at 7 TeV
$0.32^{+0.15}_{-0.16}\pm0.05$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$-0.43^{+0.38}_{-0.40}\pm0.09$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • 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

$A_{FB}(B \to K\ell^+\ell^-)$ ($0.0 < q^2 < 4.3$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
0.31±0.16±0.04	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.36^{+0.24}_{-0.26}\pm0.06$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

$A_{FB}(B \to K\ell^+\ell^-)$ ($1.0 < q^2 < 6.0$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.034^{+0.040}_{-0.029}$ OUR AVERAGE				
$0.02\ {}^{+0.05}_{-0.03}\ {}^{+0.02}_{-0.01}$	AAIJ	13H	LHCB	pp at 7 TeV
$0.13\ \pm0.09\ \pm0.02$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$-0.04\ {}^{+0.13}_{-0.16}\ \pm0.05$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				

$0.08\ ^{+0.27}_{-0.22}\ \pm 0.07$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

$A_{FB}(B \to K\ell^+\ell^-)$ ($4.3 < q^2 < 8.6$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$-0.04^{+0.04}_{-0.05}$ OUR AVERAGE				
$-0.02^{+0.03}_{-0.05}\pm 0.03$	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	$e^+e^- \to \Upsilon(4S)$
• • • 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

$A_{FB}(B \to K\ell^+\ell^-)$ ($10.09 < q^2 < 12.86$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
-0.05 ± 0.06 OUR AVERAGE				
$-0.03\pm 0.07\pm 0.01$	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	$e^+e^- \to \Upsilon(4S)$
• • • 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

$A_{FB}(B \to K\ell^+\ell^-)$ ($14.18 < q^2 < 16.0$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$-0.02^{+0.07}_{-0.05}$ OUR AVERAGE				
$-0.01^{+0.12}_{-0.06}\pm 0.01$	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	$e^+e^- \to \Upsilon(4S)$
• • • 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

$A_{FB}(B \to K\ell^+\ell^-)$ ($16.0 < q^2 < 18.0$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$-0.09^{+0.07}_{-0.09}{}^{+0.02}_{-0.01}$	AAIJ	13H	LHCB	pp at 7 TeV

$A_{FB}(B \to K\ell^+\ell^-)$ ($18.0 < q^2 < 22.0$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.02\pm 0.11\pm 0.01$	AAIJ	13H	LHCB	pp at 7 TeV

$A_{FB}(B \to K \ell^+ \ell^-)$ ($q^2 > 16.0$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.04^{+0.09}_{-0.07}$ OUR AVERAGE				
$0.09^{+0.17}_{-0.13} \pm 0.03$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.02^{+0.11}_{-0.08} \pm 0.02$	WEI	09A	BELL	$e^+ e^- \to \Upsilon(4S)$
• • • 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

$F_S(B \to K \ell^+ \ell^-)$ ($q^2 > 0.1$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.81^{+0.58}_{-0.61} \pm 0.46$	[1] AUBERT,B	06J	BABR	$e^+ e^- \to \Upsilon(4S)$

[1] Results with different q^2 cuts are also reported.

$A_{FB}(B \to K p \overline{p})$ ($m_{p\overline{p}} < 2.85$ GeV/c^2)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.495 \pm 0.012 \pm 0.007$	[1] AAIJ	14AF	LHCB	pp at 7, 8 TeV

[1] Measured in $B^+ \to K^+ p \overline{p}$ decays.

$A_{FB}(B \to \pi p \overline{p})$ ($m_{p\overline{p}} < 2.85$ GeV/c^2)

VALUE	DOCUMENT ID		TECN	COMMENT
$-0.409 \pm 0.033 \pm 0.006$	[1] AAIJ	14AF	LHCB	pp at 7, 8 TeV

[1] Measured in $B^+ \to \pi^+ p \overline{p}$ decays.

ISOSPIN ASYMMETRY

Δ_{0-} is defined as

$$\frac{\Gamma(\overline{B}^0 \to f_d) - \Gamma(B^- \to f_u)}{\Gamma(\overline{B}^0 \to f_d) + \Gamma(B^- \to f_u)},$$

the isospin asymmetry of inclusive neutral and charged B decay.

