$B^{\pm}/B^0$ 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]	(10.82 ± 0.15) %	
Γ_4	$D^- \ell^+ \nu_\ell$ anything	[b]	(2.6 ± 0.5) %	
Γ_5	$\overline{D}^0 \ell^+ \nu_\ell$ anything	[b]	(7.2 ± 1.5) %	
Γ_6	$\overline{D} \ell^+ \nu_\ell$		(2.41 ± 0.12) %	
Γ_7	$\overline{D} e^+ \nu_e$		seen	
Γ_8	$\overline{D} \mu^+ \nu_\mu$		seen	
Γ_9	$D^{*-} \ell^+ \nu_\ell$ anything	[c]	(6.7 ± 1.3) $\times 10^{-3}$	
Γ_{10}	$D^{*0} \ell^+ \nu_\ell$ anything			
Γ_{11}	$\overline{D}^* \ell^+ \nu_\ell$	[d]	(4.95 ± 0.11) %	
Γ_{12}	$\overline{D}^* e^+ \nu_e$			
Γ_{13}	$\overline{D}^* \mu^+ \nu_\mu$			
Γ_{14}	$\overline{D}^{**} \ell^+ \nu_\ell$	[b,e]	(2.7 ± 0.7) %	
Γ_{15}	$\overline{D}_1(2420) \ell^+ \nu_\ell$ anything		(3.8 ± 1.3) $\times 10^{-3}$	S=2.4
Γ_{16}	$\overline{D} \pi \ell^+ \nu_\ell$ anything + $\overline{D}^* \pi \ell^+ \nu_\ell$ anything		(2.6 ± 0.5) %	S=1.5
Γ_{17}	$\overline{D} \pi \ell^+ \nu_\ell$ anything		(1.5 ± 0.6) %	

Γ_{18}	$\overline{D}^{*}\pi\ell^{+}\nu_{\ell}$ anything		$(1.9 \pm 0.4)\ \%$	
Γ_{19}	$\overline{D}^{*}_{2}(2460)\ell^{+}\nu_{\ell}$ anything		$(4.4 \pm 1.6) \times 10^{-3}$	
Γ_{20}	$D^{*-}\pi^{+}\ell^{+}\nu_{\ell}$ anything		$(1.00 \pm 0.34)\ \%$	
Γ_{21}	$\overline{D}\pi^{+}\pi^{-}\ell^{+}\nu_{\ell}$		$(1.62 \pm 0.32) \times 10^{-3}$	
Γ_{22}	$\overline{D}^{*}\pi^{+}\pi^{-}\ell^{+}\nu_{\ell}$		$(9.4 \pm 3.2) \times 10^{-4}$	
Γ_{23}	$D_{s}^{-}\ell^{+}\nu_{\ell}$ anything	[b]	$< 7 \times 10^{-3}$	CL=90%
Γ_{24}	$D_{s}^{-}\ell^{+}\nu_{\ell}K^{+}$ anything	[b]	$< 5 \times 10^{-3}$	CL=90%
Γ_{25}	$D_{s}^{-}\ell^{+}\nu_{\ell}K^{0}$ anything	[b]	$< 7 \times 10^{-3}$	CL=90%
Γ_{26}	$X_{c}\ell^{+}\nu_{\ell}$		$(10.63 \pm 0.15)\ \%$	
Γ_{27}	$X_{u}\ell^{+}\nu_{\ell}$		$(1.88 \pm 0.27) \times 10^{-3}$	
Γ_{28}	$X_{u}e^{+}\nu_{e}$		$(1.57 \pm 0.19) \times 10^{-3}$	
Γ_{29}	$X_{u}\mu^{+}\nu_{\mu}$		$(1.62 \pm 0.21) \times 10^{-3}$	
Γ_{30}	$K^{+}\ell^{+}\nu_{\ell}$ anything	[b]	$(6.3 \pm 0.5)\ \%$	
Γ_{31}	$K^{-}\ell^{+}\nu_{\ell}$ anything	[b]	$(10 \pm 4) \times 10^{-3}$	
Γ_{32}	$K^{0}/\overline{K}^{0}\ell^{+}\nu_{\ell}$ anything	[b]	$(4.6 \pm 0.5)\ \%$	
Γ_{33}	$\overline{D}\tau^{+}\nu_{\tau}$		$(8.4 \pm 0.7) \times 10^{-3}$	
Γ_{34}	$\overline{D}^{*}\tau^{+}\nu_{\tau}$		$(1.43 \pm 0.07)\ \%$	

***D*, *D**, or *D*s modes**

Γ_{35}	$D^{\pm}$ anything		$(23.3 \pm 1.2)\ \%$	
Γ_{36}	$D^{0}/\overline{D}^{0}$ anything		$(64.6 \pm 2.0)\ \%$	S=1.5
Γ_{37}	$D^{*}(2010)^{\pm}$ anything		$(22.5 \pm 1.5)\ \%$	
Γ_{38}	$\overline{D}^{*}(2007)^{0}$ anything		$(26.0 \pm 2.7)\ \%$	
Γ_{39}	$D_{s}^{\pm}$ anything	[f]	$(10.6 \pm 0.6)\ \%$	S=1.7
Γ_{40}	$D_{s}^{*\pm}$ anything		$(6.3 \pm 1.0)\ \%$	
Γ_{41}	$D_{s}^{*\pm}\overline{D}^{(*)}$		$(3.4 \pm 0.6)\ \%$	
Γ_{42}	$\overline{D}D_{s0}(2317)$		seen	
Γ_{43}	$\overline{D}D_{sJ}(2457)$		seen	
Γ_{44}	$D^{(*)}\overline{D}^{(*)}K^{0} + D^{(*)}\overline{D}^{(*)}K^{\pm}$	[f,g]	$(7.1 {}^{+2.7}_{-1.7})\ \%$	
Γ_{45}	$b \to c\overline{c}s$		$(22 \pm 4)\ \%$	
Γ_{46}	$D_{s}{}^{(*)}\overline{D}^{(*)}$	[f,g]	$(5.0 \pm 0.4)\ \%$	
Γ_{47}	$D^{*}D^{*}(2010)^{\pm}$	[f]	$< 5.9 \times 10^{-3}$	CL=90%
Γ_{48}	$DD^{*}(2010)^{\pm} + D^{*}D^{\pm}$	[f]	$< 5.5 \times 10^{-3}$	CL=90%
Γ_{49}	$DD^{\pm}$	[f]	$< 3.1 \times 10^{-3}$	CL=90%
Γ_{50}	$D_{s}{}^{(*)\pm}\overline{D}^{(*)}X(n\pi^{\pm})$	[f,g]	$(9 {}^{+5}_{-4})\ \%$	
Γ_{51}	$\overline{D}^{*}(2010)\gamma$		$< 1.1 \times 10^{-3}$	CL=90%
Γ_{52}	$D_{s}^{+}\pi^{-}$, $D_{s}^{*+}\pi^{-}$, $D_{s}^{+}\rho^{-}$, $D_{s}^{*+}\rho^{-}$, $D_{s}^{+}\pi^{0}$, $D_{s}^{*+}\pi^{0}$, $D_{s}^{+}\eta$, $D_{s}^{*+}\eta$, $D_{s}^{+}\rho^{0}$, $D_{s}^{*+}\rho^{0}$, $D_{s}^{+}\omega$, $D_{s}^{*+}\omega$	[f]	$< 4 \times 10^{-4}$	CL=90%
Γ_{53}	$D_{s1}(2536)^{+}$ anything		$< 9.5 \times 10^{-3}$	CL=90%

Charmonium modes

Γ_{54}	$J/\psi(1S)$ anything		(1.094 ± 0.032) %		S=1.1
Γ_{55}	$J/\psi(1S)$(direct) anything		(7.8 ± 0.4) $\times 10^{-3}$		S=1.1
Γ_{56}	$\psi(2S)$ anything		(3.07 ± 0.21) $\times 10^{-3}$		
Γ_{57}	$\chi_{c1}(1P)$ anything		(3.55 ± 0.27) $\times 10^{-3}$		S=1.3
Γ_{58}	$\chi_{c1}(1P)$(direct) anything		(3.09 ± 0.19) $\times 10^{-3}$		
Γ_{59}	$\chi_{c2}(1P)$ anything		(10.0 ± 1.7) $\times 10^{-4}$		S=1.6
Γ_{60}	$\chi_{c2}(1P)$(direct) anything		(7.5 ± 1.1) $\times 10^{-4}$		
Γ_{61}	$\eta_c(1S)$ anything		< 9 $\times 10^{-3}$		CL=90%
Γ_{62}	$K\chi_{c1}(3872)$		(1.9 ± 0.7) $\times 10^{-4}$		
Γ_{63}	$K X(3940)$, $X \to D^{*0} D^0$		< 6.7 $\times 10^{-5}$		CL=90%
Γ_{64}	$K\chi_{c0}(3915)$, $\chi_{c0} \to \omega J/\psi$	[h]	(7.1 ± 3.4) $\times 10^{-5}$		

K or *K** modes

Γ_{65}	$K^{\pm}$ anything	[f]	(78.9 ± 2.5) %		
Γ_{66}	K^{+} anything		(66 ± 5) %		
Γ_{67}	K^{-} anything		(13 ± 4) %		
Γ_{68}	$K^0/\overline{K}^0$ anything	[f]	(64 ± 4) %		
Γ_{69}	$K^*(892)^{\pm}$ anything		(18 ± 6) %		
Γ_{70}	$K^*(892)^0/\overline{K}^*(892)^0$ anything	[f]	(14.6 ± 2.6) %		
Γ_{71}	$K^*(892)\gamma$		(4.10 ± 0.12) $\times 10^{-5}$		
Γ_{72}	$\eta K\gamma$		($8.5^{+1.8}_{-1.6}$) $\times 10^{-6}$		
Γ_{73}	$K_1(1400)\gamma$		< 1.27 $\times 10^{-4}$		CL=90%
Γ_{74}	$K_2^*(1430)\gamma$		($1.7^{+0.6}_{-0.5}$) $\times 10^{-5}$		
Γ_{75}	$K_2(1770)\gamma$		< 1.2 $\times 10^{-3}$		CL=90%
Γ_{76}	$K_3^*(1780)\gamma$		< 3.7 $\times 10^{-5}$		CL=90%
Γ_{77}	$K_4^*(2045)\gamma$		< 1.0 $\times 10^{-3}$		CL=90%
Γ_{78}	$K\eta'(958)$		(8.3 ± 1.1) $\times 10^{-5}$		
Γ_{79}	$K^*(892)\eta'(958)$		(4.1 ± 1.1) $\times 10^{-6}$		
Γ_{80}	$K\eta$		< 5.2 $\times 10^{-6}$		CL=90%
Γ_{81}	$K^*(892)\eta$		(1.8 ± 0.5) $\times 10^{-5}$		
Γ_{82}	$K\phi\phi$		(2.3 ± 0.9) $\times 10^{-6}$		
Γ_{83}	$\overline{b} \to \overline{s}\gamma$		(3.49 ± 0.19) $\times 10^{-4}$		
Γ_{84}	$\overline{b} \to \overline{d}\gamma$		(9.2 ± 3.0) $\times 10^{-6}$		
Γ_{85}	$\overline{b} \to \overline{s}$ gluon		< 6.8 %		CL=90%
Γ_{86}	η anything		($2.6^{+0.5}_{-0.8}$) $\times 10^{-4}$		
Γ_{87}	η' anything		(4.2 ± 0.9) $\times 10^{-4}$		
Γ_{88}	K^{+} gluon (charmless)		< 1.87 $\times 10^{-4}$		CL=90%
Γ_{89}	K^{0} gluon (charmless)		(1.9 ± 0.7) $\times 10^{-4}$		

Light unflavored meson modes

Γ_{90}	$\rho\gamma$		(1.39 ± 0.25) $\times 10^{-6}$		S=1.2
Γ_{91}	$\rho/\omega\gamma$		(1.30 ± 0.23) $\times 10^{-6}$		S=1.2

Γ_{92}	$\pi^{\pm}$ anything		[f,i]	(358 ± 7) %	
Γ_{93}	π^0 anything			(235 ±11) %	
Γ_{94}	η anything			(17.6 ± 1.6) %	
Γ_{95}	ρ^0 anything			(21 ± 5) %	
Γ_{96}	ω anything			< 81 %	CL=90%
Γ_{97}	ϕ anything			(3.43 ± 0.12) %	
Γ_{98}	$\phi K^*(892)$			< 2.2 $\times 10^{-5}$	CL=90%
Γ_{99}	$\overline{b} \to \overline{d}$ gluon				
Γ_{100}	π^+ gluon (charmless)			(3.7 ± 0.8) $\times 10^{-4}$	

Baryon modes

Γ_{101}	Λ_c^+ / $\overline{\Lambda}_c^-$ anything			(3.53 ± 0.34) %	
Γ_{102}	Λ_c^+ anything			< 1.3 %	CL=90%
Γ_{103}	$\overline{\Lambda}_c^-$ anything			< 7 %	CL=90%
Γ_{104}	$\overline{\Lambda}_c^- \ell^+$ anything			< 9 $\times 10^{-4}$	CL=90%
Γ_{105}	$\overline{\Lambda}_c^- e^+$ anything			< 1.8 $\times 10^{-3}$	CL=90%
Γ_{106}	$\overline{\Lambda}_c^- \mu^+$ anything			< – 1.4 $\times 10^{-3}$	CL=90%
Γ_{107}	$\overline{\Lambda}_c^- p$ anything			(2.01 ± 0.31) %	
Γ_{108}	$\overline{\Lambda}_c^- p e^+ \nu_e$			< 8 $\times 10^{-4}$	CL=90%
Γ_{109}	$\overline{\Sigma}_c^{--}$ anything			(3.3 ± 1.7) $\times 10^{-3}$	
Γ_{110}	$\overline{\Sigma}_c^-$ anything			< 8 $\times 10^{-3}$	CL=90%
Γ_{111}	$\overline{\Sigma}_c^0$ anything			(3.6 ± 1.7) $\times 10^{-3}$	
Γ_{112}	$\overline{\Sigma}_c^0 N (N = p$ or $n)$			< 1.1 $\times 10^{-3}$	CL=90%
Γ_{113}	Ξ_c^0 anything, $\Xi_c^0 \to \Xi^- \pi^+$			(1.93 ± 0.30) $\times 10^{-4}$	S=1.1
Γ_{114}	Ξ_c^+, $\Xi_c^+ \to \Xi^- \pi^+ \pi^+$			(4.5 $^{+1.3}_{-1.2}$) $\times 10^{-4}$	
Γ_{115}	$p/\overline{p}$ anything		[f]	(8.0 ± 0.4) %	
Γ_{116}	$p/\overline{p}$ (direct) anything		[f]	(5.5 ± 0.5) %	
Γ_{117}	$\overline{p} e^+ \nu_e$ anything			< 5.9 $\times 10^{-4}$	CL=90%
Γ_{118}	$\Lambda/\overline{\Lambda}$ anything		[f]	(4.0 ± 0.5) %	
Γ_{119}	Λ anything			seen	
Γ_{120}	$\overline{\Lambda}$ anything			seen	
Γ_{121}	$\Xi^- / \overline{\Xi}^+$ anything		[f]	(2.7 ± 0.6) $\times 10^{-3}$	
Γ_{122}	baryons anything			(6.8 ± 0.6) %	
Γ_{123}	$p\overline{p}$ anything			(2.47 ± 0.23) %	
Γ_{124}	$\Lambda\overline{p}/\overline{\Lambda}p$ anything		[f]	(2.5 ± 0.4) %	
Γ_{125}	$\Lambda\overline{\Lambda}$ anything			< 5 $\times 10^{-3}$	CL=90%

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

Γ_{126}	$s e^+ e^-$	B1		(6.7 ± 1.7) $\times 10^{-6}$	S=2.0
Γ_{127}	$s \mu^+ \mu^-$	B1		(4.3 ± 1.0) $\times 10^{-6}$	
Γ_{128}	$s \ell^+ \ell^-$	B1	[b]	(5.8 ± 1.3) $\times 10^{-6}$	S=1.8
Γ_{129}	$\pi \ell^+ \ell^-$	B1		< 5.9 $\times 10^{-8}$	CL=90%

Γ_{130}	$\pi e^+ e^-$	B1		< 1.10	$\times 10^{-7}$	CL=90%
Γ_{131}	$\pi \mu^+ \mu^-$	B1		< 5.0	$\times 10^{-8}$	CL=90%
Γ_{132}	$K e^+ e^-$	B1		(4.4 ± 0.6)	$\times 10^{-7}$	
Γ_{133}	$K^*(892) e^+ e^-$	B1		(1.19 ± 0.20)	$\times 10^{-6}$	S=1.2
Γ_{134}	$K \mu^+ \mu^-$	B1		(4.4 ± 0.4)	$\times 10^{-7}$	
Γ_{135}	$K^*(892) \mu^+ \mu^-$	B1		(1.06 ± 0.09)	$\times 10^{-6}$	
Γ_{136}	$K \ell^+ \ell^-$	B1		(4.8 ± 0.4)	$\times 10^{-7}$	
Γ_{137}	$K^*(892) \ell^+ \ell^-$	B1		(1.05 ± 0.10)	$\times 10^{-6}$	
Γ_{138}	$K \nu \overline{\nu}$	B1		< 1.6	$\times 10^{-5}$	CL=90%
Γ_{139}	$K^* \nu \overline{\nu}$	B1		< 2.7	$\times 10^{-5}$	CL=90%
Γ_{140}	$\pi \nu \overline{\nu}$	B1		< 8	$\times 10^{-6}$	CL=90%
Γ_{141}	$\rho \nu \overline{\nu}$	B1		< 2.8	$\times 10^{-5}$	CL=90%
Γ_{142}	$s e^{\pm} \mu^{\mp}$	LF	[f]	< 2.2	$\times 10^{-5}$	CL=90%
Γ_{143}	$\pi e^{\pm} \mu^{\mp}$	LF		< 9.2	$\times 10^{-8}$	CL=90%
Γ_{144}	$\rho e^{\pm} \mu^{\mp}$	LF		< 3.2	$\times 10^{-6}$	CL=90%
Γ_{145}	$K e^{\pm} \mu^{\mp}$	LF		< 3.8	$\times 10^{-8}$	CL=90%
Γ_{146}	$K^*(892) e^{\pm} \mu^{\mp}$	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 $B(B^0 \to D^{*-} \ell^+ \nu_\ell)$ 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.

VALUE (%)	DOCUMENT ID		TECN	COMMENT
10.82±0.15 OUR EVALUATION	(Produced by HFLAV)			
10.49±0.20 OUR AVERAGE	Error includes scale factor of 1.3. See the ideogram below.			
10.34±0.04±0.26	[1] LEES	17B	BABR	$e^+ e^- \to \Upsilon(4S)$
10.28±0.18±0.24	[2] URQUIJO	07	BELL	$e^+ e^- \to \Upsilon(4S)$
10.91±0.09±0.24	[3] MAHMOOD	04	CLEO	$e^+ e^- \to \Upsilon(4S)$
9.7 ±0.5 ±0.4	[4] ALBRECHT	93H	ARG	$e^+ e^- \to \Upsilon(4S)$

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

9.96±0.19±0.32	[5] AUBERT,B	06Y	BABR	Repl. by LEES 17B
10.85±0.21±0.36	[6] OKABE	05	BELL	Repl. by URQUIJO 07
10.83±0.16±0.06	[7] AUBERT	04X	BABR	Repl. by AUBERT,B 06Y
10.36±0.06±0.23	[8] AUBERT,B	04A	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
10.87±0.18±0.30	[9] AUBERT	03	BABR	Repl. by AUBERT 04X
10.90±0.12±0.49	[10] ABE	02Y	BELL	Repl. by OKABE 05
10.49±0.17±0.43	[11] BARISH	96B	CLE2	Repl. by MAHMOOD 04
10.80±0.20±0.56	[12] HENDERSON	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
10.0 ±0.4 ±0.3	[13] YANAGISAWA	91	CSB2	$e^+e^- \rightarrow \Upsilon(4S)$
10.3 ±0.6 ±0.2	[14] ALBRECHT	90H	ARG	Direct e at $\Upsilon(4S)$
10.0 ±0.6 ±0.2	[15] ALBRECHT	90H	ARG	Direct μ at $\Upsilon(4S)$
11.7 ±0.4 ±1.0	[16] WACHS	89	CBAL	Direct e at $\Upsilon(4S)$
12.0 ±0.7 ±0.5	CHEN	84	CLEO	Direct e at $\Upsilon(4S)$
10.8 ±0.6 ±1.0	CHEN	84	CLEO	Direct μ at $\Upsilon(4S)$
11.2 ±0.9 ±1.0	LEVMAN	84	CUSB	Direct μ at $\Upsilon(4S)$
13.2 ±0.8 ±1.4	[17] KLOPFEN...	83B	CUSB	Direct e at $\Upsilon(4S)$

[1] LEES 17B measurement is obtained from semileptonic decays to electrons. The result is averaged over $B^\pm$ and B^0 mesons, assuming lepton universality.

