$B^{\pm}$

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

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

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

$B^{\pm}$ MASS

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

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
5279.0±0.5 OUR FIT					
5279.1±0.5 OUR AVERAGE					
5279.1±0.4 ±0.4	526	[1] CSORNA	00	CLE2	$e^+e^- \to \Upsilon(4S)$
5279.1±1.7 ±1.4	147	ABE	96B	CDF	$p\overline{p}$ at 1.8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
5278.8±0.54±2.0	362	ALAM	94	CLE2	$e^+e^- \to \Upsilon(4S)$
5278.3±0.4 ±2.0		BORTOLETTO	92	CLEO	$e^+e^- \to \Upsilon(4S)$
5280.5±1.0 ±2.0		[2] ALBRECHT	90J	ARG	$e^+e^- \to \Upsilon(4S)$
5275.8±1.3 ±3.0	32	ALBRECHT	87C	ARG	$e^+e^- \to \Upsilon(4S)$
5278.2±1.8 ±3.0	12	[3] ALBRECHT	87D	ARG	$e^+e^- \to \Upsilon(4S)$
5278.6±0.8 ±2.0		BEBEK	87	CLEO	$e^+e^- \to \Upsilon(4S)$

[1] CSORNA 00 uses fully reconstructed 526 $B^+ \to J/\psi^{(\prime)} K^+$ events and invariant masses without beam constraint.

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

[3] Found using fully reconstructed decays with $J/\psi(1S)$. ALBRECHT 87D assume $m_{\Upsilon(4S)}$ = 10577 MeV.

$B^{\pm}$ MEAN LIFE

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

"OUR EVALUATION" is an average of the data listed below performed by the LEP B Lifetimes Working Group as described in our review "Production and Decay of b-flavored Hadrons" in the $B^{\pm}$ Section of the Listings. The averaging procedure takes into account correlations between the measurements and asymmetric lifetime errors.

VALUE (10^{-12} s)	EVTS	DOCUMENT ID		TECN	COMMENT
1.655±0.027 OUR EVALUATION					
1.648±0.049±0.035		[4] BARATE	00R	ALEP	$e^+e^- \to Z$
1.643±0.037±0.025		[5] ABBIENDI	99J	OPAL	$e^+e^- \to Z$
1.68 ±0.07 ±0.02		[6] ABE	98B	CDF	$p\overline{p}$ at 1.8 TeV
1.637±0.058$^{+0.045}_{-0.043}$		[4] ABE	98Q	CDF	$p\overline{p}$ at 1.8 TeV
1.66 ±0.06 ±0.03		[5] ACCIARRI	98S	L3	$e^+e^- \to Z$

$1.66 \pm 0.06 \pm 0.05$		[5] ABE	97J	SLD	$e^+e^- \rightarrow Z$
$1.58 {}^{+0.21}_{-0.18} {}^{+0.04}_{-0.03}$	94	[6] BUSKULIC	96J	ALEP	$e^+e^- \rightarrow Z$
$1.61 \pm 0.16 \pm 0.12$		[4,7] ABREU	95Q	DLPH	$e^+e^- \rightarrow Z$
$1.72 \pm 0.08 \pm 0.06$		[8] ADAM	95	DLPH	$e^+e^- \rightarrow Z$
$1.52 \pm 0.14 \pm 0.09$		[4] AKERS	95T	OPAL	$e^+e^- \rightarrow Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.56 \pm 0.13 \pm 0.06$		[4] ABE	96C	CDF	Repl. by ABE 98Q
$1.58 \pm 0.09 \pm 0.03$		[9] BUSKULIC	96J	ALEP	$e^+e^- \rightarrow Z$
$1.58 \pm 0.09 \pm 0.04$		[4] BUSKULIC	96J	ALEP	Repl. by BARATE 00R
1.70 ± 0.09		[10] ADAM	95	DLPH	$e^+e^- \rightarrow Z$
$1.61 \pm 0.16 \pm 0.05$	148	[6] ABE	94D	CDF	Repl. by ABE 98B
$1.30 {}^{+0.33}_{-0.29} \pm 0.16$	92	[4] ABREU	93D	DLPH	Sup. by ABREU 95Q
$1.56 \pm 0.19 \pm 0.13$	134	[8] ABREU	93G	DLPH	Sup. by ADAM 95
$1.51 {}^{+0.30}_{-0.28} {}^{+0.12}_{-0.14}$	59	[4] ACTON	93C	OPAL	Sup. by AKERS 95T
$1.47 {}^{+0.22}_{-0.19} {}^{+0.15}_{-0.14}$	77	[4] BUSKULIC	93D	ALEP	Sup. by BUSKULIC 96J