$\Delta_{0-}(B(B \to X_s \gamma))$

VALUE	DOCUMENT ID		TECN	COMMENT
-0.01 ± 0.06 OUR AVERAGE				
$-0.06 \pm 0.15 \pm 0.07$	[1,2] AUBERT	08O	BABR	$e^+ e^- \to \Upsilon(4S)$
$-0.006 \pm 0.058 \pm 0.026$	AUBERT,B	05R	BABR	$e^+ e^- \to \Upsilon(4S)$

[1] The result is for $E_\gamma > 2.2$ GeV.

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

$\Delta_{0+}(B \to K^*(892)\gamma)$

Δ_{0+} describes the isospin asymmetry between $\Gamma(B^0 \to K^*(892)^0\gamma)$ and $\Gamma(B^+ \to K^*(892)^+\gamma)$.

VALUE	DOCUMENT ID	TECN	COMMENT
0.052±0.026 OUR AVERAGE			
$0.066 \pm 0.021 \pm 0.022$	[1] AUBERT 09AO	BABR	$e^+e^- \to \Upsilon(4S)$
$0.012 \pm 0.044 \pm 0.026$	NAKAO 04	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.050 \pm 0.045 \pm 0.037$	[2] AUBERT,BE 04A	BABR	Repl. by AUBERT 09AO

[1] Uses the production ratio of charged and neutral B from $\Upsilon(4S)$ decays and the lifetime ratio $\tau_{B^+}/\tau_{B^0} = 1.071 \pm 0.009$. The 90% CL interval is $0.017 < \Delta_{0+} < 0.116$

[2] Uses the production ratio of charged and neutral B from $\Upsilon(4S)$ decays $R^{+/0} = 1.006 \pm 0.048$ and the lifetime ratio of $\tau_{B^+} / \tau_{B^0} = 1.083 \pm 0.017$. The 90% CL interval is $-0.046 < \Delta_{0+} < 0.146$.

$\Delta_{\rho\gamma} = \Gamma(B^+ \to \rho^+\gamma) / (2 \cdot \Gamma(B^0 \to \rho^0\gamma)) - 1$

VALUE	DOCUMENT ID	TECN	COMMENT
−0.46±0.17 OUR AVERAGE			
$-0.43^{+0.25}_{-0.22} \pm 0.10$	AUBERT 08BH	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.48^{+0.21}_{-0.19}{}^{+0.08}_{-0.09}$	TANIGUCHI 08	BELL	$e^+e^- \to \Upsilon(4S)$

$\Delta_{0-}(B(B \to K\ell^+\ell^-))$

VALUE	DOCUMENT ID	TECN	COMMENT
−0.13±0.06 OUR AVERAGE Error includes scale factor of 1.1.			
$-0.10^{+0.08}_{-0.09} \pm 0.02$	[1] AAIJ 14M	LHCB	pp at 7, 8 TeV
$-0.09^{+0.08}_{-0.08} \pm 0.02$	[2] AAIJ 14M	LHCB	pp at 7, 8 TeV
$-0.58^{+0.29}_{-0.37} \pm 0.02$	[3] LEES 12S	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.31^{+0.17}_{-0.14} \pm 0.08$	[4] WEI 09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$-0.35^{+0.23}_{-0.27}$	[5] AAIJ 12AH	LHCB	Repl. by AAIJ 14M
$-1.43^{+0.56}_{-0.85} \pm 0.05$	[6,7] AUBERT 09T	BABR	Repl. by LEES 12S

[1] For $1.1 < q^2 < 6.0$ GeV^2/c^4 using $\mu^+\mu^-$ as a lepton pair and assuming isospin symmetry for the $B \to J/\psi(1S)K$. Measurements in other q^2 bins are also reported.

[2] For $15.0 < q^2 < 19.0$ GeV^2/c^4 using $\mu^+\mu^-$ as a lepton pair and assuming isospin symmetry for the $B \to J/\psi(1S)K$. Measurements in other q^2 bins are also reported.

[3] For $0.10 < q^2 < 8.12$ GeV^2/c^4. Measurements in other q^2 bins are also reported.

[4] For $q^2 < 8.68$ GeV^2/c^4.

[5] For $1 < q^2 < 6$ GeV^2/c^4.