[2] URQUIJO 07 report a measurement of (10.07 ± 0.18 ± 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.

[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. The best precision on the ratio is achieved for a momentum threshold of 1.0 GeV: B($B^+ \rightarrow e^+\nu_e X$) / B($B^0 \rightarrow e^+\nu_e X$) = 1.074 ± 0.041 ± 0.026.

[6] 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 B($B^+ \rightarrow e^+\nu_e X$)/B($B^0 \rightarrow e^+\nu_e X$) = 1.08 ± 0.05 ± 0.02.

[7] 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.

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

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

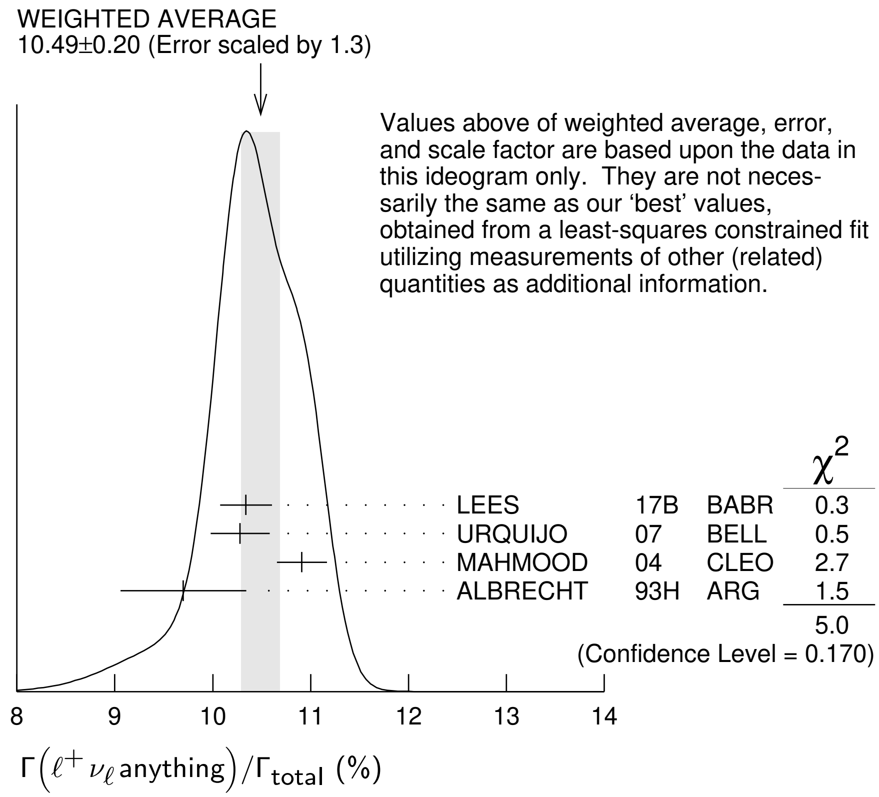
[10] Uses the high-momentum lepton tag method. ABE 02Y also reports $|V_{cb}|$ = 0.0408 ± 0.0010(exp) ±0.0025(theo.). The second error is due to uncertainties of theoretical inputs.

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

[12] 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.

[13] 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.

[14] ALBRECHT 90H uses the model of ALTARELLI 82 to correct over all lepton momenta. 0.099 ± 0.006 is obtained using ISGUR 89B.
[15] ALBRECHT 90H uses the model of ALTARELLI 82 to correct over all lepton momenta. 0.097 ± 0.006 is obtained using ISGUR 89B.
[16] Using data above $p(e) = 2.4$ GeV, WACHS 89 determine $\sigma(B \to e\nu\,\text{up})/\sigma(B \to e\nu\,\text{charm}) < 0.065$ at 90% CL.
[17] Ratio $\sigma(b \to e\nu\,\text{up})/\sigma(b \to e\nu\,\text{charm}) < 0.055$ at CL = 90%.



$\Gamma(e^+\nu_e\,\text{anything})/\Gamma(\mu^+\nu_\mu\,\text{anything})$ — Γ_1/Γ_2

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
1.007±0.005±0.025	[1] HOHMANN	25	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.007±0.009±0.019	[2] AGGARWAL	23	BELL	$e^+e^- \to \Upsilon(4S)$

[1] Measured from the partial branching fractions by extrapolating to the full phase-space via a correction factor of 1.0045 ± 0.0001, extracted from a simulation.
[2] The accompanying B meson is fully reconstructed in its hadronic decay modes. Superseded by by HOHMANN 25.

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

$\ell = e$ or μ.

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

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

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

$\ell = e$ or μ.

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

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

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

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

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

$\Gamma(\overline{D} e^+ \nu_e)/\Gamma(\overline{D} \mu^+ \nu_\mu)$ — Γ_7/Γ_8

VALUE	DOCUMENT ID		TECN	COMMENT
1.020±0.020±0.022	[1] ADACHI	25Y	BELL	$e^+ e^- \to \Upsilon(4S)$

[1] The second B meson from the $\Upsilon(4S)$ decay is not explicitly reconstructed.

$\Gamma(D^{*-} \ell^+ \nu_\ell \text{anything})/\Gamma_{\text{total}}$ — Γ_9/Γ

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

[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_{10}/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)%.

$\Gamma(\overline{D}^* e^+ \nu_e)/\Gamma(\overline{D}^* \mu^+ \nu_\mu)$ — Γ_{12}/Γ_{13}

VALUE	DOCUMENT ID		TECN	COMMENT
0.993±0.023±0.023	[1] PRIM	23	BELL	$e^+ e^- \to \Upsilon(4S)$

[1] This is the lepton-flavor universality ratio $R_{e\mu}$ for the $B^+ \to \overline{D}^{*0} \ell^+ \nu_\ell$ and $B^0 \to D^{*-} \ell^+ \nu_\ell$ average.

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

$\Gamma(\overline{D}_1(2420)\ell^+\nu_\ell \text{anything})/\Gamma_{total}$ — Γ_{15}/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	$e^+e^- \rightarrow Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
seen	[3] BUSKULIC	95B	ALEP	Repl. by BUSKULIC 97B

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

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

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

$\left[\Gamma(\overline{D}\pi\ell^+\nu_\ell \text{anything}) + \Gamma(\overline{D}^*\pi\ell^+\nu_\ell \text{anything})\right]/\Gamma_{total}$ — Γ_{16}/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	$e^+e^- \rightarrow Z$
0.0226±0.0029±0.0033	[2] BUSKULIC	97B	ALEP	$e^+e^- \rightarrow Z$

[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($b \rightarrow B$) = 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.

$\Gamma(\overline{D}\pi\ell^+\nu_\ell \text{anything})/\Gamma_{total}$ — Γ_{17}/Γ

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

$\Gamma(\overline{D}^*\pi\ell^+\nu_\ell \text{anything})/\Gamma_{total}$ — Γ_{18}/Γ

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

$\Gamma(\overline{D}_2^*(2460)\ell^+\nu_\ell \text{anything})/\Gamma_{total}$ — Γ_{19}/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	$e^+e^- \rightarrow Z$
not seen		[3] BUSKULIC	95B	ALEP	$e^+e^- \rightarrow Z$

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

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

[3] BUSKULIC 95B reports f_B × B($B \rightarrow \overline{D}_2^*(2460)^0\ell^+\nu_\ell$ anything) × B($\overline{D}_2^*(2460)^0 \rightarrow \overline{D}^*(2010)^-\pi^+$) $\leq 0.81 \times 10^{-3}$ 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_{20}/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 $f_B = 0.37 \pm 0.03$.

$\Gamma(\overline{D}\pi^+\pi^-\ell^+\nu_\ell)/\Gamma(\overline{D}\ell^+\nu_\ell)$ — Γ_{21}/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.

$\Gamma(\overline{D}^*\pi^+\pi^-\ell^+\nu_\ell)/\Gamma(\overline{D}^*\ell^+\nu_\ell)$ — Γ_{22}/Γ_{11}

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_{23}/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 [$\Gamma(B \to D_s^-\ell^+\nu_\ell$anything$)/\Gamma_{total}$] × [B($D_s^+ \to \phi\pi^+$)] assuming B($D_s^+ \to \phi\pi^+$) = 0.027, which we rescale to our best (shown rounded) value B($D_s^+ \to \phi\pi^+$) = 4.5×10^{-2}.

$\Gamma(D_s^-\ell^+\nu_\ell K^+\text{anything})/\Gamma_{total}$ — Γ_{24}/Γ

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

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

$\Gamma(D_s^-\ell^+\nu_\ell K^0\text{anything})/\Gamma_{total}$ — Γ_{25}/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 [$\Gamma(B \to D_s^-\ell^+\nu_\ell K^0$anything$)/\Gamma_{total}$] × [B($D_s^+ \to \phi\pi^+$)] assuming B($D_s^+ \to \phi\pi^+$) = 0.027, which we rescale to our best (shown rounded) value B($D_s^+ \to \phi\pi^+$) = 4.5×10^{-2}.

$\Gamma(X_c \ell^+ \nu_\ell)/\Gamma_{total}$ — Γ_{26}/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
10.63±0.15 OUR EVALUATION	(Produced by HFLAV)			
10.29±0.19 OUR AVERAGE				
10.18±0.03±0.24	[1] LEES	17B	BABR	$e^+e^- \to \Upsilon(4S)$
10.44±0.19±0.22	[2] URQUIJO	07	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
10.64±0.17±0.06	[3] AUBERT	10A	BABR	Repl. by LEES 17B
10.61±0.16±0.06	[4] AUBERT	04X	BABR	Repl. by AUBERT 10A

[1] The measurement is obtained from semileptonic decays to electrons $B \to X e\nu$, and using a theoretical model (GAMBINO 07, GAMBINO 11) to predict the contribution from $B \to X_u e\nu$. The result is averaged over $B^\pm$ and B^0 mesons, assuming lepton universality.

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

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

[4] 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.

$\Gamma(X_u \ell^+ \nu_\ell)/\Gamma_{total}$ — Γ_{27}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
1.88 ±0.27 OUR EVALUATION	(Produced by HFLAV)			
1.85 ±0.08 ±0.19	[1] CAO	21A	BELL	$e^+e^- \to \Upsilon(4S)$
$1.665\pm0.087^{+0.103}_{-0.094}$	[2] LEES	17B	BABR	$e^+e^- \to \Upsilon(4S)$
2.01 ±0.15 ±0.25	[3] LEES	12R	BABR	$e^+e^- \to \Upsilon(4S)$
2.53 ±0.24 ±0.24	[4] AUBERT,B	05X	BABR	$e^+e^- \to \Upsilon(4S)$
2.80 ±0.52 ±0.41	[5] LIMOSANI	05	BELL	$e^+e^- \to \Upsilon(4S)$
1.77 ±0.29 ±0.38	[6] BORNHEIM	02	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.39 ±0.14 ±0.22	[7] CAO	23	BELL	$e^+e^- \to \Upsilon(4S)$
1.963±0.173±0.159	[8] URQUIJO	10	BELL	Repl. by CAO 21A
1.18 ±0.09 ±0.07	[9] AUBERT	08AS	BABR	Repl. by LEES 12R
$2.27\pm0.26^{+0.37}_{-0.33}$	[10] AUBERT	06H	BABR	Repl. by LEES 17B
2.24 ±0.27 ±0.47	[11,12] AUBERT	04I	BABR	Repl. by AUBERT,B 05X

[1] Measures several partial branching fractions in different phase space regions. The most inclusive result of the full branching fraction is obtained in the region for lepton energy in B rest frame $E^*_\ell > 1$ GeV, where the measured partial branching fraction is $\Delta B = (1.59 \pm 0.07 \pm 0.16) \times 10^{-3}$. The acceptance in that region is reported to be 0.86.

[2] Obtained from the partial rate $\Delta B = (1.554 \pm 0.082^{+0.095}_{-0.086}) \times 10^{-3}$ for the electron momentum interval of 0.8–2.7 GeV/c based on GGOU1 method ($X_c \ell\nu$, m_c constraint fit of SF parameters).

[3] 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.

[4] 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 $(4.41 \pm 0.30^{+0.65}_{-0.47} \pm 0.28) \times 10^{-3}$.

[5] 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 $(5.08 \pm 0.47^{+0.49}_{-0.48}) \times 10^{-3}$.

[6] 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 $(4.08 \pm 0.34 \pm 0.53) \times 10^{-3}$.

[7] Measurement requires lepton energy $E^*_\ell > 1$ GeV in the B rest frame. It is a part of the inclusive and exclusive $|V_{ub}|$ determination.

[8] Uses a multivariate analysis method and requires lepton momentum in the B rest frame, $p^*_\ell > 1.0$ GeV/c.

[9] 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.

[10] 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.

[11] 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.

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

$\Gamma(X_u \ell^+ \nu_\ell)/\Gamma(\ell^+ \nu_\ell \text{anything})$ — Γ_{27}/Γ_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
1.82±0.19 OUR AVERAGE						
1.78±0.15±0.14			[1] HOHMANN	25	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
2.06±0.25±0.42			[2] AUBERT	04I	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
			[3] ALBRECHT	94C	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
		107	[4] BARTELT	93B	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
		77	[5] ALBRECHT	91C	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
		41	[6] ALBRECHT	90	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
		76	[7] FULTON	90	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$
<4.0	90		[8] 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] Derived using the ratio of $\Delta B(B^- \rightarrow X_u \ell \nu)/\Delta B(B^- \rightarrow X_c \ell \nu) = (1.99 \pm 0.17 \pm 0.16) \times 10^{-2}$ with the lepton $p_\ell > 1$ GeV, which covers approximately 86% and 78% of the $B(B^- \rightarrow X_u \ell \nu)$ and $B(B^- \rightarrow X_c \ell \nu)$ phase space.

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

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

[4] 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 $\pm$ 0.006 and 0.076 $\pm$ 0.008, respectively.

[5] ALBRECHT 91C result supersedes ALBRECHT 90. Two events are fully reconstructed providing evidence for the $b \to u$ 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.

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

[7] FULTON 90 observe 76 $\pm$ 20 excess e and μ (lepton) events in the momentum interval p = 2.4–2.6 GeV signaling the presence of the $b \to u$ 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($b \to c \ell \nu$) = 10.2 $\pm$ 0.2 $\pm$ 0.7%.

[8] 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.

$\Gamma(X_u e^+ \nu_e)/\Gamma_{total}$ — Γ_{28}/Γ

Requires E^*_e > 1 GeV, where E^*_e is e^+ energy in B rest frame.

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
1.57±0.10±0.16	[1] CAO	21A	BELL	$e^+ e^- \to \Upsilon(4S)$

[1] The correlation of 53% with B($B \to X_u \mu^+ \nu_\mu$)(letpon energy in B rest frame $E^*_{\mu^+}$ > 1 GeV) is reported.

$\Gamma(X_u \mu^+ \nu_\mu)/\Gamma_{total}$ — Γ_{29}/Γ

Requires E^*_μ > 1 GeV, where E^*_μ is μ^+ energy in B rest frame.

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
1.62±0.10±0.18	[1] CAO	21A	BELL	$e^+ e^- \to \Upsilon(4S)$

[1] The correlation of 53% with B($B \to X_u e^+ \nu_e$)(letpon energy in B rest frame $E^*_{e^+}$ > 1 GeV) is reported.

$\Gamma(K^+ \ell^+ \nu_\ell \text{anything})/\Gamma(\ell^+ \nu_\ell \text{anything})$ — Γ_{30}/Γ_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	$e^+ e^- \to \Upsilon(4S)$
0.54 ±0.07 ±0.06	[1] ALAM	87B	CLEO	$e^+ e^- \to \Upsilon(4S)$

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

$\Gamma(K^- \ell^+ \nu_\ell \text{anything})/\Gamma(\ell^+ \nu_\ell \text{anything})$ — Γ_{31}/Γ_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	$e^+ e^- \to \Upsilon(4S)$
0.10 ±0.05 ±0.02	[1] ALAM	87B	CLEO	$e^+ e^- \to \Upsilon(4S)$

[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_{32}/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	$e^+ e^- \to \Upsilon(4S)$
0.39 ±0.06 ±0.04	[2] ALAM 87B	CLEO	$e^+ e^- \to \Upsilon(4S)$

[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_{33}/Γ_6

VALUE (units 10^{-2})	DOCUMENT ID	TECN	COMMENT
34.7 ± 2.5 OUR EVALUATION	(Produced by HFLAV)		
34.3 ± 2.7 OUR AVERAGE			
33.5 ± 5.2	[1] AAIJ 25G	LHCB	pp at 7, 8, 13 TeV
30.7 ± 3.7±1.6	[2] CARIA 20	BELL	$e^+ e^- \to \Upsilon(4S)$
37.5 ± 6.4±2.6	[3,4] HUSCHLE 15	BELL	$e^+ e^- \to \Upsilon(4S)$
44.0 ± 5.8±4.2	[3,4] LEES 12D	BABR	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
4.16±11.7±5.2	[3] AUBERT 08N	BABR	Repl. by LEES 12D

[1] Combines measurement in $B^0 \to D^- \tau^+ \nu_\tau$ with $\tau^+ \to \mu^+ \nu_\mu \overline{\nu}_\tau$ with results from AAIJ 23AR and AAIJ 23W. Simultaneously extracts also B($B^0 \to D^*(2010)^- \tau^+ \nu_\tau$)/B($B^0 \to D^*(2010)^- \mu^+ \nu_\mu$) and reports correlation factor -0.30.

[2] The tag-side B meson is reconstructed in a semileptonic decay mode and the signal-side τ is reconstructed in a purely leptonic decay. The Belle combination of HUSCHLE 15 and CARIA 20 yields R(D) =(32.6 ± 3.4) × 10^{-2}.