[4] Data analyzed using $D/D^* \ell X$ event vertices.

[5] Data analyzed using charge of secondary vertex.

[6] Measured mean life using fully reconstructed decays.

[7] ABREU 95Q assumes $B(B^0 \rightarrow D^{**-} \ell^+ \nu_\ell) = 3.2 \pm 1.7\%$.

[8] Data analyzed using vertex-charge technique to tag B charge.

[9] Combined result of $D/D^* \ell X$ analysis and fully reconstructed B analysis.

[10] Combined ABREU 95Q and ADAM 95 result.

B^+ DECAY MODES

B^- modes are charge conjugates of the modes below. Modes which do not identify the charge state of the B are listed in the $B^\pm/B^0$ ADMIXTURE section.

The branching fractions listed below assume 50% $B^0\overline{B}^0$ and 50% B^+B^- production at the $\Upsilon(4S)$. We have attempted to bring older measurements up to date by rescaling their assumed $\Upsilon(4S)$ production ratio to 50:50 and their assumed D, D_s, D^*, and ψ branching ratios to current values whenever this would affect our averages and best limits significantly.

Indentation is used to indicate a subchannel of a previous reaction. All resonant subchannels have been corrected for resonance branching fractions to the final state so the sum of the subchannel branching fractions can exceed that of the final state.

	Mode		Fraction (Γ_i/Γ)	Scale factor/ Confidence level
	Semileptonic and leptonic modes			
Γ_1	$\ell^+\nu_\ell$ anything	[a]	$(10.2\ \pm0.9\ )$ %	
Γ_2	$\overline{D}^0\ell^+\nu_\ell$	[a]	$(\ 2.15\pm0.22)$ %	
Γ_3	$\overline{D}^*(2007)^0\ell^+\nu_\ell$	[a]	$(\ 5.3\ \pm0.8\ )$ %	
Γ_4	$\overline{D}_1(2420)^0\ell^+\nu_\ell$		$(\ 5.6\ \pm1.6\ )\times10^{-3}$	
Γ_5	$\overline{D}_2^*(2460)^0\ell^+\nu_\ell$		$<\ 8\ \times10^{-3}$	CL=90%
Γ_6	$\pi^0e^+\nu_e$		$(\ 9.0\ \pm2.8\ )\times10^{-5}$	
Γ_7	$\omega\ell^+\nu_\ell$	[a]	$<\ 2.1\ \times10^{-4}$	CL=90%
Γ_8	$\omega\mu^+\nu_\mu$			
Γ_9	$\rho^0\ell^+\nu_\ell$	[a]	$(\ 1.34^{+0.32}_{-0.35})\times10^{-4}$	
Γ_{10}	$e^+\nu_e$		$<\ 1.5\ \times10^{-5}$	CL=90%
Γ_{11}	$\mu^+\nu_\mu$		$<\ 2.1\ \times10^{-5}$	CL=90%
Γ_{12}	$\tau^+\nu_\tau$		$<\ 5.7\ \times10^{-4}$	CL=90%
Γ_{13}	$e^+\nu_e\gamma$		$<\ 2.0\ \times10^{-4}$	CL=90%
Γ_{14}	$\mu^+\nu_\mu\gamma$		$<\ 5.2\ \times10^{-5}$	CL=90%
	D, D^*, or D_s modes			
Γ_{15}	$\overline{D}^0\pi^+$		$(\ 5.3\ \pm0.5\ )\times10^{-3}$	
Γ_{16}	$\overline{D}^0\rho^+$		$(\ 1.34\pm0.18)$ %	
Γ_{17}	$\overline{D}^0K^+$		$(\ 2.9\ \pm0.8\ )\times10^{-4}$	
Γ_{18}	$\overline{D}^0\pi^+\pi^+\pi^-$		$(\ 1.1\ \pm0.4\ )$ %	
Γ_{19}	$\overline{D}^0\pi^+\pi^+\pi^-$ nonresonant		$(\ 5\ \pm4\ )\times10^{-3}$	
Γ_{20}	$\overline{D}^0\pi^+\rho^0$		$(\ 4.2\ \pm3.0\ )\times10^{-3}$	
Γ_{21}	$\overline{D}^0a_1(1260)^+$		$(\ 5\ \pm4\ )\times10^{-3}$	
Γ_{22}	$D^*(2010)^-\pi^+\pi^+$		$(\ 2.1\ \pm0.6\ )\times10^{-3}$	
Γ_{23}	$D^-\pi^+\pi^+$		$<\ 1.4\ \times10^{-3}$	CL=90%
Γ_{24}	$\overline{D}^*(2007)^0\pi^+$		$(\ 4.6\ \pm0.4\ )\times10^{-3}$	
Γ_{25}	$D^*(2010)^+\pi^0$		$<\ 1.7\ \times10^{-4}$	CL=90%