[6] For $0.1 < m^2_{\ell^+\ell^-} < 7.02$ GeV^2/c^4.

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

Δ_{0-}(B($B \to K^{*}\ell^{+}\ell^{-}$))

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{-0.03^{+0.08}_{-0.07}}$ **OUR AVERAGE**	Error includes scale factor of 1.2.			
$0.00^{+0.12}_{-0.10}\pm0.02$	[1] AAIJ	14M	LHCB	pp at 7, 8 TeV
$0.06^{+0.10}_{-0.09}\pm0.02$	[2] AAIJ	14M	LHCB	pp at 7, 8 TeV
$-0.25^{+0.20}_{-0.17}\pm0.03$	[3] LEES	12S	BABR	$e^{+}e^{-} \to \Upsilon(4S)$
$-0.29\pm0.16\pm0.09$	[4] WEI	09A	BELL	$e^{+}e^{-} \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
-0.15 ± 0.16	[5] AAIJ	12AH	LHCB	Repl. by AAIJ 14M
$-0.56^{+0.17}_{-0.15}\pm0.03$	[6,7] AUBERT	09T	BABR	Repl. by LEES 12S

[1] For $1.1 < q^2 < 6.0$ GeV^2/c^4 using $\mu^{+}\mu^{-}$ as a lepton pair and assuming isospin symmetry for the B($B \to J/\psi(1S)K^{*}(892)$). Measurements in other q^2 bins are also reported.
[2] For $15.0 < q^2 < 22.0$ GeV^2/c^4 using $\mu^{+}\mu^{-}$ as a lepton pair and assuming isospin symmetry for the B($B \to J/\psi(1S)K^{*}(892)$). Measurements in other q^2 bins are also reported.
[3] For $0.10 < q^2 < 8.12$ GeV^2/c^4. Measurements in other q^2 bins are also reported.
[4] For $q^2 < 8.68$ GeV^2/c^4.
[5] For $1 < q^2 < 6$ GeV^2/c^4.
[6] For $0.1 < m^2_{\ell^{+}\ell^{-}} < 7.02$ GeV^2/c^4.
[7] Assumes equal production of B^{+} and B^{0} at the $\Upsilon(4S)$.

Δ_{0-}(B($B \to K^{(*)}\ell^{+}\ell^{-}$))

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{-0.45\pm0.17}$ **OUR AVERAGE**	Error includes scale factor of 1.7.			
$-0.64^{+0.15}_{-0.14}\pm0.03$	[1,2] AUBERT	09T	BABR	$e^{+}e^{-} \to \Upsilon(4S)$
$-0.30^{+0.12}_{-0.11}\pm0.08$	[3] WEI	09A	BELL	$e^{+}e^{-} \to \Upsilon(4S)$

[1] For $0.1 < m^2_{\ell^{+}\ell^{-}} < 7.02$ GeV^2/c^4.
[2] Assumes equal production of B^{+} and B^{0} at the $\Upsilon(4S)$.
[3] For $q^2 < 8.68$ GeV^2/c^2.

$B \to X_c\ell\nu$ HADRONIC MASS MOMENTS

$\langle M_X^2 - \overline{M}_D^2 \rangle$ (First Moments)

VALUE (GeV^2)	DOCUMENT ID		TECN	COMMENT
0.36 ±0.08 OUR AVERAGE	Error includes scale factor of 1.8.			
$0.467\pm0.038\pm0.068$	[1] ACOSTA	05F	CDF	$p\overline{p}$ at 1.96 TeV
$0.293\pm0.012\pm0.058$	[2] CSORNA	04	CLE2	$e^{+}e^{-} \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.251\pm0.023\pm0.062$	[3] CRONIN-HEN...	01B	CLE2	$e^{+}e^{-} \to \Upsilon(4S)$

[1] Moments are measured with a minimum lepton momentum of 0.7 GeV/c in the B rest frame;
[2] Uses minimum lepton energy of 1.5 GeV and also reports moments with $E_\ell > 1.0$ GeV.
[3] The leptons are required to have $P_\ell > 1.5$ GeV/c.