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

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

$\Gamma(\overline{D}^*\tau^+\nu_\tau)/\Gamma(\overline{D}^*\ell^+\nu_\ell)$ — Γ_{34}/Γ_{11}

VALUE (units 10^{-2})	DOCUMENT ID	TECN	COMMENT
28.8±1.2 OUR EVALUATION	(Produced by HFLAV)		
28.8±1.2 OUR AVERAGE			
27.9±1.9	[1] AAIJ 25G	LHCB	pp at 7, 8, 13 TeV
$26.2^{+4.1}_{-3.9}{}^{+3.5}_{-3.2}$	[2] ADACHI 24O	BELL	$e^+ e^- \to \Upsilon(4S)$
28.3±1.8±1.4	[3] CARIA 20	BELL	$e^+ e^- \to \Upsilon(4S)$
$27.0\pm3.5^{+2.8}_{-2.5}$	[4] HIROSE 17	BELL	$e^+ e^- \to \Upsilon(4S)$
29.3±3.8±1.5	[5] HUSCHLE 15	BELL	$e^+ e^- \to \Upsilon(4S)$
33.2±2.4±1.8	[5] LEES 12D	BABR	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
28.1±1.8±2.4	[6] AAIJ 23AR	LHCB	Repl. by AAIJ 25G
29.7±5.6±1.8	[7] AUBERT 08N	BABR	Repl. by LEES 12D

[1] Combines measurement in $B^0 \to D^*(2010)^- \tau^+ \nu_\tau$ with $\tau^+ \to \mu^+ \nu_\mu \overline{\nu}_\tau$ with results from AAIJ 23AR and AAIJ 23W. Simultaneously extracts also B($B^0 \to D^- \tau^+ \nu_\tau$)/B($B^0 \to D^- \mu^+ \nu_\mu$) and reports correlation factor -0.30.

[2] Uses leptonic τ decays and a fully reconstructed B meson in hadronic final states as a tag on the recoil side.

[3] The tag-side B meson is reconstructed in a semileptonic decay mode and the signal-side τ is reconstructed in a purely leptonic decay. The Belle combination of HUSCHLE 15, HIROSE 17, and CARIA 20 yields R(D^*) = 0.238 ± 0.018.

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

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

[6] Uses $\tau^+ \to \mu^+ \nu_\mu \overline{\nu}_\tau$ and μ^+ as ℓ^+. The measurement combines fully reconstructed D^{*+} sample with sample where only D^0 from D^* decays is reconstructed.

[7] 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	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.98±0.16±0.12	[2] ALAM	87B	CLEO	$e^+ e^- \to \Upsilon(4S)$

[1] GIBBONS 97B from charm counting using B($D_s^+ \to \phi\pi$) = 0.036 ± 0.009 and B($\Lambda_c^+ \to p K^- \pi^+$) = 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_{35}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.233±0.012 OUR AVERAGE					
0.232±0.012±0.004		[1] GIBBONS	97B	CLE2	$e^+ e^- \to \Upsilon(4S)$
0.243±0.038±0.004		[2] BORTOLETTO	92	CLEO	$e^+ e^- \to \Upsilon(4S)$
0.224±0.052±0.003		[3] ALBRECHT	91H	ARG	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.204±0.048±0.003	20k	[4] BORTOLETTO	87	CLEO	Sup. by BORTOLETTO 92

[1] GIBBONS 97B reports [$\Gamma(B \to D^\pm \text{anything})/\Gamma_{\text{total}}$] × [B($D^+ \to K^- 2\pi^+$)] = 0.0216 ± 0.0008 ± 0.00082 which we divide by our best (shown rounded) value B($D^+ \to K^- 2\pi^+$) = (9.31 ± 0.14) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

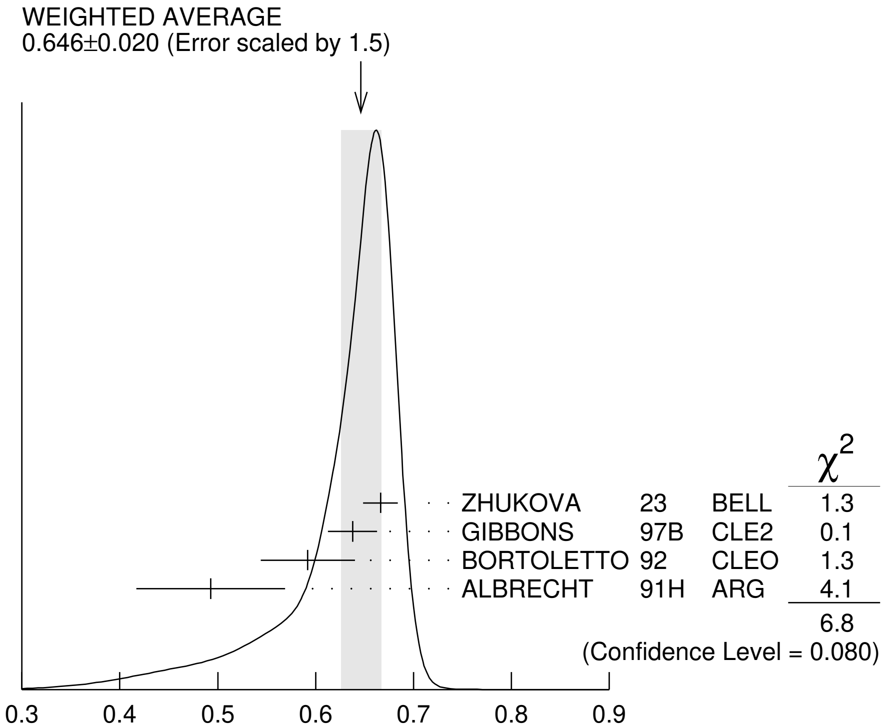
[2] BORTOLETTO 92 reports [$\Gamma(B \to D^\pm \text{anything})/\Gamma_{\text{total}}$] × [B($D^+ \to K^- 2\pi^+$)] = 0.0226 ± 0.0030 ± 0.0018 which we divide by our best (shown rounded) value B($D^+ \to K^- 2\pi^+$) = (9.31 ± 0.14) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

[3] ALBRECHT 91H reports [$\Gamma(B \to D^\pm \text{anything})/\Gamma_{\text{total}}$] × [B($D^+ \to K^- 2\pi^+$)] = 0.0209 ± 0.0027 ± 0.0040 which we divide by our best (shown rounded) value B($D^+ \to K^- 2\pi^+$) = (9.31 ± 0.14) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

[4] BORTOLETTO 87 reports [$\Gamma(B \to D^\pm \text{anything})/\Gamma_{\text{total}}$] × [B($D^+ \to K^- 2\pi^+$)] = 0.019 ± 0.004 ± 0.002 which we divide by our best (shown rounded) value B($D^+ \to K^- 2\pi^+$) = (9.31 ± 0.14) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

$\Gamma(D^0/\overline{D}^0\,\text{anything})/\Gamma_{\text{total}}$ $\quad\Gamma_{36}/\Gamma$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.646 ±0.020 OUR AVERAGE		Error includes scale factor of 1.5. See the ideogram below.			
0.6663±0.0004±0.0177		ZHUKOVA	23	BELL	$e^+e^- \to \Upsilon(4S)$
0.638 ±0.024 ±0.005		[1] GIBBONS	97B	CLE2	$e^+e^- \to \Upsilon(4S)$
0.592 ±0.047 ±0.005		[2] BORTOLETTO	92	CLEO	$e^+e^- \to \Upsilon(4S)$
0.493 ±0.074 ±0.004		[3] ALBRECHT	91H	ARG	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.534 ±0.066 ±0.004	21k	[4] BORTOLETTO	87	CLEO	$e^+e^- \to \Upsilon(4S)$
0.610 ±0.183 ±0.005		[5] GREEN	83	CLEO	Repl. by BORTOLETTO 87



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

[1] GIBBONS 97B reports $[\Gamma(B \to D^0/\overline{D}^0\,\text{anything})/\Gamma_{\text{total}}] \times [B(D^0 \to K^-\pi^+)] = 0.0251 \pm 0.0006 \pm 0.00075$ which we divide by our best (shown rounded) value $B(D^0 \to K^-\pi^+) = (3.936 \pm 0.030) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

[2] BORTOLETTO 92 reports $[\Gamma(B \to D^0/\overline{D}^0\,\text{anything})/\Gamma_{\text{total}}] \times [B(D^0 \to K^-\pi^+)] = 0.0233 \pm 0.0012 \pm 0.0014$ which we divide by our best (shown rounded) value $B(D^0 \to K^-\pi^+) = (3.936 \pm 0.030) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

[3] ALBRECHT 91H reports $[\Gamma(B \to D^0/\overline{D}^0\,\text{anything})/\Gamma_{\text{total}}] \times [B(D^0 \to K^-\pi^+)] = 0.0194 \pm 0.0015 \pm 0.0025$ which we divide by our best (shown rounded) value $B(D^0 \to K^-\pi^+) = (3.936 \pm 0.030) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

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

$K^- \pi^+) = (3.936 \pm 0.030) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

[5] GREEN 83 reports $[\Gamma(B \to D^0/\overline{D}^0 \text{anything})/\Gamma_{\text{total}}] \times [B(D^0 \to K^- \pi^+)] = 0.024 \pm 0.006 \pm 0.004$ which we divide by our best (shown rounded) value $B(D^0 \to K^- \pi^+) = (3.936 \pm 0.030) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

$\Gamma(D^- \ell^+ \nu_\ell \text{anything})/\Gamma(\overline{D}^0 \ell^+ \nu_\ell \text{anything})$ — Γ_4/Γ_5

VALUE	DOCUMENT ID		TECN	COMMENT
0.359±0.006±0.009	[1] AAIJ	19AD	LHCB	pp at 13 TeV

[1] AAIJ 19AD uses $D^0 \to K^- \pi^+$ and $D^+ \to K^- \pi^+ \pi^+$ modes.

$\Gamma(D^*(2010)^\pm \text{anything})/\Gamma_{\text{total}}$ — Γ_{37}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.225±0.015 OUR AVERAGE					
0.247±0.019±0.01		[1] GIBBONS	97B	CLE2	$e^+ e^- \to \Upsilon(4S)$
0.205±0.019±0.007		[2] ALBRECHT	96D	ARG	$e^+ e^- \to \Upsilon(4S)$
0.230±0.028±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±0.053±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 $B(B \to D^*(2010)^+ \text{anything}) = 0.25 \pm 0.03 \pm 0.04$ using MARK II $B(D^*(2010)^+ \to D^0 \pi^+) = 0.57 \pm 0.06$ and $B(D^0 \to K^- \pi^+) = 0.042 \pm 0.008$. 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 $0.348 \pm 0.060 \pm 0.035$ from a measurement of $[\Gamma(B \to D^*(2010)^\pm \text{anything})/\Gamma_{\text{total}}] \times [B(D^*(2010)^+ \to D^0 \pi^+)]$ assuming $B(D^*(2010)^+ \to D^0 \pi^+) = 0.55 \pm 0.04$, which we rescale to our best (shown rounded) value $B(D^*(2010)^+ \to D^0 \pi^+) = (67.7 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value. Uses the PDG 90 $B(D^0 \to K^- \pi^+) = 0.0371 \pm 0.0025$.

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

[6] $V-A$ momentum spectrum used to extrapolate below $p = 1$ GeV. We correct the value assuming $B(D^0 \to K^- \pi^+) = 0.042 \pm 0.006$ and $B(D^{*+} \to D^0 \pi^+) = 0.6^{+0.08}_{-0.15}$. The

product branching fraction is B($B \to D^{*+}$X)·B($D^{*+} \to \pi^+ D^0$)·B($D^0 \to K^- \pi^+$) $= (68 \pm 15 \pm 9) \times 10^{-4}$.

$\Gamma(\overline{D}^*(2007)^0$ anything$)/\Gamma_{total}$ Γ_{38}/Γ

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

[1] GIBBONS 97B reports B($B \to D^*(2007)^0$ anything) $0.247 \pm 0.012 \pm 0.018 \pm 0.018$ 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$)/\Gamma_{total}$ Γ_{39}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.106 ±0.006 OUR AVERAGE		Error includes scale factor of 1.7. See the ideogram below.			
0.1128±0.0003±0.0043		ZHUKOVA	23	BELL	$e^+e^- \to \Upsilon(4S)$
0.089 ±0.010 ±0.008		[1] ARTUSO	05B	CLE2	$e^+e^- \to \Upsilon(5S)$
0.087 ±0.005 ±0.008		[2] AUBERT	02G	BABR	$e^+e^- \to \Upsilon(4S)$
0.065 ±0.011 ±0.006		[3] ALBRECHT	92G	ARG	$e^+e^- \to \Upsilon(4S)$
0.068 ±0.010 ±0.006	257	[4] BORTOLETTO	90	CLEO	$e^+e^- \to \Upsilon(4S)$
0.085 ±0.022 ±0.008		[5] HAAS	86	CLEO	$e^+e^- \to \Upsilon(4S)$
• • • 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	$e^+e^- \to \Upsilon(4S)$

[1] ARTUSO 05B reports $0.0905 \pm 0.0025 \pm 0.0140$ from a measurement of [$\Gamma(B \to D_s^{\pm}$ anything$)/\Gamma_{total}$] × [B($D_s^+ \to \phi\pi^+$)] assuming B($D_s^+ \to \phi\pi^+$) $= (4.4 \pm 0.5) \times 10^{-2}$, which we rescale to our best (shown rounded) 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 (shown rounded) value.

[2] AUBERT 02G reports [$\Gamma(B \to D_s^{\pm}$ anything$)/\Gamma_{total}$] × [B($D_s^+ \to \phi\pi^+$)] $= 0.00393 \pm 0.00007 \pm 0.00021$ which we divide by our best (shown rounded) 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 (shown rounded) value.

[3] ALBRECHT 92G reports [$\Gamma(B \to D_s^{\pm}$ anything$)/\Gamma_{total}$] × [B($D_s^+ \to \phi\pi^+$)] $= 0.00292 \pm 0.00039 \pm 0.00031$ which we divide by our best (shown rounded) 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 (shown rounded) value.

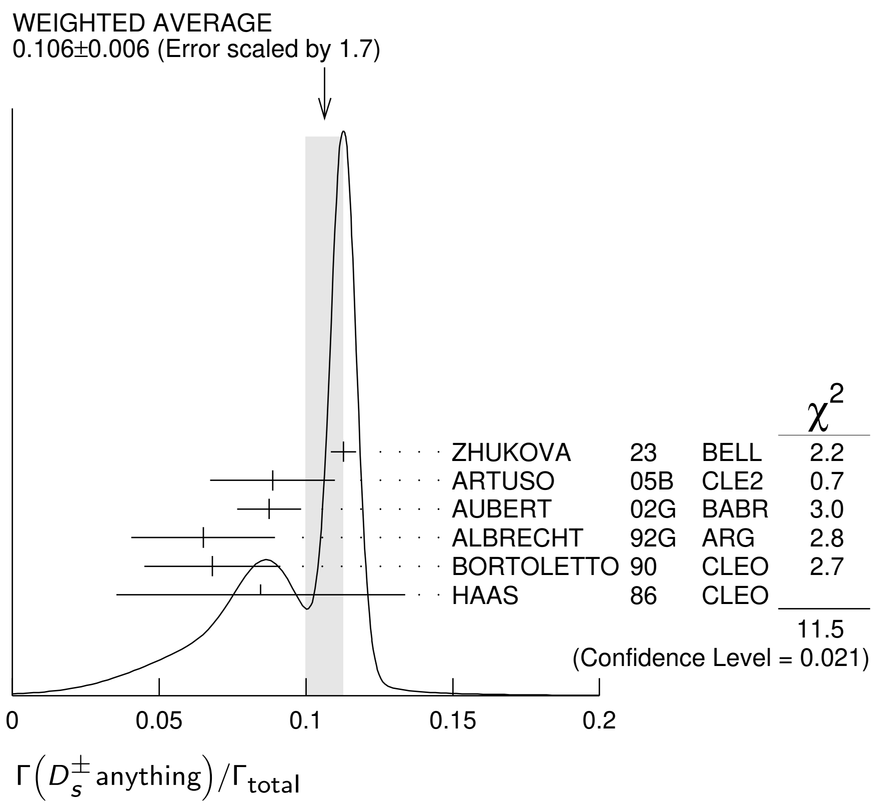
[4] BORTOLETTO 90 reports [$\Gamma(B \to D_s^{\pm}$ anything$)/\Gamma_{total}$] × [B($D_s^+ \to \phi\pi^+$)] $= 0.00306 \pm 0.00047$ which we divide by our best (shown rounded) value B($D_s^+ \to \phi\pi^+$) $= (4.5 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second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

[5] HAAS 86 reports [$\Gamma(B \to D_s^{\pm}$ anything$)/\Gamma_{total}$] × [B($D_s^+ \to \phi\pi^+$)] $= 0.0038 \pm 0.0010$ which we divide by our best (shown rounded) 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 (shown rounded) value. 64 ± 22% decays are 2-body.

[6] GIBAUT 96 reports $0.1211 \pm 0.0039 \pm 0.0088$ from a measurement of [$\Gamma(B \to D_s^{\pm}$ anything$)/\Gamma_{total}$] × [B($D_s^+ \to \phi\pi^+$)] assuming B($D_s^+ \to \phi\pi^+$) $= 0.035$, which

we rescale to our best (shown rounded) 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 (shown rounded) 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 (shown rounded) 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 (shown rounded) 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_{40}/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 (shown rounded) 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 (shown rounded) value.

$\Gamma(D_s^{*\pm}\overline{D}^{(*)})/\Gamma(D_s^{*\pm}\text{anything})$ — Γ_{41}/Γ_{40}

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_{42}/Γ

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

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

$\Gamma(\overline{D} D_{sJ}(2457))/\Gamma_{total}$ — Γ_{43}/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.

$[\Gamma(D^{(*)}\overline{D}^{(*)}K^0) + \Gamma(D^{(*)}\overline{D}^{(*)}K^\pm)]/\Gamma_{total}$ — Γ_{44}/Γ

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

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

$\Gamma(b \to c\overline{c}s)/\Gamma_{total}$ — Γ_{45}/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.

$\Gamma(D_s^{(*)}\overline{D}^{(*)})/\Gamma(D_s^\pm \text{ anything})$ — Γ_{46}/Γ_{39}

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.

$\Gamma(D^* D^*(2010)^\pm)/\Gamma_{total}$ — Γ_{47}/Γ

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

$[\Gamma(D D^*(2010)^\pm) + \Gamma(D^* D^\pm)]/\Gamma_{total}$ — Γ_{48}/Γ

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

$\Gamma(D D^\pm)/\Gamma_{total}$ — Γ_{49}/Γ

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

$\Gamma(D_s^{(*)\pm}\overline{D}^{(*)}X(n\pi^\pm))/\Gamma_{total}$ — Γ_{50}/Γ

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

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

$\Gamma(\overline{D}^*(2010)\gamma)/\Gamma_{total}$ — Γ_{51}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.1\times10^{-3}$	90	[1] LESIAK	92	CBAL	$e^+e^- \to \Upsilon(4S)$

[1] LESIAK 92 set a limit on the inclusive process $B(b \to s\gamma) < 2.8\times10^{-3}$ 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_{52}/Γ

Sum over modes.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4\times10^{-4}$	90	[1] ALEXANDER	93B	CLE2	$e^+e^- \to \Upsilon(4S)$

[1] ALEXANDER 93B reports $< 4.8\times10^{-4}$ 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 (shown rounded) value $B(D_s^+ \to \phi\pi^+) = 4.5\times10^{-2}$. 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_{53}/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_{54}/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 $[\Gamma(B \to J/\psi(1S)\,\text{anything})/\Gamma_{\text{total}}] \times [B(J/\psi(1S) \to e^+e^-)]$ assuming $B(J/\psi(1S) \to e^+e^-) = 0.069 \pm 0.009$, which we rescale to our best (shown rounded) 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 (shown rounded) value.