Γ_{26}	$\overline{D}^*(2007)^0 \rho^+$	(1.55±0.31)	%	
Γ_{27}	$\overline{D}^*(2007)^0 \pi^+ \pi^+ \pi^-$	(9.4 ±2.6)	$\times 10^{-3}$	
Γ_{28}	$\overline{D}^*(2007)^0 a_1(1260)^+$	(1.9 ±0.5)	%	
Γ_{29}	$D^*(2010)^- \pi^+ \pi^+ \pi^0$	(1.5 ±0.7)	%	
Γ_{30}	$D^*(2010)^- \pi^+ \pi^+ \pi^+ \pi^-$	< 1	%	CL=90%
Γ_{31}	$\overline{D}_1^*(2420)^0 \pi^+$	(1.5 ±0.6)	$\times 10^{-3}$	S=1.3
Γ_{32}	$\overline{D}_1^*(2420)^0 \rho^+$	< 1.4	$\times 10^{-3}$	CL=90%
Γ_{33}	$\overline{D}_2^*(2460)^0 \pi^+$	< 1.3	$\times 10^{-3}$	CL=90%
Γ_{34}	$\overline{D}_2^*(2460)^0 \rho^+$	< 4.7	$\times 10^{-3}$	CL=90%
Γ_{35}	$\overline{D}^0 D_s^+$	(1.3 ±0.4)	%	
Γ_{36}	$\overline{D}^0 D_s^{*+}$	(9 ±4)	$\times 10^{-3}$	
Γ_{37}	$\overline{D}^*(2007)^0 D_s^+$	(1.2 ±0.5)	%	
Γ_{38}	$\overline{D}^*(2007)^0 D_s^{*+}$	(2.7 ±1.0)	%	
Γ_{39}	$D_s^{(*)+} \overline{D}^{**0}$	(2.7 ±1.2)	%	
Γ_{40}	$\overline{D}^*(2007)^0 D^*(2010)^+$	< 1.1	%	CL=90%
Γ_{41}	$\overline{D}^0 D^*(2010)^+ + \overline{D}^*(2007)^0 D^+$	< 1.3	%	CL=90%
Γ_{42}	$\overline{D}^0 D^+$	< 6.7	$\times 10^{-3}$	CL=90%
Γ_{43}	$D_s^+ \pi^0$	< 2.0	$\times 10^{-4}$	CL=90%
Γ_{44}	$D_s^{*+} \pi^0$	< 3.3	$\times 10^{-4}$	CL=90%
Γ_{45}	$D_s^+ \eta$	< 5	$\times 10^{-4}$	CL=90%
Γ_{46}	$D_s^{*+} \eta$	< 8	$\times 10^{-4}$	CL=90%
Γ_{47}	$D_s^+ \rho^0$	< 4	$\times 10^{-4}$	CL=90%
Γ_{48}	$D_s^{*+} \rho^0$	< 5	$\times 10^{-4}$	CL=90%
Γ_{49}	$D_s^+ \omega$	< 5	$\times 10^{-4}$	CL=90%
Γ_{50}	$D_s^{*+} \omega$	< 7	$\times 10^{-4}$	CL=90%
Γ_{51}	$D_s^+ a_1(1260)^0$	< 2.2	$\times 10^{-3}$	CL=90%
Γ_{52}	$D_s^{*+} a_1(1260)^0$	< 1.6	$\times 10^{-3}$	CL=90%
Γ_{53}	$D_s^+ \phi$	< 3.2	$\times 10^{-4}$	CL=90%
Γ_{54}	$D_s^{*+} \phi$	< 4	$\times 10^{-4}$	CL=90%
Γ_{55}	$D_s^+ \overline{K}^0$	< 1.1	$\times 10^{-3}$	CL=90%
Γ_{56}	$D_s^{*+} \overline{K}^0$	< 1.1	$\times 10^{-3}$	CL=90%
Γ_{57}	$D_s^+ \overline{K}^*(892)^0$	< 5	$\times 10^{-4}$	CL=90%
Γ_{58}	$D_s^{*+} \overline{K}^*(892)^0$	< 4	$\times 10^{-4}$	CL=90%
Γ_{59}	$D_s^- \pi^+ K^+$	< 8	$\times 10^{-4}$	CL=90%
Γ_{60}	$D_s^{*-} \pi^+ K^+$	< 1.2	$\times 10^{-3}$	CL=90%
Γ_{61}	$D_s^- \pi^+ K^*(892)^+$	< 6	$\times 10^{-3}$	CL=90%
Γ_{62}	$D_s^{*-} \pi^+ K^*(892)^+$	< 8	$\times 10^{-3}$	CL=90%