$\langle M_X^2 \rangle$ (First Moments)

VALUE (GeV^2)	DOCUMENT ID		TECN	COMMENT
4.156±0.029 OUR AVERAGE				
4.144±0.028±0.022	[1] SCHWANDA	07	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
4.18 ±0.04 ±0.03	[1] AUBERT,B	04	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] The leptons are required to have $E_\ell > 1.5$ GeV/c.

$\langle (M_X^2 - \overline{M}_X^2)^2 \rangle$ (Second Moments)

VALUE (GeV^4)	DOCUMENT ID		TECN	COMMENT
0.55 ±0.08 OUR AVERAGE				
0.515±0.061±0.064	[1] SCHWANDA	07	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
0.629±0.031±0.143	[2] CSORNA	04	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.05 ±0.26 ±0.13	[3] ACOSTA	05F	CDF	$p\overline{p}$ at 1.96 TeV
0.576±0.048±0.168	[1] CRONIN-HEN..	01B	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] The leptons are required to have $E_\ell > 1.5$ GeV/c.

[2] Uses minimum lepton energy of 1.5 GeV and also reports moments with $E_\ell > 1.0$ GeV.

[3] Moments are measured with a minimum lepton momentum of 0.7 GeV/c in the B rest frame;

$\langle (M_X^2 - \overline{M}_D^2)^2 \rangle$ (Second Moments)

VALUE (GeV^4)	DOCUMENT ID		TECN	COMMENT
0.639±0.056±0.178	[1] CRONIN-HEN..	01B	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] The leptons are required to have $E_\ell > 1.5$ GeV/c.

$B \rightarrow X_c \ell \nu$ LEPTON MOMENTUM MOMENTS

R_0 ($\Gamma_{E_l > 1.7 GeV}$ / $\Gamma_{E_l > 1.5 GeV}$)

VALUE	DOCUMENT ID		TECN	COMMENT
0.6187±0.0014±0.0016	[1] MAHMOOD	03	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] The leptons are required to have E_l >1.5 GeV in the B rest frame.

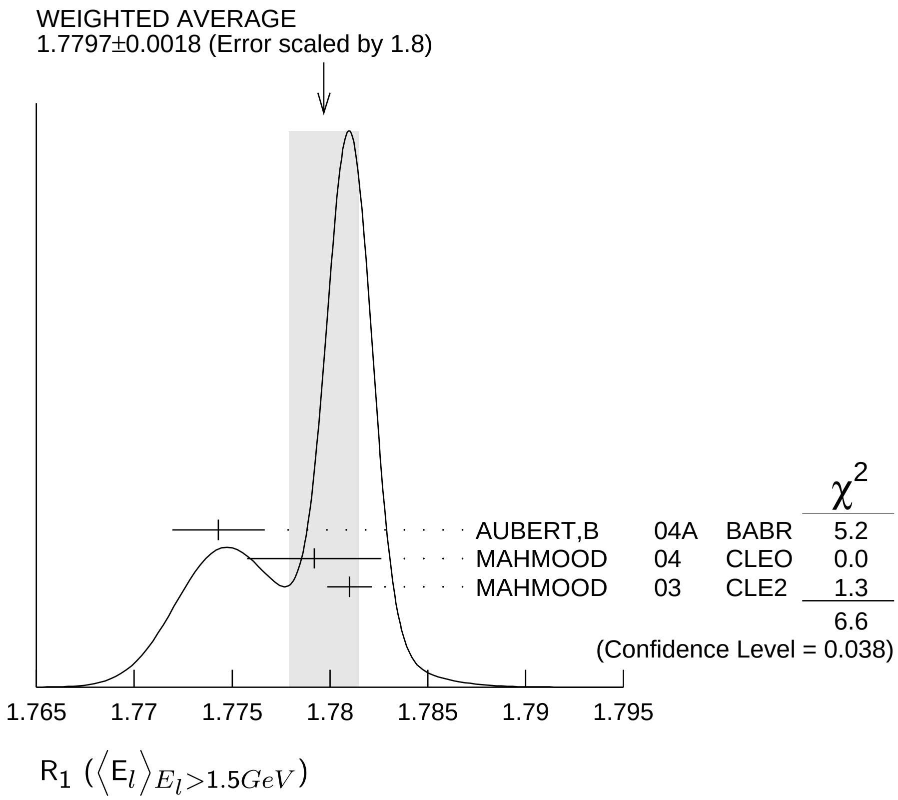
R_1 ($\langle E_l \rangle_{E_l > 1.5 GeV}$)