[3] ALBRECHT 87D reports $(1.07 \pm 0.16 \pm 0.22) \times 10^{-2}$ from a measurement of $[\Gamma(B \to J/\psi(1S)\,\text{anything})/\Gamma_{\text{total}}] \times [B(J/\psi(1S) \to e^+e^-)]$ assuming $B(J/\psi(1S) \to e^+e^-) = 0.069 \pm 0.009$, which we rescale to our best (shown rounded) 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 (shown rounded) 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 $[\Gamma(B \to J/\psi(1S)\,\text{anything})/\Gamma_{\text{total}}] \times [B(J/\psi(1S) \to \mu^+\mu^-)]$ assuming $B(J/\psi(1S) \to \mu^+\mu^-) = 0.074 \pm 0.012$, which we rescale to our best (shown rounded) value $B(J/\psi(1S) \to \mu^+\mu^-) = (5.961 \pm 0.033) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

[5] BALEST 95B reports $(1.12 \pm 0.04 \pm 0.06) \times 10^{-2}$ from a measurement of $[\Gamma(B \to J/\psi(1S)\,\text{anything})/\Gamma_{\text{total}}] \times [B(J/\psi(1S) \to e^+e^-)]$ assuming $B(J/\psi(1S) \to e^+e^-) = 0.0599 \pm 0.0025$, which we rescale to our best (shown rounded) 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 (shown rounded) value. They measure $J/\psi(1S) \to e^+e^-$ 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 $B \to J/\psi(1S) + X$ where m_X <1 GeV.

[7] Dimuon and dielectron events used.

$\Gamma(J/\psi(1S)\,(\text{direct})\,\text{anything})/\Gamma_{\text{total}}$ — Γ_{55}/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	$e^+e^- \to \Upsilon(4S)$
0.00813±0.00017±0.00037	[2] ANDERSON	02	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.0080 ±0.0008	[3] BALEST	95B	CLE2	$e^+e^- \to \Upsilon(4S)$

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

[2] Also reports the measurement of $J/\psi \to \ell^+\ell^-$ 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 $J/\psi(1S) \to e^+e^-$ and $J/\psi(1S) \to \mu^+\mu^-$. The $B \to J/\psi(1S)X$ branching ratio contains $J/\psi(1S)$ mesons directly from B decays and also from feeddown through $\psi(2S) \to J/\psi(1S)$, $\chi_{c1}(1P) \to J/\psi(1S)$, or $\chi_{c2}(1P) \to J/\psi(1S)$. Using the measured inclusive rates, BALEST 95B corrects for the feeddown and finds the $B \to J/\psi(1S)\,(\text{direct})\,X$ branching ratio.

$\Gamma(\psi(2S)\,\text{anything})/\Gamma_{\text{total}}$ — Γ_{56}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.00307±0.00021 OUR AVERAGE					
0.00297±0.00020±0.00020		AUBERT	03F	BABR	$e^+e^- \to \Upsilon(4S)$
0.00316±0.00014±0.00028		[1] ANDERSON	02	CLE2	$e^+e^- \to \Upsilon(4S)$
0.0046 ±0.0017 ±0.0011	8	ALBRECHT	87D	ARG	$e^+e^- \to \Upsilon(4S)$

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

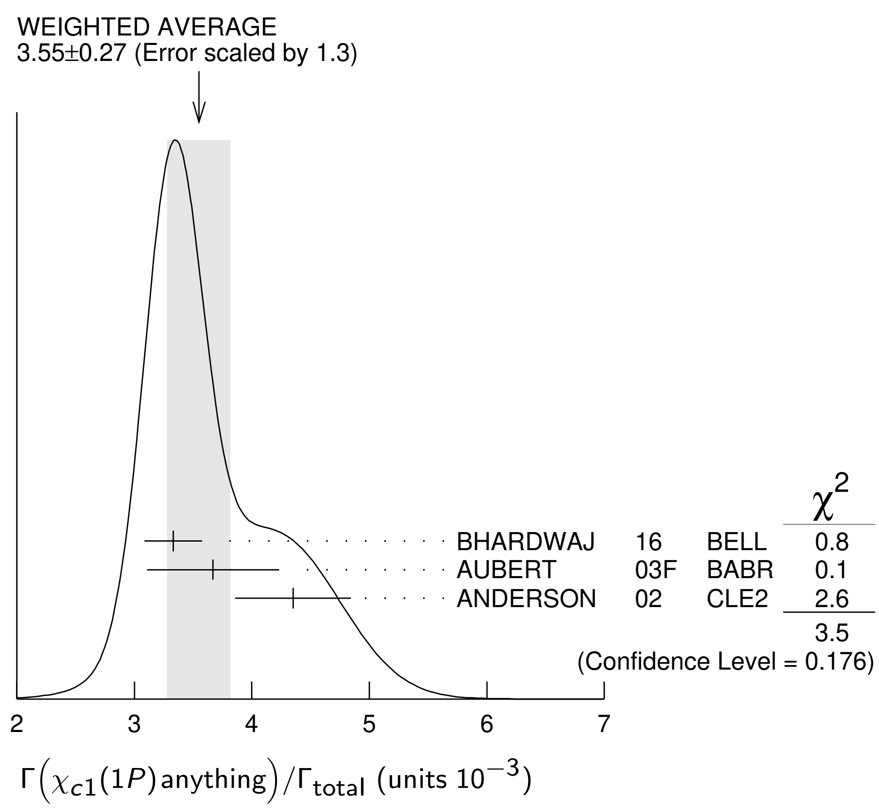
0.0034 ±0.0004 ±0.0003	240	[2] BALEST	95B	CLE2	$e^+e^- \to \Upsilon(4S)$

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

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

$\Gamma(\chi_{c1}(1P)$anything$)/\Gamma_{total}$ — Γ_{57}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
3.55±0.27 OUR AVERAGE		Error includes scale factor of 1.3. See the ideogram below.		
3.33±0.05±0.24		[1] BHARDWAJ 16	BELL	$e^+e^- \to \Upsilon(4S)$
3.67±0.35±0.44		AUBERT 03F	BABR	$e^+e^- \to \Upsilon(4S)$
4.35±0.29±0.40		ANDERSON 02	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3.63±0.22±0.34		[2] ABE 02L	BELL	Repl. by BHARDWAJ 16
3.3 ±0.4 ±0.1		[3] CHEN 01	CLE2	$e^+e^- \to \Upsilon(4S)$
4.0 ±0.6 ±0.4	112	[4] BALEST 95B	CLE2	Repl. by CHEN 01
10.5 ±3.5 ±2.5		[5] ALBRECHT 92E	ARG	$e^+e^- \to \Upsilon(4S)$



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

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

[3] CHEN 01 reports 0.00414 ± 0.00031 ± 0.00040 from a measurement of [$\Gamma(B \to \chi_{c1}(1P)$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 (shown rounded) 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 (shown rounded) value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

[4] 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.

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

$\Gamma(\chi_{c1}(1P)\text{(direct) anything})/\Gamma_{total}$ — Γ_{58}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
3.09±0.19 OUR AVERAGE				
$3.03 \pm 0.05 \pm 0.24$	[1] BHARDWAJ	16	BELL	$e^+e^- \to \Upsilon(4S)$
$3.41 \pm 0.35 \pm 0.42$	AUBERT	03F	BABR	$e^+e^- \to \Upsilon(4S)$
$3.1 \pm 0.4 \pm 0.1$	[2] CHEN	01	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$3.32 \pm 0.22 \pm 0.34$	[3] ABE	02L	BELL	Repl. by BHARDWAJ 16
3.7 ± 0.7	[4] BALEST	95B	CLE2	Repl. by CHEN 01

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

[2] CHEN 01 reports $0.00383 \pm 0.00031 \pm 0.00040$ from a measurement of $[\Gamma(B \to \chi_{c1}(1P)\text{(direct) anything})/\Gamma_{total}] \times [B(\chi_{c1}(1P) \to \gamma J/\psi(1S))]$ assuming $B(\chi_{c1}(1P) \to \gamma J/\psi(1S)) = 0.273 \pm 0.016$, which we rescale to our best (shown rounded) 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 (shown rounded) value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

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

[4] 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_{59}/Γ

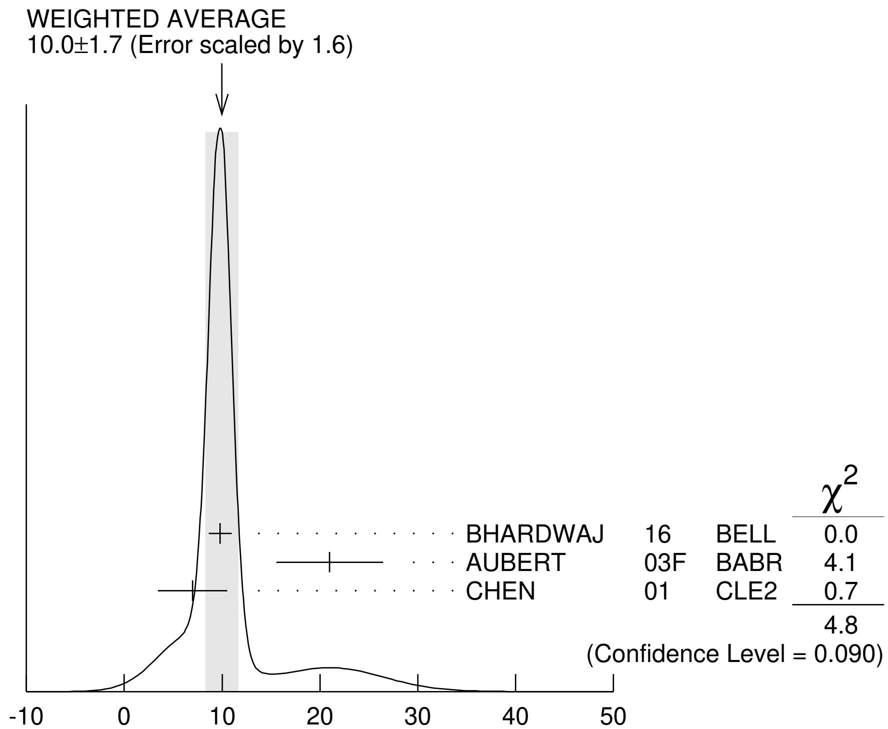
VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
10.0±1.7 OUR AVERAGE		Error includes scale factor of 1.6. See the ideogram below.			
$9.8 \pm 0.6 \pm 1.0$		[1] BHARDWAJ	16	BELL	$e^+e^- \to \Upsilon(4S)$
$21.0 \pm 4.5 \pm 3.1$		AUBERT	03F	BABR	$e^+e^- \to \Upsilon(4S)$
$7.0 \pm 3.5 \pm 0.3$		[2] CHEN	01	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$18.0^{+2.3}_{-2.8} \pm 2.6$		[3] ABE	02L	BELL	Repl. by BHARDWAJ 16
<38	90	[4] BALEST	95B	CLE2	Repl. by CHEN 01

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

[2] CHEN 01 reports $(9.8 \pm 4.8 \pm 1.5) \times 10^{-4}$ from a measurement of $[\Gamma(B \to \chi_{c2}(1P)\text{anything})/\Gamma_{total}] \times [B(\chi_{c2}(1P) \to \gamma J/\psi(1S))]$ assuming $B(\chi_{c2}(1P) \to \gamma J/\psi(1S)) = 0.135 \pm 0.011$, which we rescale to our best (shown rounded) value $B(\chi_{c2}(1P) \to \gamma J/\psi(1S)) = (19.0 \pm 0.8) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

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

[4] 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) =$(0.25 \pm 0.10 \pm 0.03) \times 10^{-2}$.



$\Gamma\left(\chi_{c2}(1P)\,\text{anything}\right)/\Gamma_{\text{total}}$ Γ_{59}/Γ

$\Gamma\left(\chi_{c2}(1P)\,\text{(direct) anything}\right)/\Gamma_{\text{total}}$ Γ_{60}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.75±0.11 OUR AVERAGE				
$0.70 \pm 0.06 \pm 0.10$	[1] BHARDWAJ	16	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$1.90 \pm 0.45 \pm 0.29$	AUBERT	03F	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.53^{+0.23}_{-0.28} \pm 0.27$	[2] ABE	02L	BELL	Repl. by BHARDWAJ 16

[1] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[2] ABE 02L uses PDG 01 values for B($J/\psi(1S) \rightarrow \ell^+ \ell^-$) and B($\chi_{c1,c2} \rightarrow J/\psi(1S)\gamma$).

$\Gamma\left(\eta_c(1S)\,\text{anything}\right)/\Gamma_{\text{total}}$ Γ_{61}/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 $J/\psi(1S) \rightarrow e^+ e^-$ and $J/\psi(1S) \rightarrow \mu^+ \mu^-$. Search region 2960 $< m_{\eta_c(1S)} <$3010 MeV/c^2.

$\Gamma(K\chi_{c1}(3872))/\Gamma_{total}$ Γ_{62}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
1.9±0.7 OUR AVERAGE				
$1.7\pm0.5\pm0.6$	[1] AUSHEV	10	BELL	$e^+e^-\rightarrow\Upsilon(4S)$
$2.2^{+0.7+1.2}_{-0.8-1.1}$	[2,3] GOKHROO	06	BELL	$e^+e^-\rightarrow\Upsilon(4S)$

[1] AUSHEV 10 reports $[\Gamma(B\rightarrow K\chi_{c1}(3872))/\Gamma_{total}]\times[B(\chi_{c1}(3872)\rightarrow\overline{D}^{*0}D^0)] = (0.80\pm0.20\pm0.10)\times10^{-4}$ which we divide by our best (shown rounded) value $B(\chi_{c1}(3872)\rightarrow\overline{D}^{*0}D^0) = (46\pm16)\times10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

[2] GOKHROO 06 reports $[\Gamma(B\rightarrow K\chi_{c1}(3872))/\Gamma_{total}]\times[B(\chi_{c1}(3872)\rightarrow D^0\overline{D}^0\pi^0)] = (1.22\pm0.31^{+0.23}_{-0.30})\times10^{-4}$ which we divide by our best (shown rounded) value $B(\chi_{c1}(3872)\rightarrow D^0\overline{D}^0\pi^0) = (55\pm28)\times10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

[3] Measure the near-threshold enhancements in the $(D^0\overline{D}^0\pi^0)$ system at a mass $3875.2\pm0.7^{+0.3}_{-1.6}\pm0.8$ MeV/c^2.

$\Gamma(KX(3940),\ X\rightarrow D^{*0}D^0)/\Gamma_{total}$ Γ_{63}/Γ

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

$\Gamma(K\chi_{c0}(3915),\ \chi_{c0}\rightarrow\omega J/\psi)/\Gamma_{total}$ Γ_{64}/Γ

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

[1] CHOI 05 reports the observation of a near-threshold enhancement in the $\omega J/\psi$ mass spectrum in exclusive $B\rightarrow K\omega J/\psi$. The new state, denoted as $\chi_{c0}(3915)$, is measured to have a mass of $3943\pm11\pm13$ GeV/c^2 and a width $\Gamma=87\pm22\pm26$ MeV.

$\Gamma(K^{\pm}\text{anything})/\Gamma_{total}$ Γ_{65}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.789±0.025 OUR AVERAGE				
$0.82\pm0.01\pm0.05$	ALBRECHT	94C	ARG	$e^+e^-\rightarrow\Upsilon(4S)$
$0.775\pm0.015\pm0.025$	[1] ALBRECHT	93I	ARG	$e^+e^-\rightarrow\Upsilon(4S)$
$0.85\pm0.07\pm0.09$	ALAM	87B	CLEO	$e^+e^-\rightarrow\Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
seen	[2] BRODY	82	CLEO	$e^+e^-\rightarrow\Upsilon(4S)$
seen	[3] GIANNINI	82	CUSB	$e^+e^-\rightarrow\Upsilon(4S)$

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

[2] Assuming $\Upsilon(4S)\rightarrow B\overline{B}$, a total of $3.38\pm0.34\pm0.68$ 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 $\rightarrow$ c-quark)/(b-quark $\rightarrow$ all) of $1.09\pm0.33\pm0.13$.

[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 $b\rightarrow cX$ decay.

$\Gamma(K^{+}\text{anything})/\Gamma_{total}$ Γ_{66}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.66 ±0.05	[1] ALBRECHT	94C	ARG	$e^+e^-\rightarrow\Upsilon(4S)$

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

$0.620 \pm 0.013 \pm 0.038$	[2] ALBRECHT	94C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
$0.66 \pm 0.05 \pm 0.07$	[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 $(18.1 \pm 4.3)\%$.

[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_{67}/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. • • •				
$0.165 \pm 0.011 \pm 0.036$	[2] ALBRECHT	94C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
$0.19 \pm 0.05 \pm 0.02$	[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 $(18.1 \pm 4.3)\%$.

[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_{68}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.64 ±0.04 OUR AVERAGE				
$0.642 \pm 0.010 \pm 0.042$	[1] ALBRECHT	94C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
$0.63 \pm 0.06 \pm 0.06$	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_{69}/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_{70}/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_{71}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
4.10±0.12 OUR AVERAGE					
$4.10 \pm 0.08 \pm 0.09$		[1] ADACHI	25Z	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$4.24 \pm 0.54 \pm 0.32$		[2] COAN	00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<150	90	[3] 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 assuming $B(\Upsilon(4S) \rightarrow B^+B^-) = 0.5113^{+0.0073}_{-0.0108}$ and $B(\Upsilon(4S) \rightarrow B^0\overline{B}^0) = 0.4861^{+0.0074}_{-0.0080}$.

[2] An average of B($B^+ \to K^*(892)^+ \gamma$) and B($B^0 \to K^*(892)^0 \gamma$) measurements reported in COAN 00 by assuming full correlated systematic errors.
[3] 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.

$\Gamma(\eta K \gamma)/\Gamma_{total}$ — Γ_{72}/Γ

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
$8.5 \pm 1.3^{+1.2}_{-0.9}$	[1] NISHIDA	05	BELL	$e^+ e^- \to \Upsilon(4S)$

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

$\Gamma(K_1(1400)\gamma)/\Gamma_{total}$ — Γ_{73}/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_{74}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
$1.66^{+0.59}_{-0.53} \pm 0.13$		[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_{75}/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_{76}/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_{77}/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_{78}/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_{79}/Γ

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

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

$\Gamma(K\eta)/\Gamma_{total}$ — Γ_{80}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.2 \times 10^{-6}$	90	[1] RICHICHI	00	CLE2	$e^+e^- \to \Upsilon(4S)$

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

$\Gamma(K^*(892)\eta)/\Gamma_{total}$ — Γ_{81}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$(1.80^{+0.49}_{-0.43}\pm0.18) \times 10^{-5}$	[1] RICHICHI	00	CLE2	$e^+e^- \to \Upsilon(4S)$

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

$\Gamma(K\phi\phi)/\Gamma_{total}$ — Γ_{82}/Γ

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

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

$\Gamma(\overline{b} \to \overline{s}\gamma)/\Gamma_{total}$ — Γ_{83}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
3.49±0.19 OUR AVERAGE				
3.75±0.18±0.35	[1,2] SAITO	15	BELL	$e^+e^- \to \Upsilon(4S)$
3.52±0.20±0.51	[1,3] LEES	12U	BABR	$e^+e^- \to \Upsilon(4S)$
3.32±0.16±0.31	[1,4] LEES	12V	BABR	$e^+e^- \to \Upsilon(4S)$
3.47±0.15±0.40	[1,5] LIMOSANI	09	BELL	$e^+e^- \to \Upsilon(4S)$
3.90±0.91±0.64	[1,6] AUBERT	08O	BABR	$e^+e^- \to \Upsilon(4S)$
3.29±0.44±0.29	[1,7] CHEN	01C	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.30±0.08±0.30	[8] DEL-AMO-SA...	10M	BABR	$e^+e^- \to \Upsilon(4S)$
4.3 ±0.3 ±0.7	[9] AUBERT	09U	BABR	Repl. by DEL-AMO-SANCHEZ 10M
3.92±0.31±0.47	[1,10] AUBERT,BE	06B	BABR	Repl. by LEES 12V
$3.49\pm0.20^{+0.59}_{-0.46}$	[1,11] AUBERT,B	05R	BABR	Repl. by LEES 12U

$3.50 \pm 0.32 \pm 0.31$	[1,12] KOPPENBURG	04	BELL	Repl. by LIMOSANI 09
$3.36 \pm 0.53 ^{+0.65}_{-0.68}$	[13] ABE	01F	BELL	Repl. by SAITO 15
$2.32 \pm 0.57 \pm 0.35$	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 $(3.51 \pm 0.17 \pm 0.33) \times 10^{-4}$ 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_{84}/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_{84}/Γ_{83}

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.