Charmonium modes

Γ_{63}	$\eta_c K^+$	$(6.9\ ^{+3.4}_{-3.0}) \times 10^{-4}$	
Γ_{64}	$J/\psi(1S) K^+$	$(10.0 \pm 1.0) \times 10^{-4}$	
Γ_{65}	$J/\psi(1S) K^+ \pi^+ \pi^-$	$(1.4 \pm 0.6) \times 10^{-3}$	
Γ_{66}	$J/\psi(1S) K^*(892)^+$	$(1.48 \pm 0.27) \times 10^{-3}$	
Γ_{67}	$J/\psi(1S) \phi K^+$	$(8.8\ ^{+3.7}_{-3.3}) \times 10^{-5}$	
Γ_{68}	$J/\psi(1S) \pi^+$	$(5.1 \pm 1.5) \times 10^{-5}$	
Γ_{69}	$J/\psi(1S) \rho^+$	$< 7.7 \times 10^{-4}$	CL=90%
Γ_{70}	$J/\psi(1S) a_1(1260)^+$	$< 1.2 \times 10^{-3}$	CL=90%
Γ_{71}	$\psi(2S) K^+$	$(5.8 \pm 1.0) \times 10^{-4}$	
Γ_{72}	$\psi(2S) K^*(892)^+$	$< 3.0 \times 10^{-3}$	CL=90%
Γ_{73}	$\psi(2S) K^+ \pi^+ \pi^-$	$(1.9 \pm 1.2) \times 10^{-3}$	
Γ_{74}	$\chi_{c0}(1P) K^+$	$< 4.8 \times 10^{-4}$	CL=90%
Γ_{75}	$\chi_{c1}(1P) K^+$	$(1.0 \pm 0.4) \times 10^{-3}$	
Γ_{76}	$\chi_{c1}(1P) K^*(892)^+$	$< 2.1 \times 10^{-3}$	CL=90%