VALUE	DOCUMENT ID		TECN	COMMENT
1.7797±0.0018 OUR AVERAGE Error includes scale factor of 1.8. See the ideogram below.				
1.7743±0.0019±0.0014	[1] AUBERT,B	04A	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
1.7792±0.0021±0.0027	[2] MAHMOOD	04	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$
1.7810±0.0007±0.0009	[3] MAHMOOD	03	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] The leptons are required to have $E_l > 1.5$ GeV in the B rest frame. The result with $E_l > 0.6$ GeV is also given.

[2] Uses $E_e > 1.5$ GeV and also reports moments with other minimum minimum E_e conditions, as low as $E_e > 0.6$ GeV.

[3] The leptons are required to have E_l >1.5 GeV in the B rest frame.



R_2 ($\langle E_l^2 - \overline{E}_l^2 \rangle_{E_l > 1.5 GeV}$)

VALUE (10^{-3} GeV^2)	DOCUMENT ID		TECN	COMMENT
30.8±0.8 OUR AVERAGE				
30.3±0.9±0.5	[1] AUBERT,B	04A	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
31.6±0.8±1.0	[2] MAHMOOD	04	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] The leptons are required to have $E_l > 1.5$ GeV in the B rest frame. The result with $E_l > 0.6$ GeV is also given.

[2] Uses $E_e > 1.5$ GeV and also reports moments with other minimum minimum E_e conditions, as low as $E_e > 0.6$ GeV.

R_3 ($\langle E_l^3 - \overline{E}_l^3 \rangle_{E_l > 1.5 GeV}$)

VALUE (10^{-3} GeV^3)	DOCUMENT ID		TECN	COMMENT
2.12±0.47±0.20	[1] AUBERT,B	04A	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] The leptons are required to have $E_l > 1.5$ GeV in the B rest frame. The result with $E_l > 0.6$ GeV is also given.

$B \rightarrow X_s \gamma$ PHOTON ENERGY MOMENTS

$\langle E_\gamma \rangle$

VALUE (GeV)	DOCUMENT ID		TECN	COMMENT
2.314±0.011 OUR AVERAGE				
$2.346 \pm 0.018 {}^{+0.027}_{-0.022}$	[1,2] LEES	12U	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
2.304±0.014±0.017	[2,3] LEES	12V	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
2.311±0.009±0.015	[3] LIMOSANI	09	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

$2.289 \pm 0.058 \pm 0.027$	[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 $\mu^2_\pi = 0.257^{+0.034}_{-0.039}$ GeV^2 in the shape function model. The same HQET parameters are also determined in the kinetic model.

[2] Results for different E_γ threshold values are also measured.

[3] The result is for $E_\gamma > 1.9$ GeV.

[4] Uses a fully reconstructed B meson as a tag on the recoil side.

$\langle E^2_\gamma \rangle - \langle E_\gamma \rangle^2$

VALUE (10^{-2} GeV^2)	DOCUMENT ID		TECN	COMMENT
3.03±0.25 OUR AVERAGE				
$2.11 \pm 0.57^{+0.55}_{-0.69}$	[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 $\mu^2_\pi = 0.257^{+0.034}_{-0.039}$ GeV^2 in the shape function model. The same HQET parameters are also determined in the kinetic model.

[2] Results for different E_γ threshold values are also measured.

[3] The result is for $E_\gamma > 1.9$ GeV.

[4] Uses a fully reconstructed B meson as a tag on the recoil side.

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ALBRECHT	92E	PL B277 209	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	92G	ZPHY C54 1	H. Albrecht *et al.*	(ARGUS Collab.)