$\Gamma(\overline{b} \to \overline{s}\text{gluon})/\Gamma_{\text{total}}$ Γ_{85}/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_{86}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
$\mathbf{2.61 \pm 0.30^{+0.44}_{-0.74}}$		[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_{87}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
4.2±0.9 OUR AVERAGE				
3.9±0.8±0.9	[1] AUBERT,B	04F	BABR	$e^+e^- \to \Upsilon(4S)$
4.6±1.1±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_{88}/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_{89}/Γ

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
$\mathbf{1.95^{+0.51}_{-0.45}\pm0.50}$	[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.

$\Gamma(\rho\gamma)/\Gamma_{\text{total}}$ Γ_{90}/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	$e^+e^- \to \Upsilon(4S)$
$1.21^{+0.24}_{-0.22}\pm0.12$		[1,2] TANIGUCHI	08	BELL	$e^+e^- \to \Upsilon(4S)$
• • • 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	$e^+e^- \to \Upsilon(4S)$

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

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

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

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

$\Gamma(\rho\gamma)/\Gamma(K^*(892)\gamma)$ Γ_{90}/Γ_{71}

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

$\Gamma(\rho/\omega\gamma)/\Gamma_{\text{total}}$ Γ_{91}/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	$e^+e^- \to \Upsilon(4S)$
$1.14\pm0.20^{+0.10}_{-0.12}$		[1,3] TANIGUCHI	08	BELL	$e^+e^- \to \Upsilon(4S)$
• • • 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
$1.32^{+0.34}_{-0.31}{}^{+0.10}_{-0.09}$		[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	$e^+e^- \to \Upsilon(4S)$

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

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

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

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

$\Gamma(\rho/\omega\gamma)/\Gamma(K^*(892)\gamma)$ — Γ_{91}/Γ_{71}

VALUE (units 10^{-2})	CL%	DOCUMENT ID		TECN	COMMENT
$2.84\pm0.50^{+0.27}_{-0.29}$		[1] TANIGUCHI	08	BELL	$e^+e^- \to \Upsilon(4S)$
• • • 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 $|V_{td}/V_{ts}| = 0.195^{+0.020}_{-0.019} \pm 0.015$.

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

VALUE	DOCUMENT ID		TECN	COMMENT
$3.585\pm0.025\pm0.070$	[1] ALBRECHT	93I	ARG	$e^+e^- \to \Upsilon(4S)$

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

$\Gamma(\pi^0 \text{ anything})/\Gamma_{total}$ — Γ_{93}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$2.35\pm0.02\pm0.11$	[1] ABE	01J	BELL	$e^+e \to \Upsilon(4S)$

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

$\Gamma(\eta \text{ anything})/\Gamma_{total}$ — Γ_{94}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$0.176\pm0.011\pm0.012$	KUBOTA	96	CLE2	$e^+e^- \to \Upsilon(4S)$

$\Gamma(\rho^0 \text{ anything})/\Gamma_{total}$ — Γ_{95}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$0.208\pm0.042\pm0.032$	ALBRECHT	94J	ARG	$e^+e^- \to \Upsilon(4S)$

$\Gamma(\omega \text{ anything})/\Gamma_{total}$ — Γ_{96}/Γ

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

$\Gamma(\phi \text{ anything})/\Gamma_{total}$ — Γ_{97}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.0343 ± 0.0012 OUR AVERAGE				
$0.0353\pm0.0005\pm0.0030$	HUANG	07	CLEO	$e^+e^- \to \Upsilon(4S)$
$0.0341\pm0.0006\pm0.0012$	AUBERT	04S	BABR	$e^+e^- \to \Upsilon(4S)$
$0.0390\pm0.0030\pm0.0035$	ALBRECHT	94J	ARG	$e^+e^- \to \Upsilon(4S)$
$0.023\pm0.006\pm0.005$	BORTOLETTO	86	CLEO	$e^+e^- \to \Upsilon(4S)$

$\Gamma(\phi K^*(892))/\Gamma_{total}$ — Γ_{98}/Γ

VALUE	CL%	DOCUMENT ID		TECN
$<2.2\times10^{-5}$	90	[1] BERGFELD	98	CLE2

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

$\Gamma(\pi^+ \text{ gluon (charmless)})/\Gamma_{total}$ — Γ_{100}/Γ

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

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

$\Gamma(\Lambda_c^+ \,/\, \overline{\Lambda}_c^- \text{ anything})/\Gamma_{\text{total}}$ — Γ_{101}/Γ

VALUE (%)	CL%	DOCUMENT ID		TECN	COMMENT
3.53±0.31±0.12		[1] AUBERT	07C	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
6.4 ±0.8 ±0.8		[2] CRAWFORD	92	CLEO	$e^+e^- \to \Upsilon(4S)$
14 ±9		[3] ALBRECHT	88E	ARG	$e^+e^- \to \Upsilon(4S)$
<11.2	90	[4] ALAM	87	CLEO	$e^+e^- \to \Upsilon(4S)$

[1] AUBERT 07C reports $0.045 \pm 0.003 \pm 0.012$ from a measurement of $[\Gamma(B \to \Lambda_c^+ / \overline{\Lambda}_c^- \text{anything})/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \to pK^-\pi^+)]$ assuming $B(\Lambda_c^+ \to pK^-\pi^+) = (5.0 \pm 1.3) \times 10^{-2}$, which we rescale to our best (shown rounded) value $B(\Lambda_c^+ \to pK^-\pi^+) = (6.37 \pm 0.21) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) 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 $B(B \to \Lambda_c^+ X) \cdot B(\Lambda_c^+ \to pK^-\pi^+) = (0.30 \pm 0.12 \pm 0.06)\%$ and used $B(\Lambda_c^+ \to pK^-\pi^+) = (2.2 \pm 1.0)\%$ 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.

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

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

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

$\Gamma(\overline{\Lambda}_c^- \mu^+ \text{ anything})/\Gamma(\overline{\Lambda}_c^- \text{ anything})$ — $\Gamma_{106}/\Gamma_{103}$

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

$\Gamma(\overline{\Lambda}_c^- \ell^+ \text{ anything})/\Gamma(\Lambda_c^+ \,/\, \overline{\Lambda}_c^- \text{ anything})$ — $\Gamma_{104}/\Gamma_{101}$

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

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

$\Gamma(\overline{\Lambda}_c^- e^+ \text{ anything})/\Gamma(\Lambda_c^+ \,/\, \overline{\Lambda}_c^- \text{ anything})$ — $\Gamma_{105}/\Gamma_{101}$

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

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

$\Gamma(\overline{\Lambda}_c^- e^+ \text{ anything})/\Gamma(\overline{\Lambda}_c^- \text{ anything})$ — $\Gamma_{105}/\Gamma_{103}$

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

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

$\Gamma\big(\overline{\Lambda}_c^- \ell^+ \text{anything}\big)/\Gamma\big(\overline{\Lambda}_c^- \text{anything}\big)$ — $\Gamma_{104}/\Gamma_{103}$

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 $\Gamma\big(B \rightarrow \overline{\Lambda}_c^- \ell^+ \text{anything}\big)/\Gamma\big(B \rightarrow \overline{\Lambda}_c^- \text{anything}\big) = (1.7 \pm 1.0 \pm 0.6) \times 10^{-2}$.

$\Gamma\big(\overline{\Lambda}_c^- p \text{ anything}\big)/\Gamma\big(\Lambda_c^+ / \overline{\Lambda}_c^- \text{anything}\big)$ — $\Gamma_{107}/\Gamma_{101}$

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

$\Gamma\big(\overline{\Lambda}_c^- p e^+ \nu_e\big)/\Gamma\big(\overline{\Lambda}_c^- p \text{ anything}\big)$ — $\Gamma_{108}/\Gamma_{107}$

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.

$\Gamma\big(\overline{\Sigma}_c^{--} \text{anything}\big)/\Gamma_{\text{total}}$ — Γ_{109}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0033±0.0017±0.0001	77	[1] PROCARIO	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[1] PROCARIO 94 reports $[\Gamma\big(B \rightarrow \overline{\Sigma}_c^{--} \text{anything}\big)/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow pK^-\pi^+)] = 0.00021 \pm 0.00008 \pm 0.00007$ which we divide by our best (shown rounded) value $B(\Lambda_c^+ \rightarrow pK^-\pi^+) = (6.37 \pm 0.21) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

$\Gamma\big(\overline{\Sigma}_c^{-} \text{anything}\big)/\Gamma_{\text{total}}$ — Γ_{110}/Γ

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

[1] PROCARIO 94 reports $[\Gamma\big(B \rightarrow \overline{\Sigma}_c^{-} \text{anything}\big)/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow pK^-\pi^+)] < 0.00048$ which we divide by our best (shown rounded) value $B(\Lambda_c^+ \rightarrow pK^-\pi^+) = 6.37 \times 10^{-2}$.

$\Gamma\big(\overline{\Sigma}_c^{0} \text{anything}\big)/\Gamma_{\text{total}}$ — Γ_{111}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0036±0.0017±0.0001	76	[1] PROCARIO	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[1] PROCARIO 94 reports $[\Gamma\big(B \rightarrow \overline{\Sigma}_c^{0} \text{anything}\big)/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow pK^-\pi^+)] = 0.00023 \pm 0.00008 \pm 0.00007$ which we divide by our best (shown rounded) value $B(\Lambda_c^+ \rightarrow pK^-\pi^+) = (6.37 \pm 0.21) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

$\Gamma\big(\overline{\Sigma}_c^{0} N (N = p \text{ or } n)\big)/\Gamma_{\text{total}}$ — Γ_{112}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.1 × 10^{-3}	90	[1] PROCARIO	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[1] PROCARIO 94 reports < 0.0017 from a measurement of $[\Gamma\big(B \rightarrow \overline{\Sigma}_c^{0} N (N = p \text{ or } n)\big)/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow pK^-\pi^+)]$ assuming $B(\Lambda_c^+ \rightarrow pK^-\pi^+) = 0.043$, which we rescale to our best (shown rounded) value $B(\Lambda_c^+ \rightarrow pK^-\pi^+) = 6.37 \times 10^{-2}$.

$\Gamma(\Xi_c^0$ anything, $\Xi_c^0 \to \Xi^- \pi^+)/\Gamma_{total}$ — Γ_{113}/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	$e^+ e^- \to \Upsilon(4S)$
0.144±0.048±0.021	[2] BARISH	97	CLE2	$e^+ e^- \to \Upsilon(4S)$

[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_{114}/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_{115}/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±0.005±0.005		ALBRECHT	93I	ARG	$e^+ e^- \to \Upsilon(4S)$
0.080±0.005±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 ± 0.006 ± 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_{116}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.055±0.005 OUR AVERAGE					
0.055±0.005±0.0035		ALBRECHT	93I	ARG	$e^+ e^- \to \Upsilon(4S)$
0.056±0.006±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_{117}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
< 5.9 × 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 × 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_{118}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.040±0.005 OUR AVERAGE					
0.038±0.004±0.006	2998	CRAWFORD	92	CLEO	$e^+ e^- \to \Upsilon(4S)$
0.042±0.005±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±0.003±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 ± 0.041, *i.e.*, an admixture of B^0, $B^\pm$, and B_s.

[2] ALAM 83B reported their result as > 0.022 ± 0.007 ± 0.004. Values are for (B(ΛX)+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.

Γ(Λ anything)/Γ(Λ̄ anything) — $\Gamma_{119}/\Gamma_{120}$

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

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

Γ(Ξ⁻/Ξ̄⁺ anything)/Γtotal — Γ_{121}/Γ

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

Γ(baryons anything)/Γtotal — Γ_{122}/Γ

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

[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)%.

Γ(pp̄ anything)/Γtotal — Γ_{123}/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	$e^+e^- \to \Upsilon(4S)$
0.025 ±0.002 ±0.002	918	ALBRECHT 89K	ARG	$e^+e^- \to \Upsilon(4S)$

Γ(pp̄ anything)/Γ(p/p̄ anything) — $\Gamma_{123}/\Gamma_{115}$

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	$e^+e^- \to \Upsilon(4S)$

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

Γ(Λp̄/Λ̄p anything)/Γtotal — Γ_{124}/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	$e^+e^- \to \Upsilon(4S)$
0.023±0.004±0.003	165	ALBRECHT 89K	ARG	$e^+e^- \to \Upsilon(4S)$

$\Gamma(\Lambda\overline{p}/\overline{\Lambda}p$ anything$)/\Gamma(\Lambda/\overline{\Lambda}$ anything$)$ — $\Gamma_{124}/\Gamma_{118}$

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. • • •				
$0.76\pm0.11\pm0.08$	[1] CRAWFORD	92	CLEO	$e^+e^- \to \Upsilon(4S)$

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

$\Gamma(\Lambda\overline{\Lambda}$ anything$)/\Gamma_{total}$ — Γ_{125}/Γ

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

$\Gamma(\Lambda\overline{\Lambda}$ anything$)/\Gamma(\Lambda/\overline{\Lambda}$ anything$)$ — $\Gamma_{125}/\Gamma_{118}$

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	$e^+e^- \to \Upsilon(4S)$

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

$\Gamma(se^+e^-)/\Gamma_{total}$ — Γ_{126}/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	$e^+e^- \to \Upsilon(4S)$
$4.04\pm1.30^{+0.87}_{-0.83}$		[2] IWASAKI	05	BELL	$e^+e^- \to \Upsilon(4S)$
• • • 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	$e^+e^- \to \Upsilon(4S)$
<50000	90	BEBEK	81	CLEO	$e^+e^- \to \Upsilon(4S)$

[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.

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

$\Gamma(s\mu^+\mu^-)/\Gamma_{total}$ — Γ_{127}/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	$e^+e^- \to \Upsilon(4S)$
$4.13\pm1.05^{+0.85}_{-0.81}$		[2] IWASAKI	05	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$5.0\pm2.8\pm1.2$		AUBERT,B	04I	BABR	Repl. by LEES 14D

$7.9 \pm 2.1\ ^{+2.1}_{-1.5}$		KANEKO	03	BELL	Repl. by IWASAKI 05
$<\ 58$	90	GLENN	98	CLEO	$e^+e^- \to \Upsilon(4S)$
<17000	90	CHADWICK	81	CLEO	$e^+e^- \to \Upsilon(4S)$

[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.

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

$\left[\Gamma(se^+e^-)+\Gamma(s\mu^+\mu^-)\right]/\Gamma_{\text{total}}$ $\qquad (\Gamma_{126}+\Gamma_{127})/\Gamma$

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.

$\Gamma(s\ell^+\ell^-)/\Gamma_{\text{total}}$ $\qquad \Gamma_{128}/\Gamma$

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.

$\Gamma(\pi\ell^+\ell^-)/\Gamma_{\text{total}}$ $\qquad \Gamma_{129}/\Gamma$

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 $\Upsilon(4S)$.

$\Gamma(\pi e^+e^-)/\Gamma_{\text{total}}$ $\qquad \Gamma_{130}/\Gamma$

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_{131}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.0\times10^{-8}$	90	[1] LEES	13M	BABR	$e^+e^-\to\Upsilon(4S)$

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

$\Gamma(Ke^+e^-)/\Gamma_{total}$ — 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
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_{133}/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_{134}/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.

$\Gamma(K\mu^+\mu^-)/\Gamma(Ke^+e^-)$ $\Gamma_{134}/\Gamma_{132}$

VALUE	DOCUMENT ID		TECN	COMMENT
$1.01^{+0.19}_{-0.16}$ OUR AVERAGE				
$1.03^{+0.28}_{-0.24}\pm0.01$	[1] CHOUDHURY	21	BELL	$e^+e^-\to\Upsilon(4S)$
$1.00^{+0.31}_{-0.25}\pm0.07$	[2] LEES	12S	BABR	$e^+e^-\to\Upsilon(4S)$
$0.96^{+0.44}_{-0.34}\pm0.05$	AUBERT	09T	BABR	$e^+e^-\to\Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.03\pm0.19\pm0.06$	[3] WEI	09A	BELL	$e^+e^-\to\Upsilon(4S)$
$1.06\pm0.48\pm0.08$	AUBERT,B	06J	BABR	Repl. by AUBERT 09T

[1] For $1.0 < q^2 < 6.0$ GeV^2/c^4. Measurements in other q^2 bins are also reported.
[2] Measured in the union of $0.10 < q^2 < 8.12$ GeV^2/c^4 and $q^2 > 10.11$ GeV^2/c^4. LEES 12S reports also individual measurements $\Gamma(B\to K\mu^+\mu^-)/\Gamma(B\to Ke^+e^-) = 0.74^{+0.40}_{-0.31}\pm0.06$ for $0.10 < q^2 < 8.12$ GeV^2/c^4 and $\Gamma(B\to K\mu^+\mu^-)/\Gamma(B\to Ke^+e^-) = 1.43^{+0.65}_{-0.44}\pm0.12$ for $q^2 > 10.11$ GeV^2/c^4.
[3] Superseded by CHOUDHURY 21.

$\Gamma(K^*(892)\mu^+\mu^-)/\Gamma_{total}$ Γ_{135}/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	$e^+e^-\to\Upsilon(4S)$
$11.0^{+1.6}_{-1.4}\pm0.8$		[1] WEI	09A	BELL	$e^+e^-\to\Upsilon(4S)$
• • • 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.

$\Gamma(K^*(892)\mu^+\mu^-)/\Gamma(K^*(892)e^+e^-)$ $\Gamma_{135}/\Gamma_{133}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.98±0.15 OUR AVERAGE				
$1.13^{+0.34}_{-0.26}\pm0.10$	[1] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$1.37^{+0.53}_{-0.40}\pm0.09$	AUBERT	09T	BABR	$e^+e^- \to \Upsilon(4S)$
$0.83\pm0.17\pm0.08$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.91\pm0.45\pm0.06$	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.

$\Gamma(K\ell^+\ell^-)/\Gamma_{total}$ Γ_{136}/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					
$4.7\pm0.6\pm0.2$		LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$4.8^{+0.5}_{-0.4}\pm0.3$		WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$3.9\pm0.7\pm0.2$		[1] AUBERT	09T	BABR	Repl. by LEES 12S
$3.4\pm0.7\pm0.2$		[1] AUBERT,B	06J	BABR	Repl. by AUBERT 09T
$6.5^{+1.4}_{-1.3}\pm0.4$		[2] AUBERT	03U	BABR	Repl. by AUBERT,B 06J
$4.8^{+1.0}_{-0.9}\pm0.3$		[3] ISHIKAWA	03	BELL	Repl. by WEI 09A
$7.5^{+2.5}_{-2.1}\pm0.6$		[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.

$\Gamma(K^*(892)\ell^+\ell^-)/\Gamma_{total}$ Γ_{137}/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					
$10.2^{+1.4}_{-1.3}\pm0.5$		LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
$10.7^{+1.1}_{-1.0}\pm0.9$		WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$

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

$11.1^{+1.9}_{-1.8}\pm0.7$		[1] AUBERT	09T	BABR	Repl. by LEES 12S
$7.8^{+1.9}_{-1.7}\pm1.1$		[1] AUBERT,B	06J	BABR	Repl. by AUBERT 09T
$8.8^{+3.3}_{-2.9}\pm1.0$		[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	$e^+e^- \to \Upsilon(4S)$

[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 $\Gamma(B \to K^*(892)e^+e^-)/\Gamma(B \to K^*(892)\mu^+\mu^-) = 1.33$.
[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] For averaging $K^*(892)\mu^+\mu^-$ and $K^*(892)e^+e^-$ modes, AUBERT 02L assumed $B(B \to K^*(892)e^+e^-)/B(B \to K^*(892)\mu^+\mu^-) = 1.2$.
[5] The result is for di-lepton masses above 0.5 GeV.