K or K^* modes

Γ_{77}	$K^0 \pi^+$	$(1.8\ ^{+0.5}_{-0.4}) \times 10^{-5}$	
Γ_{78}	$K^+ \pi^0$	$(1.16 \pm 0.32) \times 10^{-5}$	
Γ_{79}	$\eta' K^+$	$(8.0 \pm 1.2) \times 10^{-5}$	
Γ_{80}	$\eta' K^*(892)^+$	$< 3.5 \times 10^{-5}$	CL=90%
Γ_{81}	ηK^+	$< 6.9 \times 10^{-6}$	CL=90%
Γ_{82}	$\eta K^*(892)^+$	$(2.6\ ^{+1.0}_{-0.9}) \times 10^{-5}$	
Γ_{83}	ωK^+	$< 7.9 \times 10^{-6}$	CL=90%
Γ_{84}	$\omega K^*(892)^+$	$< 8.7 \times 10^{-5}$	CL=90%
Γ_{85}	$K^*(892)^0 \pi^+$	$< 1.6 \times 10^{-5}$	CL=90%
Γ_{86}	$K^*(892)^+ \pi^0$	$< 3.1 \times 10^{-5}$	CL=90%
Γ_{87}	$K^+ \pi^- \pi^+$ nonresonant	$< 2.8 \times 10^{-5}$	CL=90%
Γ_{88}	$K^- \pi^+ \pi^+$ nonresonant	$< 5.6 \times 10^{-5}$	CL=90%
Γ_{89}	$K_1(1400)^0 \pi^+$	$< 2.6 \times 10^{-3}$	CL=90%
Γ_{90}	$K_2^*(1430)^0 \pi^+$	$< 6.8 \times 10^{-4}$	CL=90%
Γ_{91}	$K^+ \rho^0$	$< 1.7 \times 10^{-5}$	CL=90%
Γ_{92}	$K^0 \rho^+$	$< 4.8 \times 10^{-5}$	CL=90%
Γ_{93}	$K^*(892)^+ \pi^+ \pi^-$	$< 1.1 \times 10^{-3}$	CL=90%
Γ_{94}	$K^*(892)^+ \rho^0$	$< 9.0 \times 10^{-4}$	CL=90%
Γ_{95}	$K_1(1400)^+ \rho^0$	$< 7.8 \times 10^{-4}$	CL=90%
Γ_{96}	$K_2^*(1430)^+ \rho^0$	$< 1.5 \times 10^{-3}$	CL=90%
Γ_{97}	$K^+ \overline{K}^0$	$< 5.1 \times 10^{-6}$	CL=90%
Γ_{98}	$K^+ K^- \pi^+$ nonresonant	$< 7.5 \times 10^{-5}$	CL=90%