ALBRECHT	92O	ZPHY C56 1	H. Albrecht *et al.*	(ARGUS Collab.)
BORTOLETTO	92	PR D45 21	D. Bortoletto *et al.*	(CLEO Collab.)
CRAWFORD	92	PR D45 752	G. Crawford *et al.*	(CLEO Collab.)
HENDERSON	92	PR D45 2212	S. Henderson *et al.*	(CLEO Collab.)
LESIAK	92	ZPHY C55 33	T. Lesiak *et al.*	(Crystal Ball Collab.)
ALBRECHT	91C	PL B255 297	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	91H	ZPHY C52 353	H. Albrecht *et al.*	(ARGUS Collab.)
FULTON	91	PR D43 651	R. Fulton *et al.*	(CLEO Collab.)
YANAGISAWA	91	PRL 66 2436	C. Yanagisawa *et al.*	(CUSB II Collab.)
ALBRECHT	90	PL B234 409	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	90H	PL B249 359	H. Albrecht *et al.*	(ARGUS Collab.)
BORTOLETTO	90	PRL 64 2117	D. Bortoletto *et al.*	(CLEO Collab.)
Also		PR D45 21	D. Bortoletto *et al.*	(CLEO Collab.)
FULTON	90	PRL 64 16	R. Fulton *et al.*	(CLEO Collab.)
MASCHMANN	90	ZPHY C46 555	W.S. Maschmann *et al.*	(Crystal Ball Collab.)
PDG	90	PL B239 1	J.J. Hernandez *et al.*	(IFIC, BOST, CIT+)
ALBRECHT	89K	ZPHY C42 519	H. Albrecht *et al.*	(ARGUS Collab.)
ISGUR	89B	PR D39 799	N. Isgur *et al.*	(TNTO, CIT)
WACHS	89	ZPHY C42 33	K. Wachs *et al.*	(Crystal Ball Collab.)
ALBRECHT	88E	PL B210 263	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	88H	PL B210 258	H. Albrecht *et al.*	(ARGUS Collab.)
KOERNER	88	ZPHY C38 511	J.G. Korner, G.A. Schuler	(MANZ, DESY)
ALAM	87	PRL 59 22	M.S. Alam *et al.*	(CLEO Collab.)
ALAM	87B	PRL 58 1814	M.S. Alam *et al.*	(CLEO Collab.)
ALBRECHT	87D	PL B199 451	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	87H	PL B187 425	H. Albrecht *et al.*	(ARGUS Collab.)
BEAN	87	PR D35 3533	A. Bean *et al.*	(CLEO Collab.)
BEHRENDS	87	PRL 59 407	S. Behrends *et al.*	(CLEO Collab.)
BORTOLETTO	87	PR D35 19	D. Bortoletto *et al.*	(CLEO Collab.)
ALAM	86	PR D34 3279	M.S. Alam *et al.*	(CLEO Collab.)
BALTRUSAIT...	86E	PRL 56 2140	R.M. Baltrusaitis *et al.*	(Mark III Collab.)
BORTOLETTO	86	PRL 56 800	D. Bortoletto *et al.*	(CLEO Collab.)
HAAS	86	PRL 56 2781	J. Haas *et al.*	(CLEO Collab.)
ALBRECHT	85H	PL 162B 395	H. Albrecht *et al.*	(ARGUS Collab.)
CSORNA	85	PRL 54 1894	S.E. Csorna *et al.*	(CLEO Collab.)
HAAS	85	PRL 55 1248	J. Haas *et al.*	(CLEO Collab.)
AVERY	84	PRL 53 1309	P. Avery *et al.*	(CLEO Collab.)
CHEN	84	PRL 52 1084	A. Chen *et al.*	(CLEO Collab.)
LEVMAN	84	PL 141B 271	G.M. Levman *et al.*	(CUSB Collab.)
ALAM	83B	PRL 51 1143	M.S. Alam *et al.*	(CLEO Collab.)
GREEN	83	PRL 51 347	J. Green *et al.*	(CLEO Collab.)
KLOPFEN...	83B	PL 130B 444	C. Klopfenstein *et al.*	(CUSB Collab.)
ALTARELLI	82	NP B208 365	G. Altarelli *et al.*	(ROMA, INFN, FRAS)
BRODY	82	PRL 48 1070	A.D. Brody *et al.*	(CLEO Collab.)
GIANNINI	82	NP B206 1	G. Giannini *et al.*	(CUSB Collab.)
BEBEK	81	PRL 46 84	C. Bebek *et al.*	(CLEO Collab.)
CHADWICK	81	PRL 46 88	K. Chadwick *et al.*	(CLEO Collab.)
ABRAMS	80	PRL 44 10	G.S. Abrams *et al.*	(SLAC, LBL)