$\Gamma(K\nu\overline{\nu})/\Gamma_{total}$ — Γ_{138}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.6 \times 10^{-5}$	90	[1] GRYGIER	17	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.7 \times 10^{-5}$	90	[1,2] LEES	13I	BABR	$e^+e^- \to \Upsilon(4S)$
$<1.4 \times 10^{-5}$	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.

$\Gamma(K^*\nu\overline{\nu})/\Gamma_{total}$ — Γ_{139}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.7 \times 10^{-5}$	90	[1] GRYGIER	17	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<7.6 \times 10^{-5}$	90	[1,2] LEES	13I	BABR	$e^+e^- \to \Upsilon(4S)$
$<8 \times 10^{-5}$	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.

$\Gamma(\pi\nu\overline{\nu})/\Gamma_{total}$ — Γ_{140}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<0.8 \times 10^{-5}$	90	[1] GRYGIER	17	BELL	$e^+e^- \to \Upsilon(4S)$

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

$\Gamma(\rho\nu\overline{\nu})/\Gamma_{total}$ — Γ_{141}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.8 \times 10^{-5}$	90	[1] GRYGIER	17	BELL	$e^+e^- \to \Upsilon(4S)$

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

$\Gamma(s e^{\pm} \mu^{\mp})/\Gamma_{total}$ Γ_{142}/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	$e^+ e^- \to \Upsilon(4S)$

$\Gamma(\pi e^{\pm} \mu^{\mp})/\Gamma_{total}$ Γ_{143}/Γ

Test of lepton family number conservation.

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

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

$\Gamma(\rho e^{\pm} \mu^{\mp})/\Gamma_{total}$ Γ_{144}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.2 \times 10^{-6}$	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_{145}/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_{146}/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 ± 0.011 OUR AVERAGE				
$-0.004 \pm 0.014 \pm 0.003$	[1] HORIGUCHI	17	BELL	$e^+ e^- \to \Upsilon(4S)$
$-0.003 \pm 0.017 \pm 0.007$	[2] AUBERT	09AO	BABR	$e^+ e^- \to \Upsilon(4S)$
$0.08 \pm 0.13 \pm 0.03$	[3] COAN	00	CLE2	$e^+ e^- \to \Upsilon(4S)$

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

$-0.013\pm0.036\pm0.010$	[4] AUBERT,BE	04A	BABR	Repl. by AUBERT 09AO
$-0.015\pm0.044\pm0.012$	[3] NAKAO	04	BELL	Repl. by HORIGUCHI 17
$-0.044\pm0.076\pm0.012$	[5] AUBERT	02C	BABR	Repl. by AUBERT,BE 04A

[1] Uses B($\Upsilon(4S) \to B^+ B^-$) = (51.4 ± 0.6)% and B($\Upsilon(4S) \to B^0 \overline{B}^0$) = (48.6 ± 0.6)%.
[2] Corresponds to a 90% CL interval $-0.033 < A_{CP} < 0.028$.
[3] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[4] Corresponds to a 90% CL allowed region, $-0.074 < A_{CP} < 0.049$.
[5] A 90% CL range is $-0.170 < A_{CP} < 0.082$.

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.015 ±0.011 OUR AVERAGE				
$0.0144\pm0.0128\pm0.0011$	[1] WATANUKI	19	BELL	$e^+e^- \to \Upsilon(4S)$
$0.017 \pm0.019 \pm0.010$	[2] LEES	14K	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.011 \pm0.030 \pm0.014$	[3] AUBERT	08BJ	BABR	Repl. by LEES 14K
$0.025 \pm0.050 \pm0.015$	[4] AUBERT,B	04E	BABR	Repl. by AUBERT 08BJ
$0.002 \pm0.050 \pm0.030$	[5] NISHIDA	04	BELL	Repl. by WATANUKI 19

[1] Using a sum-of-exclusive technique with $m_{X_s} < 2.8$ GeV/c^2.
[2] 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).
[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.
[5] 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.

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.010±0.031 OUR AVERAGE				
$0.022\pm0.039\pm0.009$	[1] PESANTEZ	15	BELL	$e^+e^- \to \Upsilon(4S)$
$0.057\pm0.060\pm0.018$	LEES	12V	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.10 \pm0.18 \pm0.05$	[2] AUBERT	08O	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.110\pm0.115\pm0.017$	AUBERT,BE	06B	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.079\pm0.108\pm0.022$	[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. • • •				
$-0.22\pm0.26\pm0.02$	[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.

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

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

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

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

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

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

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

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

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

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

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

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

[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 $A_{CP}(B \rightarrow K^* \ell^+ \ell^-) = -0.13^{+0.18}_{-0.19} \pm 0.01$ for $0.10 < q^2 < 8.12$ GeV^2/c^4 and $A_{CP}(B \rightarrow K^* \ell^+ \ell^-) = 0.16^{+0.18}_{-0.19} \pm 0.01$ for $q^2 > 10.11$ GeV^2/c^4.

$A_{CP}(B \rightarrow \eta$ anything)

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

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

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

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.041 ± 0.023 OUR AVERAGE				
$0.0369 \pm 0.0265 \pm 0.0076$	[1] WATANUKI	19	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.050 \pm 0.039 \pm 0.015$	[2] LEES	14K	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

[1] Using a sum-of-exclusive technique with $m_{X_s} < 2.8$ GeV/c^2.

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

$\overline{A}_{CP}(B \to X_s\gamma) = (A_{CP}(B^+ \to X_s\gamma) + A_{CP}(B^0 \to X_s\gamma))/2$

VALUE	DOCUMENT ID		TECN	COMMENT
0.0091±0.0121±0.0013	[1] WATANUKI	19	BELL	$e^+e^- \to \Upsilon(4S)$

[1] Using a sum-of-exclusive technique with $m_{X_s} < 2.8$ GeV/c^2.

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

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.025±0.023 OUR AVERAGE				
0.026±0.038±0.006	ADACHI	25Z	BELL	$e^+e^- \to \Upsilon(4S)$
0.024±0.028±0.005	[1] HORIGUCHI	17	BELL	$e^+e^- \to \Upsilon(4S)$

[1] Uses B($\Upsilon(4S) \to B^+B^-$) = (51.4 ± 0.6)% and B($\Upsilon(4S) \to B^0\overline{B}^0$) = (48.6 ± 0.6)%.

$\overline{A}_{CP}(B \to K^*\gamma) = (A_{CP}(B^+ \to K^{*+}\gamma) + A_{CP}(B^0 \to K^{*0}\gamma))/2$

This is the average *CP* asymmetry.

VALUE	DOCUMENT ID		TECN	COMMENT
−0.009±0.011 OUR AVERAGE				
−0.024±0.019±0.003	ADACHI	25Z	BELL	$e^+e^- \to \Upsilon(4S)$
−0.001±0.014±0.003	[1] HORIGUCHI	17	BELL	$e^+e^- \to \Upsilon(4S)$

[1] Uses B($\Upsilon(4S) \to B^+B^-$) = (51.4 ± 0.6)% and B($\Upsilon(4S) \to B^0\overline{B}^0$) = (48.6 ± 0.6)%.

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 (∥) or perpendicular (⊥) 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±0.16±0.04	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
$0.660^{+0.083}_{-0.077} \pm 0.022$	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, $K^{*0}\mu^+\mu^-$
$0.30 \pm 0.16 \pm 0.02$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.29^{+0.21}_{-0.18} \pm 0.02$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.60^{+0.00}_{-0.28} \pm 0.19$	[1] CHATRCHYAN	13BL	CMS	pp at 7 TeV
$0.00^{+0.13}_{-0.00} \pm 0.02$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.53^{+0.32}_{-0.34} \pm 0.07$	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				
$0.876^{+0.109}_{-0.097} \pm 0.017$	[1] AAIJ	16B	LHCB	pp at 7, 8 TeV
$0.80 \pm 0.08 \pm 0.06$	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	$e^+e^- \to \Upsilon(4S)$
• • • 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.

$F_L(B \to K^* \ell^+ \ell^-)$ ($4.0 < q^2 < 6.0$ 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

$F_L(B \to K^* \ell^+ \ell^-)$ ($6.0 < q^2 < 8.0$ 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

$F_L(B \to K^* \ell^+ \ell^-)$ ($4.3 < q^2 < 8.6$ 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, $K^{*0}\mu^+\mu^-$

$0.81^{+0.13}_{-0.12}\pm0.05$	CHATRCHYAN	13BL	CMS	pp at 7 TeV
$0.68^{+0.15}_{-0.17}\pm0.09$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.64^{+0.23}_{-0.24}\pm0.07$	WEI	09A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.60^{+0.06}_{-0.07}\pm0.01$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.82^{+0.19}_{-0.23}\pm0.07$	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				
$0.493^{+0.049}_{-0.047}\pm0.013$	[1] AAIJ	16B	LHCB	pp at 7, 8 TeV
$0.39\pm0.05\pm0.04$	KHACHATRY...	16D	CMS	pp at 8 TeV
$0.48^{+0.08}_{-0.09}\pm0.03$	AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0}\mu^+\mu^-$
$0.45^{+0.10}_{-0.11}\pm0.04$	CHATRCHYAN	13BL	CMS	pp at 7 TeV
$0.47\pm0.14\pm0.03$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.17^{+0.17}_{-0.15}\pm0.03$	WEI	09A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.41\pm0.11\pm0.03$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.31^{+0.19}_{-0.18}\pm0.02$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

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

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

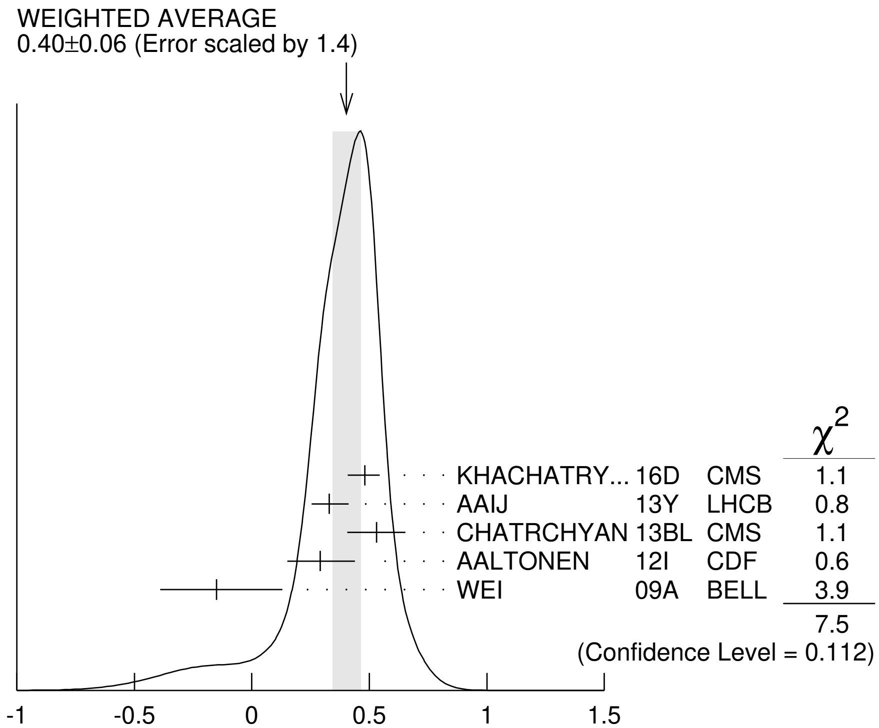
VALUE	DOCUMENT ID		TECN	COMMENT
0.349±0.039±0.009	AAIJ	16B	LHCB	pp at 7, 8 TeV

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

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

$F_L(B \rightarrow K^* \ell^+ \ell^-)$ ($14.18 < q^2 < 16.0$ 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	$e^+e^- \rightarrow \Upsilon(4S)$
• • • 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
0.350±0.019 OUR AVERAGE					
$0.345 \pm 0.020 \pm 0.007$	[1]	AAIJ	20Y	LHCB	pp at 7, 8, 13 TeV
$0.38\ ^{+0.05}_{-0.06} \pm 0.04$		KHACHATRY...	16D	CMS	pp at 8 TeV
$0.38\ ^{+0.09}_{-0.07} \pm 0.03$		AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0} \mu^+ \mu^-$
$0.44 \pm 0.07 \pm 0.03$		CHATRCHYAN	13BL	CMS	pp at 7 TeV
$0.20\ ^{+0.19}_{-0.17} \pm 0.05$		AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.12\ ^{+0.15}_{-0.13} \pm 0.02$		WEI	09A	BELL	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.344\ ^{+0.028}_{-0.030} \pm 0.008$	[1]	AAIJ	16B	LHCB	Repl. by AAIJ 20Y
$0.26\ ^{+0.10}_{-0.08} \pm 0.03$		AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.09\ ^{+0.18}_{-0.14} \pm 0.03$		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
0.67 ±0.07 OUR AVERAGE					Error includes scale factor of 2.8. See the ideogram below.
$0.700 \pm 0.025 \pm 0.013$	[1]	AAIJ	20Y	LHCB	pp at 7, 8, 13 TeV
0.72 ± 0.06		KHACHATRY...	16D	CMS	pp at 7, 8 TeV
$0.24\ ^{+0.09}_{-0.08} \pm 0.02$	[2]	LEES	16C	BABR	$e^+ e^- \to \Upsilon(4S)$

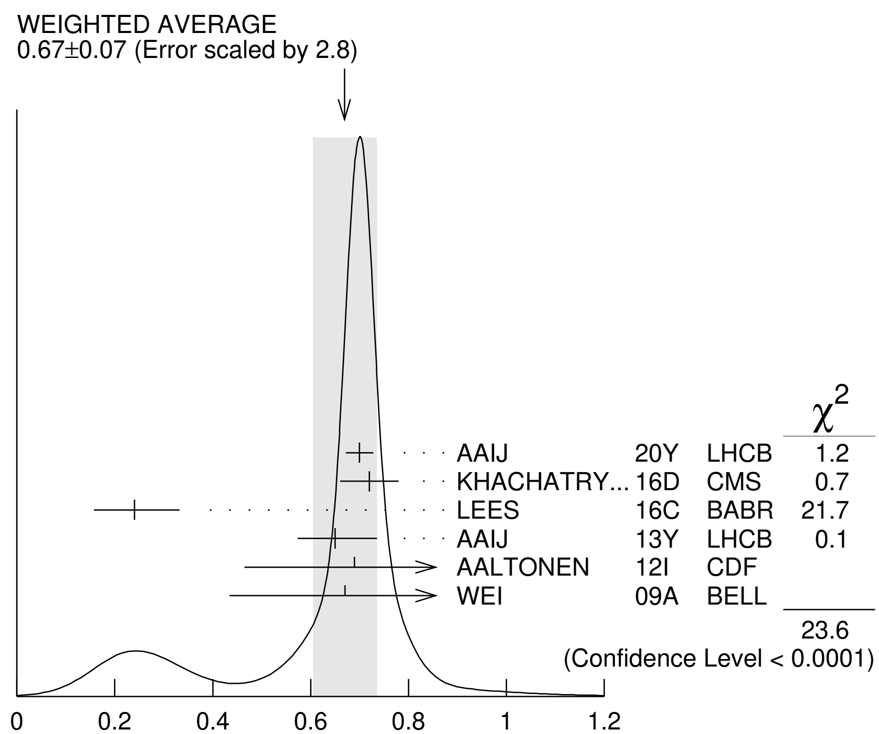
$0.65\ {}^{+0.08}_{-0.07}\ \pm 0.03$		AAIJ	13Y LHCB	pp at 7 TeV, $K^{*0}\mu^+\mu^-$
$0.69\ {}^{+0.19}_{-0.21}\ \pm 0.08$		AALTONEN	12I CDF	$p\overline{p}$ at 1.96 TeV
$0.67\ \pm 0.23\ \pm 0.05$		WEI	09A BELL	$e^+e^- \rightarrow \Upsilon(4S)$

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

$0.690^{+0.035}_{-0.036}\pm 0.017$	[1]	AAIJ	16B LHCB	Repl. by AAIJ 20Y
$0.68\ \pm 0.10\ \pm 0.02$		CHATRCHYAN	13BL CMS	Repl. by KHACHATRYAN 16D
$0.55\ \pm 0.10\ \pm 0.03$		AAIJ	12U LHCB	Repl. by AAIJ 13Y
$0.50\ {}^{+0.27}_{-0.30}\ \pm 0.03$		AALTONEN	11L CDF	Repl. by AALTONEN 12I

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

[2] Measured by combining B^0 and B^+ with e and μ as leptons. Results are also provided separately for B^0 and B^+.



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

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

VALUE	DOCUMENT ID	TECN	COMMENT
$0.33^{+0.14}_{-0.13}\pm 0.03$	AALTONEN 12I	CDF	$p\overline{p}$ at 1.96 TeV

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

$0.47^{+0.23}_{-0.24}\pm 0.03$	AALTONEN 11L	CDF	Repl. by AALTONEN 12I

$A_T^{(2)}$ in $B \rightarrow K^* e^+ e^-$ (at low q^2)

VALUE		DOCUMENT ID	TECN	COMMENT
$0.52\pm 0.53\pm 0.11$	[1,2]	FERLEWICZ 24	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

[1] Events are reconstructed in $B^0 \to K^{*0}(\to K^+\pi^-)e^+e^-$ and $B^+ \to K^{*+}(\to K^0_S\pi^+)e^+e^-$ decay modes. The effective dielectron invariant mass is required to be in the range $0.0008 < q^2 < 1.12$ GeV^2/c^4.

[2] A_T^{Im} and $A_T^{(2)}$ measure the ratio of the right- and left-handed Wilson coefficients, $C_7^{'}/C_7$, which constrains non-SM contributions at small q^2.

A_T^{Im} in $B \to K^* e^+ e^-$ (at low q^2)

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{-1.27 \pm 0.52 \pm 0.12}$	[1,2] FERLEWICZ	24	BELL	$e^+e^- \to \Upsilon(4S)$

[1] Events are reconstructed in $B^0 \to K^{*0}(\to K^+\pi^-)e^+e^-$ and $B^+ \to K^{*+}(\to K^0_S\pi^+)e^+e^-$ decay modes. The effective dielectron invariant mass is required to be in the range $0.0008 < q^2 < 1.12$ GeV^2/c^4.

[2] A_T^{Im} and $A_T^{(2)}$ measure the ratio of the right- and left-handed Wilson coefficients, $C_7^{'}/C_7$, which constrains non-SM contributions at small q^2.

$P_\tau(B \to D^* \tau^+ \nu_\tau)$

Measures difference in decay widths with positive and negative τ^+ helicities normalized to the sum of those decay widths.

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{-0.38 \pm 0.51 ^{+0.21}_{-0.16}}$	[1] HIROSE	17	BELL	$e^+e^- \to \Upsilon(4S)$

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

Γ_L/Γ in $B \to \overline{D}^* \ell^+ \nu_\ell$

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.502 \pm 0.012 \pm 0.004}$	[1] PRIM	23	BELL	$e^+e^- \to \Upsilon(4S)$

[1] This is the $B^+ \to \overline{D}^{*0} \ell^+ \nu_\ell$ and $B^0 \to D^{*-} \ell^+ \nu_\ell$ average.

Γ_L/Γ in $B \to \overline{D}^* e^+ \nu_e$

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.485 \pm 0.018 \pm 0.005}$	[1] PRIM	23	BELL	$e^+e^- \to \Upsilon(4S)$

[1] This is the $B^+ \to \overline{D}^{*0} e^+ \nu_e$ and $B^0 \to D^{*-} e^+ \nu_e$ average.