Γ_{99}	$K^+ K^+ \pi^-$ nonresonant	<	8.79	$\times 10^{-5}$	CL=90%
Γ_{100}	$K^+ K^*(892)^0$	<	5.3	$\times 10^{-6}$	CL=90%
Γ_{101}	$K^+ K^- K^+$	<	2.0	$\times 10^{-4}$	CL=90%
Γ_{102}	$K^+ \phi$	<	5	$\times 10^{-6}$	CL=90%
Γ_{103}	$K^+ K^- K^+$ nonresonant	<	3.8	$\times 10^{-5}$	CL=90%
Γ_{104}	$K^*(892)^+ K^+ K^-$	<	1.6	$\times 10^{-3}$	CL=90%
Γ_{105}	$K^*(892)^+ \phi$	<	4.1	$\times 10^{-5}$	CL=90%
Γ_{106}	$K_1(1400)^+ \phi$	<	1.1	$\times 10^{-3}$	CL=90%
Γ_{107}	$K_2^*(1430)^+ \phi$	<	3.4	$\times 10^{-3}$	CL=90%
Γ_{108}	$K^+ f_0(980)$	<	8	$\times 10^{-5}$	CL=90%
Γ_{109}	$K^*(892)^+ \gamma$		(3.8 $\pm$0.9)	$\times 10^{-5}$	
Γ_{110}	$K_1(1270)^+ \gamma$	<	7.3	$\times 10^{-3}$	CL=90%
Γ_{111}	$K_1(1400)^+ \gamma$	<	2.2	$\times 10^{-3}$	CL=90%
Γ_{112}	$K_2^*(1430)^+ \gamma$	<	1.4	$\times 10^{-3}$	CL=90%
Γ_{113}	$K^*(1680)^+ \gamma$	<	1.9	$\times 10^{-3}$	CL=90%
Γ_{114}	$K_3^*(1780)^+ \gamma$	<	5.5	$\times 10^{-3}$	CL=90%
Γ_{115}	$K_4^*(2045)^+ \gamma$	<	9.9	$\times 10^{-3}$	CL=90%

Light unflavored meson modes

Γ_{116}	$\rho^+ \gamma$	<	1.3	$\times 10^{-5}$	CL=90%
Γ_{117}	$\pi^+ \pi^0$	<	1.27	$\times 10^{-5}$	CL=90%
Γ_{118}	$\pi^+ \pi^+ \pi^-$	<	1.3	$\times 10^{-4}$	CL=90%
Γ_{119}	$\rho^0 \pi^+$		(1.0 $\pm$0.4)	$\times 10^{-5}$	
Γ_{120}	$\pi^+ f_0(980)$	<	1.4	$\times 10^{-4}$	CL=90%
Γ_{121}	$\pi^+ f_2(1270)$	<	2.4	$\times 10^{-4}$	CL=90%
Γ_{122}	$\pi^+ \pi^- \pi^+$ nonresonant	<	4.1	$\times 10^{-5}$	CL=90%
Γ_{123}	$\pi^+ \pi^0 \pi^0$	<	8.9	$\times 10^{-4}$	CL=90%
Γ_{124}	$\rho^+ \pi^0$	<	4.3	$\times 10^{-5}$	CL=90%
Γ_{125}	$\pi^+ \pi^- \pi^+ \pi^0$	<	4.0	$\times 10^{-3}$	CL=90%
Γ_{126}	$\rho^+ \rho^0$	<	1.0	$\times 10^{-3}$	CL=90%
Γ_{127}	$a_1(1260)^+ \pi^0$	<	1.7	$\times 10^{-3}$	CL=90%
Γ_{128}	$a_1(1260)^0 \pi^+$	<	9.0	$\times 10^{-4}$	CL=90%
Γ_{129}	$\omega \pi^+$		($1.13^{+0.36}_{-0.32}$)	$\times 10^{-5}$	
Γ_{130}	$\omega \rho^+$	<	6.1	$\times 10^{-5}$	CL=90%
Γ_{131}	$\eta \pi^+$	<	5.7	$\times 10^{-6}$	CL=90%
Γ_{132}	$\eta' \pi^+$	<	1.2	$\times 10^{-5}$	CL=90%
Γ_{133}	$\eta' \rho^+$	<	3.3	$\times 10^{-5}$	CL=90%
Γ_{134}	$\eta \rho^+$	<	1.5	$\times 10^{-5}$	CL=90%
Γ_{135}	$\phi \pi^+$	<	5	$\times 10^{-6}$	CL=90%
Γ_{136}	$\phi \rho^+$	<	1.6	$\times 10^{-5}$	

Γ_{137}	$\pi^+\pi^+\pi^+\pi^-\pi^-$		<	8.6	$\times 10^{-4}$	CL=90%
Γ_{138}	$\rho^0 a_1(1260)^+$		<	6.2	$\times 10^{-4}$	CL=90%
Γ_{139}	$\rho^0 a_2(1320)^+$		<	7.2	$\times 10^{-4}$	CL=90%
Γ_{140}	$\pi^+\pi^+\pi^+\pi^-\pi^-\pi^0$		<	6.3	$\times 10^{-3}$	CL=90%
Γ_{141}	$a_1(1260)^+ a_1(1260)^0$		<	1.3	%	CL=90%

Charged particle ($h^\pm$) modes

$h^\pm = K^\pm$ or $\pi^\pm$

Γ_{142}	$h^+\pi^0$			$(1.6\ ^{+0.7}_{-0.6})$	$\times 10^{-5}$	
Γ_{143}	ωh^+			$(1.4\ \pm 0.4)$	$\times 10^{-5}$	

Baryon modes

Γ_{144}	$p\overline{p}\pi^+$		<	1.6	$\times 10^{-4}$	CL=90%
Γ_{145}	$p\overline{p}\pi^+$ nonresonant		<	5.3	$\times 10^{-5}$	CL=90%
Γ_{146}	$p\overline{p}\pi^+\pi^+\pi^-$		<	5.2	$\times 10^{-4}$	CL=90%
Γ_{147}	$p\overline{p}K^+$ nonresonant		<	8.9	$\times 10^{-5}$	CL=90%
Γ_{148}	$p\overline{\Lambda}$		<	2.6	$\times 10^{-6}$	CL=90%
Γ_{149}	$p\overline{\Lambda}\pi^+\pi^-$		<	2.0	$\times 10^{-4}$	CL=90%
Γ_{150}	$\overline{\Delta}^0 p$		<	3.8	$\times 10^{-4}$	CL=90%
Γ_{151}	$\Delta^{++}\overline{p}$		<	1.5	$\times 10^{-4}$	CL=90%
Γ_{152}	$\overline{\Lambda}_c^- p\pi^+$			$(6.2\ \pm 2.7)$	$\times 10^{-4}$	
Γ_{153}	$\overline{\Lambda}_c^- p\pi^+\pi^0$		<	3.12	$\times 10^{-3}$	CL=90%
Γ_{154}	$\overline{\Lambda}_c^- p\pi^+\pi^+\pi^-$		<	1.46	$\times 10^{-3}$	CL=90%
Γ_{155}	$\overline{\Lambda}_c^- p\pi^+\pi^+\pi^-\pi^0$		<	1.34	%	CL=90%