Γ_L/Γ in $B \to \overline{D}^* \mu^+ \nu_\mu$

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.515 \pm 0.017 \pm 0.005}$	[1] PRIM	23	BELL	$e^+e^- \to \Upsilon(4S)$

[1] This is the $B^+ \to \overline{D}^{*0} \mu^+ \nu_\mu$ and $B^0 \to D^{*-} \mu^+ \nu_\mu$ average.

$\Delta(\Gamma_L/\Gamma)$ in $B \to \overline{D}^* (leption)^+ \nu_\ell$

$\Delta(\Gamma_L/\Gamma) = (\Gamma_L/\Gamma)^\mu - (\Gamma_L/\Gamma)^e$

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.030 \pm 0.025 \pm 0.007}$	[1] PRIM	23	BELL	$e^+e^- \to \Upsilon(4S)$

[1] This is the B^+ and B^0 average.

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)

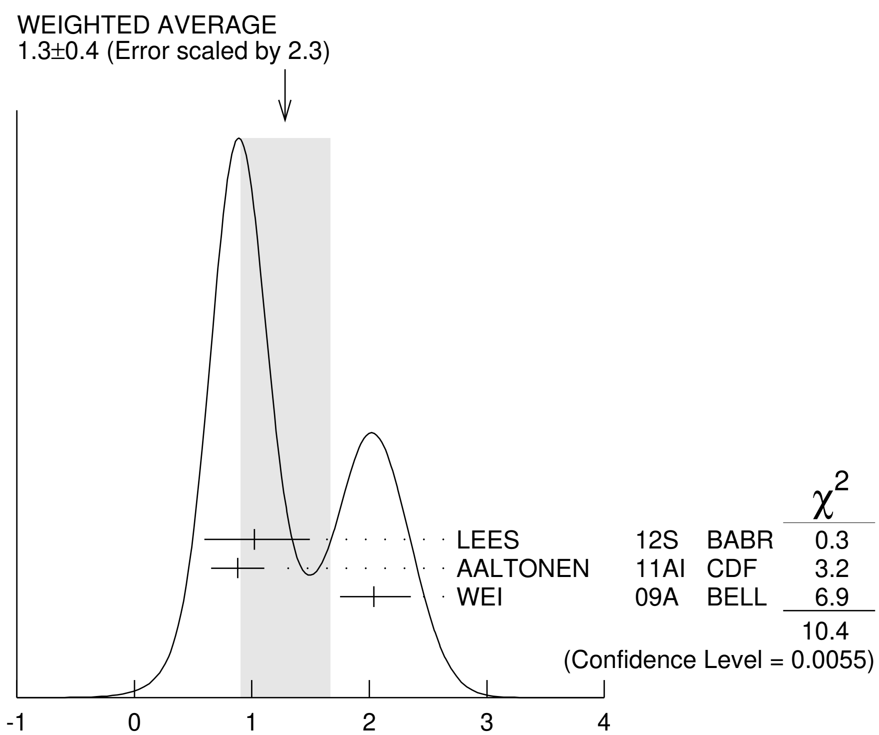
VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
1.21±0.17 OUR AVERAGE				
$1.46^{+0.41}_{-0.36}\pm0.06$	[1] LEES	12S	BABR	$e^+ e^- \to \Upsilon(4S)$

$1.21 \pm 0.24 \pm 0.07$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$1.05^{+0.29}_{-0.26} \pm 0.08$	WEI	09A	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • 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($B \rightarrow K^* \ell^+ \ell^-$) ($16.0 < q^2$ 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	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.88 \pm 0.22 \pm 0.05$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$2.04^{+0.27}_{-0.24} \pm 0.16$	WEI	09A	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • 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($B \rightarrow K^* \ell^+ \ell^-$) ($16.0 < q^2$ GeV^2/c^4) (units 10^{-7})

B($B \rightarrow K^* \ell^+ \ell^-$) ($1.0 < q^2 < 6.0$ 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	$e^+ e^- \rightarrow \Upsilon(4S)$
$1.48 \pm 0.39 \pm 0.12$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$1.49^{+0.45}_{-0.40} \pm 0.12$	WEI	09A	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • 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($B^+ \to K^* \mu^+ \mu^-$) / B($B^+ \to K^* e^+ e^-$) ($0.045 < q^2 < 1.1$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$0.52^{+0.36}_{-0.26}\pm0.05$	WEHLE	21	BELL	$e^+ e^- \to \Upsilon(4S)$

B($B^+ \to K^* \mu^+ \mu^-$) / B($B^+ \to K^* e^+ e^-$) ($1.1 < q^2 < 6.0$ GeV^2/c^4)

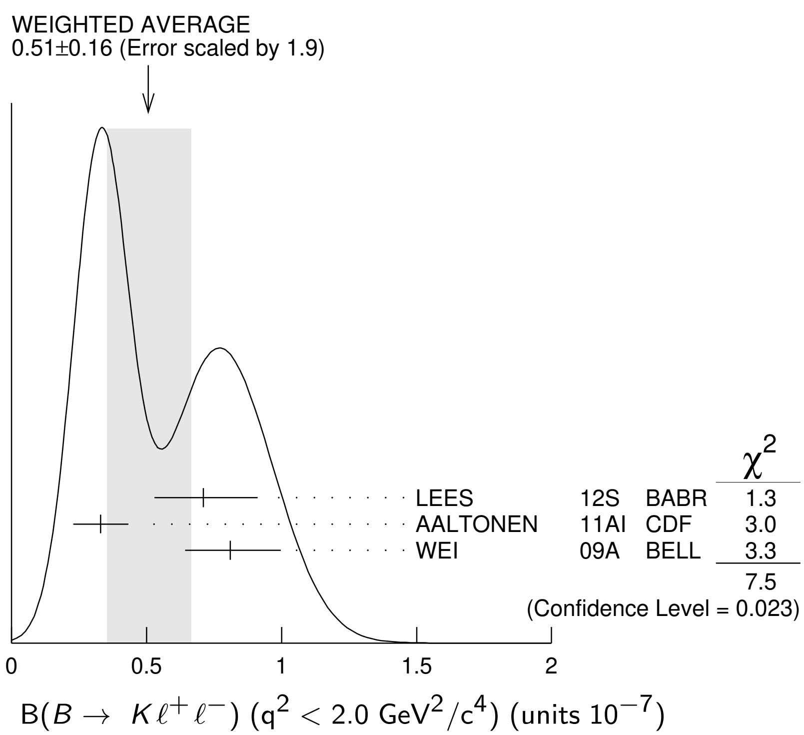
VALUE	DOCUMENT ID		TECN	COMMENT
$0.96^{+0.45}_{-0.29}\pm0.11$	WEHLE	21	BELL	$e^+ e^- \to \Upsilon(4S)$

B($B^+ \to K^* \mu^+ \mu^-$) / B($B^+ \to K^* e^+ e^-$) ($15.0 < q^2 < 19.0$ GeV^2/c^4)

VALUE	DOCUMENT ID		TECN	COMMENT
$1.18^{+0.52}_{-0.32}\pm0.10$	WEHLE	21	BELL	$e^+ e^- \to \Upsilon(4S)$

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($B \to K \ell^+ \ell^-$) ($2.0 < q^2 < 4.3$ 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.			
$0.49^{+0.15}_{-0.13} \pm 0.01$	LEES	12S	BABR	$e^+ e^- \to \Upsilon(4S)$
$0.77 \pm 0.14 \pm 0.05$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$0.46^{+0.14}_{-0.12} \pm 0.03$	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)

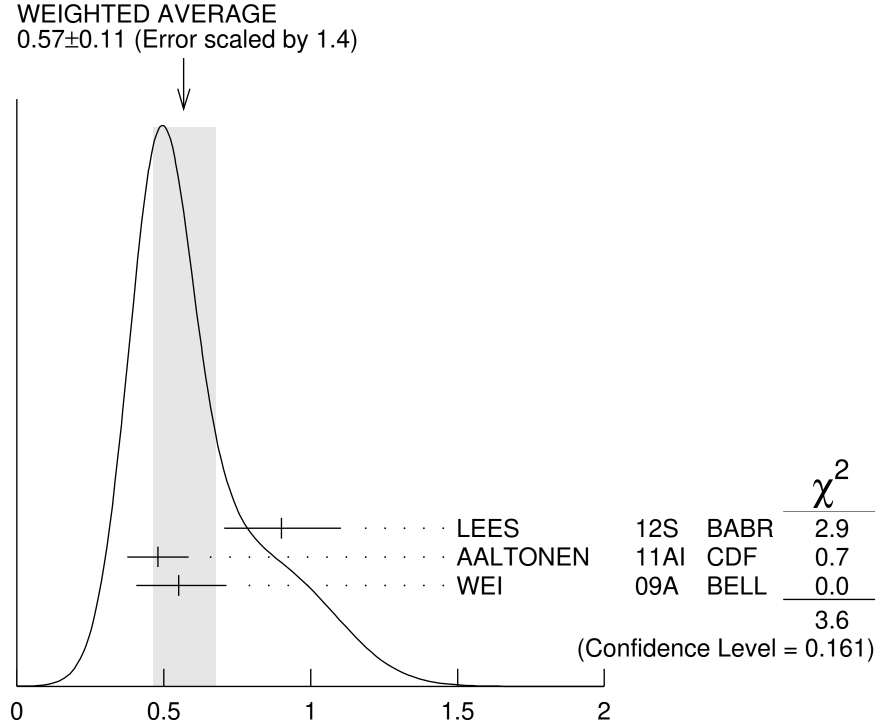
VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
1.00 ± 0.11 OUR AVERAGE				
$0.94^{+0.20}_{-0.19} \pm 0.02$	[1] LEES	12S	BABR	$e^+ e^- \to \Upsilon(4S)$
$1.05 \pm 0.17 \pm 0.07$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$1.00^{+0.19}_{-0.18} \pm 0.06$	WEI	09A	BELL	$e^+ e^- \to \Upsilon(4S)$
• • • 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})

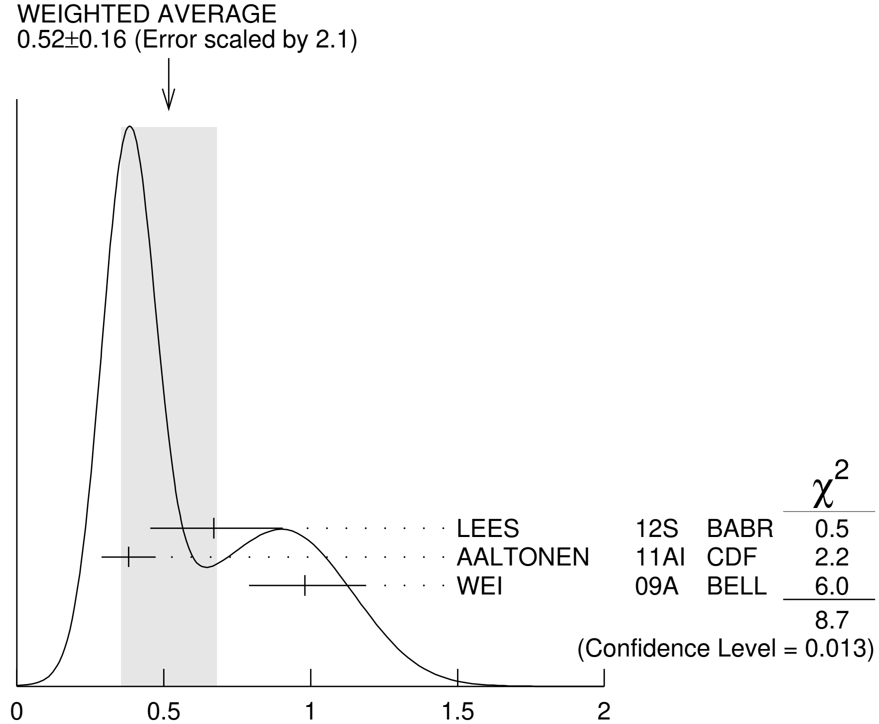
$B(B \to K \ell^+ \ell^-)$ ($14.18 < q^2 < 16.0$ GeV^2/c^4)

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

B($B \rightarrow K \ell^+ \ell^-$) ($1.0 < q^2 < 6.0$ 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	$e^+e^- \rightarrow \Upsilon(4S)$
$1.29\pm0.18\pm0.08$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
$1.36^{+0.23}_{-0.21}\pm0.08$	WEI	09A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • 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($B \rightarrow K \ell^+ \ell^-$) ($0.0 < q^2 < 4.3$ 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($B \rightarrow X_s \ell^+ \ell^-$) ($1.0 < q^2 < 6.0$ 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	$e^+e^- \rightarrow \Upsilon(4S)$

[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.

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
$\mathbf{1.93^{+0.47}_{-0.45}{}^{+0.28}_{-0.24}}$	[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
$\mathbf{0.66^{+0.82}_{-0.76}{}^{+0.31}_{-0.25}}$	[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
$\mathbf{0.57^{+0.16}_{-0.15}{}^{+0.03}_{-0.02}}$	[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 $s=q^2/m_B^2$, 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.

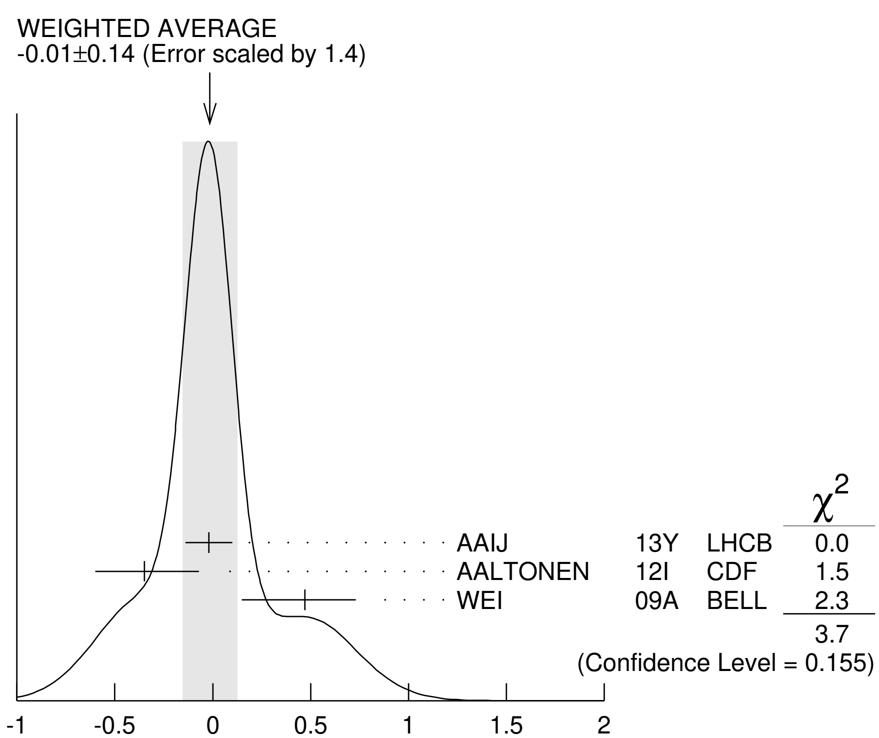
$A_{FB}(B \to K^*\ell^+\ell^-)$ ($q^2 > 0.1$ GeV^2/c^4)

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.			
$-0.02 \pm 0.12 \pm 0.01$	AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0}\mu^+\mu^-$
$-0.35^{+0.26}_{-0.23} \pm 0.10$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.47^{+0.26}_{-0.32} \pm 0.03$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.29^{+0.37}_{-0.00} \pm 0.18$	[1] CHATRCHYAN	13BL	CMS	pp at 7 TeV
$-0.15 \pm 0.20 \pm 0.06$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.13^{+1.65}_{-0.75} \pm 0.25$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I



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

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

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

VALUE	DOCUMENT ID		TECN	COMMENT
$0.24^{+0.18}_{-0.23} \pm 0.05$	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
$0.76^{+0.52}_{-0.32} \pm 0.07$	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
$-0.003^{+0.058}_{-0.057} \pm 0.009$	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
$-0.191^{+0.068}_{-0.080} \pm 0.012$	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
$-0.08^{+0.21}_{-0.20} \pm 0.05$	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
$0.025^{+0.051}_{-0.052} \pm 0.004$	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
$0.152^{+0.041}_{-0.040} \pm 0.008$	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
-0.078 ± 0.022 OUR AVERAGE	Error includes scale factor of 1.1.			
$-0.073 \pm 0.021 \pm 0.002$	[1] AAIJ	20Y	LHCB	pp at 7, 8, 13 TeV
-0.12 ± 0.08	KHACHATRY...	16D	CMS	pp at 7, 8 TeV
$0.21\ ^{+0.10}_{-0.15}\ ^{+0.07}_{-0.09}$	[2] LEES	16C	BABR	$e^+ e^- \to \Upsilon(4S)$
$-0.17 \pm 0.06 \pm 0.01$	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. • • •				
$-0.075\ ^{+0.032}_{-0.034} \pm 0.007$	[1] AAIJ	16B	LHCB	Repl. by AAIJ 20Y
0.55 ± 0.43	[3] SATO	16	BELL	$e^+ e^- \to \Upsilon(4S)$
$-0.07 \pm 0.12 \pm 0.01$	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.
[2] Measured by combining B^0 and B^+ with e and μ as leptons. Results are also provided separately for B^0 and B^+.
[3] Uses $K^* \to K^- \pi^+$, $K^- \pi^0$, $K^0_S \pi^-$ in the range M($K\pi$) < 1.1 GeV/c^2. Uncertainty is statistical only.

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

VALUE	DOCUMENT ID		TECN	COMMENT
$0.13^{+0.06}_{-0.05}$ 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	$e^+ e^- \to \Upsilon(4S)$
• • • 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

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

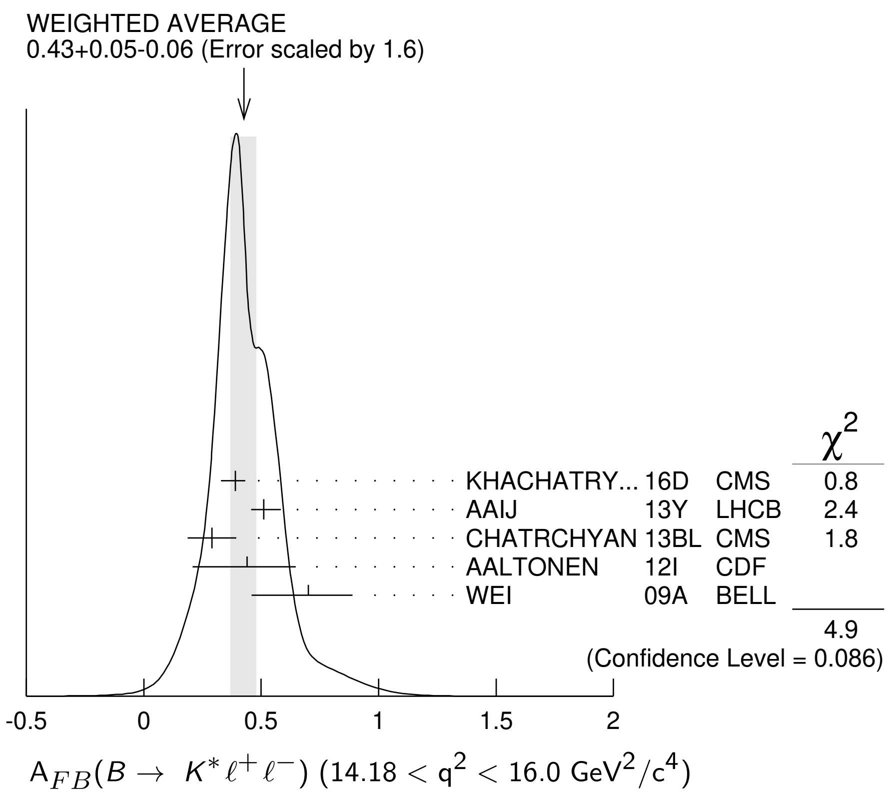
VALUE	DOCUMENT ID		TECN	COMMENT
0.288 ± 0.034 OUR AVERAGE	Error includes scale factor of 1.2.			
$0.318^{+0.044}_{-0.040} \pm 0.009$	[1] AAIJ	16B	LHCB	pp at 7, 8 TeV
$0.16 \pm 0.06 \pm 0.01$	KHACHATRY...	16D	CMS	pp at 8 TeV

$0.28\ ^{+0.07}_{-0.06}\ \pm0.02$	AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0}\mu^+\mu^-$
$0.40\ \pm0.08\ \pm0.05$	CHATRCHYAN	13BL	CMS	pp at 7 TeV
$0.38\ ^{+0.16}_{-0.19}\ \pm0.09$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.43\ ^{+0.18}_{-0.20}\ \pm0.03$	WEI	09A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.27\ ^{+0.11}_{-0.13}\ \pm0.02$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.66\ ^{+0.23}_{-0.20}\ \pm0.07$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

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

$A_{FB}(B \rightarrow K^* \ell^+ \ell^-)$ ($14.18 < q^2 < 16.0$ 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.			
$0.39^{+0.04}_{-0.06}\pm0.01$	KHACHATRY...	16D	CMS	pp at 8 TeV
$0.51^{+0.07}_{-0.05}\pm0.02$	AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0}\mu^+\mu^-$
$0.29\pm0.09\pm0.05$	CHATRCHYAN	13BL	CMS	pp at 7 TeV
$0.44^{+0.18}_{-0.21}\pm0.10$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.70^{+0.16}_{-0.22}\pm0.10$	WEI	09A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.47^{+0.06}_{-0.08}\pm0.03$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.42\pm0.16\pm0.09$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I



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

VALUE	DOCUMENT ID		TECN	COMMENT
$0.411^{+0.41}_{-0.037}\pm0.008$	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
$0.305^{+0.049}_{-0.048}\pm0.013$	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
0.362±0.019 OUR AVERAGE				
$0.353\pm0.020\pm0.010$	[1] AAIJ	20Y	LHCB	pp at 7, 8, 13 TeV
$0.35\pm0.07\pm0.01$	KHACHATRY...	16D	CMS	pp at 8 TeV
$0.30\pm0.08{}^{+0.01}_{-0.02}$	AAIJ	13Y	LHCB	pp at 7 TeV, $K^{*0}\mu^+\mu^-$
$0.41\pm0.05\pm0.03$	CHATRCHYAN	13BL	CMS	pp at 7 TeV
$0.65{}^{+0.17}_{-0.18}\pm0.16$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.66{}^{+0.11}_{-0.16}\pm0.04$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.355\pm0.027\pm0.009$	[1] AAIJ	16B	LHCB	Repl. by AAIJ 20Y
$0.16{}^{+0.11}_{-0.13}\pm0.06$	AAIJ	12U	LHCB	Repl. by AAIJ 13Y
$0.70{}^{+0.16}_{-0.25}\pm0.10$	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

$A_{FB}(B \rightarrow K\ell^+\ell^-)$ ($2.0 < q^2 < 4.3$ 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	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.72^{+0.40}_{-0.35}\pm0.07$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

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

VALUE	DOCUMENT ID		TECN	COMMENT
$0.31\pm0.16\pm0.04$	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

$A_{FB}(B \rightarrow K\ell^+\ell^-)$ ($1.0 < q^2 < 6.0$ 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	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.00\ \pm0.13$	[1] SATO	16	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$0.08\ {}^{+0.27}_{-0.22}\ \pm0.07$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

[1] Statistical uncertainty only.

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

VALUE	DOCUMENT ID		TECN	COMMENT
$-0.04^{+0.04}_{-0.05}$ OUR AVERAGE				
$-0.02^{+0.03}_{-0.05}\pm0.03$	AAIJ	13H	LHCB	pp at 7 TeV
$0.01^{+0.13}_{-0.10}\pm0.01$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$-0.20^{+0.12}_{-0.14}\pm0.03$	WEI	09A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.20^{+0.17}_{-0.28}\pm0.03$	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
-0.05 ± 0.06 OUR AVERAGE				
$-0.03\pm0.07\pm0.01$	AAIJ	13H	LHCB	pp at 7 TeV

VALUE	DOCUMENT ID		TECN	COMMENT
$-0.03^{+0.11}_{-0.10}\pm0.04$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$-0.21^{+0.17}_{-0.15}\pm0.06$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.10^{+0.17}_{-0.15}\pm0.07$	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
$\mathbf{-0.02^{+0.07}_{-0.05}}$ **OUR AVERAGE**				
$-0.01^{+0.12}_{-0.06}\pm0.01$	AAIJ	13H	LHCB	pp at 7 TeV
$-0.05^{+0.09}_{-0.11}\pm0.03$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.04^{+0.32}_{-0.26}\pm0.05$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.03^{+0.49}_{-0.16}\pm0.04$	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
$\mathbf{-0.09^{+0.07}_{-0.09}{}^{+0.02}_{-0.01}}$	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
$\mathbf{0.02\pm0.11\pm0.01}$	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
$\mathbf{0.04^{+0.09}_{-0.07}}$ **OUR AVERAGE**				
$0.09^{+0.17}_{-0.13}\pm0.03$	AALTONEN	12I	CDF	$p\overline{p}$ at 1.96 TeV
$0.02^{+0.11}_{-0.08}\pm0.02$	WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.07^{+0.30}_{-0.23}\pm0.02$	AALTONEN	11L	CDF	Repl. by AALTONEN 12I

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

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.74 ± 0.54	[1] SATO	16	BELL	$e^+e^- \to \Upsilon(4S)$

[1] Uses the sum of 10 exclusive X_s modes in the range $M(X_s) > 1.1$ GeV/c^2. Uncertainty is statistical only.

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

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.81^{+0.58}_{-0.61}\pm0.46}$	[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±0.012±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±0.033±0.006	[1] AAIJ	14AF	LHCB	pp at 7, 8 TeV

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

A_{FB} in $B \to \overline{D}^* e^+ \nu_e$

VALUE	DOCUMENT ID		TECN	COMMENT
0.227±0.020±0.006	[1] PRIM	23	BELL	$e^+ e^- \to \Upsilon(4S)$

[1] This is the B^+ and B^0 average.

A_{FB} in $B \to \overline{D}^* \mu^+ \nu_\mu$

VALUE	DOCUMENT ID		TECN	COMMENT
0.256±0.020±0.005	[1] PRIM	23	BELL	$e^+ e^- \to \Upsilon(4S)$

[1] This is the B^+ and B^0 average.

$\Delta(A_{FB}) = (A^{\mu}_{FB} - A^{e}_{FB})$ in $B^0 \to D^{*-} \ell^+ \nu_\ell$

VALUE	DOCUMENT ID		TECN	COMMENT
0.028±0.028±0.008	[1] PRIM	23	BELL	$e^+ e^- \to \Upsilon(4S)$

[1] This is the B^+ and B^0 average.

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
−0.005 ±0.020 OUR AVERAGE				
−0.0048±0.0149±0.0150	[1] WATANUKI	19	BELL	$e^+ e^- \to \Upsilon(4S)$
−0.006 ±0.058 ±0.026	AUBERT,B	05R	BABR	$e^+ e^- \to \Upsilon(4S)$

[1] Using a sum-of-exclusive technique with m_{X_s} < 2.8 GeV/c^2.

$\Delta_{0-}(B(B \to X_{s+d} \gamma))$

VALUE	DOCUMENT ID		TECN	COMMENT
−0.06±0.15±0.07	[1] AUBERT	08O	BABR	$e^+ e^- \to \Upsilon(4S)$

[1] Uses a fully reconstructed B meson as a tag on the recoil side. The result is for $E_\gamma >$ 2.2 GeV.

$\Delta_{0+}(B \to K^*(892)\gamma)$

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
0.059±0.014 OUR AVERAGE				
0.048±0.020±0.018	[1] ADACHI	25Z	BELL	$e^+e^- \to \Upsilon(4S)$
0.062±0.015±0.013	[2] HORIGUCHI	17	BELL	$e^+e^- \to \Upsilon(4S)$
0.066±0.021±0.022	[3] AUBERT	09AO	BABR	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.050±0.045±0.037	[4] AUBERT,BE	04A	BABR	Repl. by AUBERT 09AO
0.012±0.044±0.026	NAKAO	04	BELL	Repl. by HORIGUCHI 17

[1] Uses B($\Upsilon(4S) \to B^+B^-$)=($51.13^{+0.73}_{-1.08}$)%, B($\Upsilon(4S) \to B^0\overline{B}^0$)=($48.61^{+0.74}_{-0.80}$)%.

[2] Uses B($\Upsilon(4S) \to B^+B^-$) = (51.4 ± 0.6)% and B($\Upsilon(4S) \to B^0\overline{B}^0$) = (48.6 ± 0.6)%.

[3] Uses the production ratio of charged and neutral B from $\Upsilon(4S)$ decays and the lifetime ratio τ_{B^+}/τ_{B^0} = 1.071 ± 0.009. The 90% CL interval is $0.017 < \Delta_{0+} < 0.116$

[4] Uses the production ratio of charged and neutral B from $\Upsilon(4S)$ decays $R^{+/0}$ = 1.006 ± 0.048 and the lifetime ratio of τ_{B^+} / τ_{B^0} = 1.083 ± 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
−0.36 ±0.13 OUR AVERAGE				
$-0.197^{+0.190}_{-0.182}{}^{+0.119}_{-0.127}$	[1] ADACHI	25G	BELL	$e^+e^- \to \Upsilon(4S)$
$-0.43^{+0.25}_{-0.22} \pm 0.10$	AUBERT	08BH	BABR	$e^+e^- \to \Upsilon(4S)$
$-0.48^{+0.21}_{-0.19}{}^{+0.08}_{-0.09}$	TANIGUCHI	08	BELL	$e^+e^- \to \Upsilon(4S)$

[1] ADACHI 25G reports the ratio $(2\,\Gamma(B^0 \to \rho^0\gamma) - \Gamma(B^+ \to \rho^+\gamma))$ / $(2\,\Gamma(B^0 \to \rho^0\gamma) + \Gamma(B^+ \to \rho^+\gamma))$ = $0.109^{+0.112}_{-0.117}{}^{+0.068}_{-0.062}{}^{+0.038}_{-0.039}$, where the last uncertainty comes from f_{+-}/f_{00} uncertainty combined with the one from τ_{B^+}/τ_{B^0} lifetimes ratio.

$\Delta_{0-}(B(B \to K\ell^+\ell^-))$

VALUE	DOCUMENT ID		TECN	COMMENT
−0.15±0.06 OUR AVERAGE Error includes scale factor of 1.2.				
$-0.31^{+0.13}_{-0.11} \pm 0.01$	[1] CHOUDHURY	21	BELL	$e^+e^- \to \Upsilon(4S)$
$-0.10^{+0.08}_{-0.09} \pm 0.02$	[2] AAIJ	14M	LHCB	pp at 7, 8 TeV
$-0.09^{+0.08}_{-0.08} \pm 0.02$	[3] AAIJ	14M	LHCB	pp at 7, 8 TeV
$-0.58^{+0.29}_{-0.37} \pm 0.02$	[4] LEES	12S	BABR	$e^+e^- \to \Upsilon(4S)$
• • • 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
$-0.31^{+0.17}_{-0.14} \pm 0.08$	[8,9] WEI	09A	BELL	$e^+e^- \to \Upsilon(4S)$

[1] For $1.0 < q^2 < 6.0$ GeV^2/c^4 using both $\mu^+\mu^-$ and e^+e^- as a lepton pair. Measurements in other q^2 bins are also reported.

[2] 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.
[3] 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.
[4] For 0.10 $<$ q^2 $<$ 8.12 GeV^2/c^4. Measurements in other q^2 bins are also reported.
[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 $\Upsilon(4S)$.
[8] Superseded by CHOUDHURY 21.
[9] For q^2 $<$ 8.68 GeV^2/c^4.

Δ_{0-}(B($B \to K^*\ell^+\ell^-$))

VALUE	DOCUMENT ID	TECN	COMMENT
$-0.03^{+0.08}_{-0.07}$ 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
-0.45 ± 0.17 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±0.038±0.068	[1] ACOSTA	05F	CDF	$p\overline{p}$ at 1.96 TeV
0.293±0.012±0.058	[2] CSORNA	04	CLE2	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.251±0.023±0.062	[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	$e^+ e^- \to \Upsilon(4S)$
4.18 ±0.04 ±0.03	[1] AUBERT,B	04	BABR	$e^+ e^- \to \Upsilon(4S)$

[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	$e^+ e^- \to \Upsilon(4S)$
0.629±0.031±0.143	[2] CSORNA	04	CLE2	$e^+ e^- \to \Upsilon(4S)$
• • • 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	$e^+ e^- \to \Upsilon(4S)$

[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	$e^+ e^- \to \Upsilon(4S)$

[1] The leptons are required to have $E_\ell > 1.5$ GeV/c.

$B \to X_c \ell \nu$ 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	$e^+ e^- \to \Upsilon(4S)$

[1] The leptons are required to have E_l >1.5 GeV in the B rest frame.

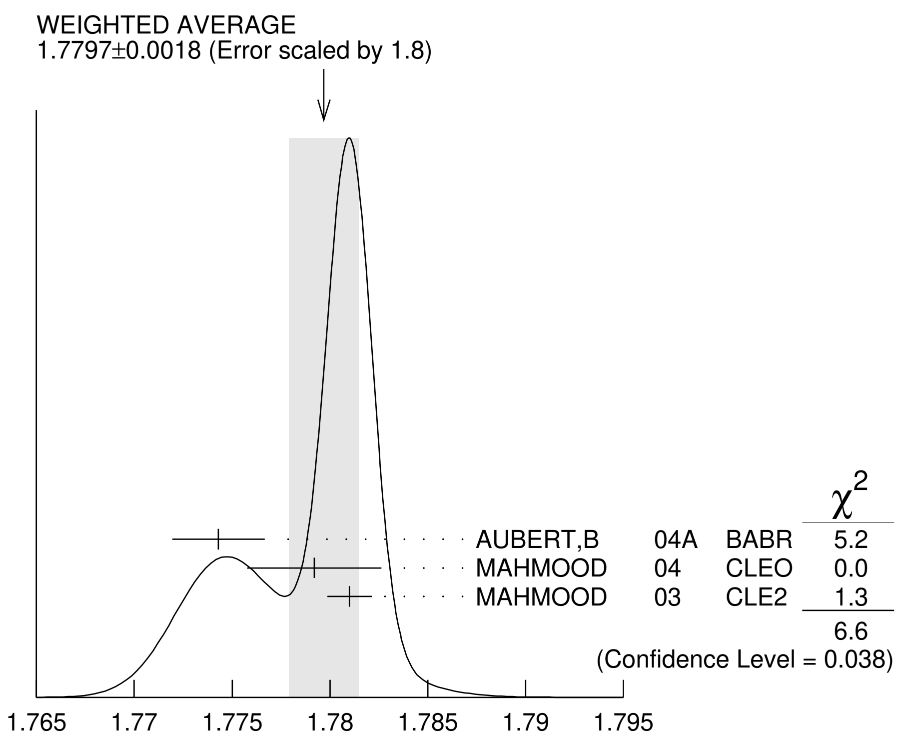
R_1 ($\langle E_l \rangle_{E_l > 1.5 GeV}$)

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	$e^+ e^- \to \Upsilon(4S)$
1.7792±0.0021±0.0027	[2] MAHMOOD 04	CLEO	$e^+ e^- \to \Upsilon(4S)$
1.7810±0.0007±0.0009	[3] MAHMOOD 03	CLE2	$e^+ e^- \to \Upsilon(4S)$

[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_1 ($\langle E_l \rangle_{E_l > 1.5 GeV}$)

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	$e^+ e^- \to \Upsilon(4S)$
31.6±0.8±1.0	[2] MAHMOOD 04	CLEO	$e^+ e^- \to \Upsilon(4S)$

[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	$e^+ e^- \rightarrow \Upsilon(4S)$
$2.304 \pm 0.014 \pm 0.017$	[2,3] LEES	12V	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$2.311 \pm 0.009 \pm 0.015$	[3] LIMOSANI	09	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$2.289 \pm 0.058 \pm 0.027$	[3,4] AUBERT	08O	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$2.309 \pm 0.023 \pm 0.023$	[2,3] SCHWANDA	08	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$2.288 \pm 0.025 \pm 0.023$	[3] AUBERT,BE	06B	BABR	Repl. by LEES 12V

[1] LEES 12U uses $E_\gamma > 1.897$ GeV to calculate the moments; the moments are used to calculate the HQET parameters $m_b = 4.579^{+0.032}_{-0.029}$ GeV/c^2 and $\mu_\pi^2 = 0.257^{+0.034}_{-0.039}$ GeV^2 in the shape function model. The same HQET parameters are also determined in the kinetic model.

[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.

$\langle E_\gamma^2 \rangle - \langle E_\gamma \rangle^2$

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	$e^+ e^- \rightarrow \Upsilon(4S)$
$3.62 \pm 0.33 \pm 0.33$	[2,3] LEES	12V	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$3.02 \pm 0.19 \pm 0.30$	[3] LIMOSANI	09	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$3.34 \pm 1.24 \pm 0.62$	[3,4] AUBERT	08O	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$2.17 \pm 0.60 \pm 0.55$	[2,3] SCHWANDA	08	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$3.28 \pm 0.40 \pm 0.43$	[3] AUBERT,BE	06B	BABR	Repl. by LEES 12V

[1] LEES 12U uses $E_\gamma > 1.897$ GeV to calculate the moments; the moments are used to calculate the HQET parameters $m_b = 4.579^{+0.032}_{-0.029}$ GeV/c^2 and $\mu_\pi^2 = 0.257^{+0.034}_{-0.039}$ GeV^2 in the shape function model. The same HQET parameters are also determined in the kinetic model.

[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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CAO	23	PRL 131 211801	L. Cao *et al.*	(BELLE Collab.)
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ZHUKOVA	23	JHEP 2308 131	V. Zhukova *et al.*	(BELLE Collab.)
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KUBOTA	96	PR D53 6033	Y. Kubota *et al.*	(CLEO Collab.)
PDG	96	PR D54 1	R. M. Barnett *et al.*	(PDG Collab.)
ALAM	95	PRL 74 2885	M.S. Alam *et al.*	(CLEO Collab.)
ALBRECHT	95D	PL B353 554	H. Albrecht *et al.*	(ARGUS Collab.)
BALEST	95B	PR D52 2661	R. Balest *et al.*	(CLEO Collab.)
BARISH	95	PR D51 1014	B.C. Barish *et al.*	(CLEO Collab.)
BUSKULIC	95B	PL B345 103	D. Buskulic *et al.*	(ALEPH Collab.)
ALBRECHT	94C	ZPHY C62 371	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	94J	ZPHY C61 1	H. Albrecht *et al.*	(ARGUS Collab.)
PROCARIO	94	PRL 73 1472	M. Procario *et al.*	(CLEO Collab.)
ALBRECHT	93	ZPHY C57 533	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	93E	ZPHY C60 11	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	93H	PL B318 397	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	93I	ZPHY C58 191	H. Albrecht *et al.*	(ARGUS Collab.)
ALEXANDER	93B	PL B319 365	J. Alexander *et al.*	(CLEO Collab.)
ARTUSO	93	PL B311 307	M. Artuso	(SYRA)
BARTELT	93B	PRL 71 4111	J.E. Bartelt *et al.*	(CLEO Collab.)
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	(MAINZ, 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)