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

Γ_{156}	$\pi^+ e^+ e^-$	*B1*	<	3.9	$\times 10^{-3}$	CL=90%
Γ_{157}	$\pi^+\mu^+\mu^-$	*B1*	<	9.1	$\times 10^{-3}$	CL=90%
Γ_{158}	$K^+ e^+ e^-$	*B1*	<	6	$\times 10^{-5}$	CL=90%
Γ_{159}	$K^+\mu^+\mu^-$	*B1*	<	5.2	$\times 10^{-6}$	CL=90%
Γ_{160}	$K^*(892)^+ e^+ e^-$	*B1*	<	6.9	$\times 10^{-4}$	CL=90%
Γ_{161}	$K^*(892)^+\mu^+\mu^-$	*B1*	<	1.2	$\times 10^{-3}$	CL=90%
Γ_{162}	$\pi^+ e^+\mu^-$	*LF*	<	6.4	$\times 10^{-3}$	CL=90%
Γ_{163}	$\pi^+ e^-\mu^+$	*LF*	<	6.4	$\times 10^{-3}$	CL=90%
Γ_{164}	$K^+ e^+\mu^-$	*LF*	<	6.4	$\times 10^{-3}$	CL=90%
Γ_{165}	$K^+ e^-\mu^+$	*LF*	<	6.4	$\times 10^{-3}$	CL=90%
Γ_{166}	$\pi^- e^+ e^+$	*L*	<	3.9	$\times 10^{-3}$	CL=90%
Γ_{167}	$\pi^-\mu^+\mu^+$	*L*	<	9.1	$\times 10^{-3}$	CL=90%
Γ_{168}	$\pi^- e^+\mu^+$	*LF*	<	6.4	$\times 10^{-3}$	CL=90%
Γ_{169}	$K^- e^+ e^+$	*L*	<	3.9	$\times 10^{-3}$	CL=90%
Γ_{170}	$K^-\mu^+\mu^+$	*L*	<	9.1	$\times 10^{-3}$	CL=90%
Γ_{171}	$K^- e^+\mu^+$	*LF*	<	6.4	$\times 10^{-3}$	CL=90%

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

B^+ BRANCHING RATIOS

$\Gamma(\ell^+ \nu_\ell \text{anything})/\Gamma_{\text{total}}$ — Γ_1/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.1025±0.0057±0.0065	[11] ARTUSO	97	CLE2	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.101 ±0.018 ±0.015	ATHANAS	94	CLE2	Sup. by ARTUSO 97

[11] ARTUSO 97 uses partial reconstruction of $B \to D^* \ell \nu_\ell$ and inclusive semileptonic branching ratio from BARISH 96B (0.1049 ± 0.0017 ± 0.0043).

$\Gamma(\overline{D}^0 \ell^+ \nu_\ell)/\Gamma_{\text{total}}$ — Γ_2/Γ

$\ell = e$ or μ, not sum over e and μ modes.

VALUE	DOCUMENT ID		TECN	COMMENT
0.0215±0.0022 OUR AVERAGE				
0.0221±0.0013±0.0019	[12] BARTELT	99	CLE2	$e^+ e^- \to \Upsilon(4S)$
0.016 ±0.006 ±0.003	[13] FULTON	91	CLEO	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.0194±0.0015±0.0034	[14] ATHANAS	97	CLE2	Repl. by BARTELT 99

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

[13] FULTON 91 assumes equal production of $B^0 \overline{B}^0$ and $B^+ B^-$ at the $\Upsilon(4S)$.

[14] ATHANAS 97 uses missing energy and missing momentum to reconstruct neutrino.

$\Gamma(\overline{D}^*(2007)^0 \ell^+ \nu_\ell)/\Gamma_{\text{total}}$ — Γ_3/Γ

$\ell = e$ or μ, not sum over e and μ modes.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.053 ±0.008 OUR AVERAGE					
0.0513±0.0054±0.0064	302	[15] BARISH	95	CLE2	$e^+ e^- \to \Upsilon(4S)$
0.066 ±0.016 ±0.015		[16] ALBRECHT	92C	ARG	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen	398	[17] SANGHERA	93	CLE2	$e^+ e^- \to \Upsilon(4S)$
0.041 ±0.008 $^{+0.008}_{-0.009}$		[18] FULTON	91	CLEO	$e^+ e^- \to \Upsilon(4S)$
0.070 ±0.018 ±0.014		[19] ANTREASYAN	90B	CBAL	$e^+ e^- \to \Upsilon(4S)$

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

[16] ALBRECHT 92C reports 0.058±0.014±0.013. We rescale using the method described in STONE 94 but with the updated PDG 94 B($D^0 \to K^- \pi^+$). Assumes equal production of $B^0 \overline{B}^0$ and $B^+ B^-$ at the $\Upsilon(4S)$.

[17] Combining $\overline{D}^{*0} \ell^+ \nu_\ell$ and $\overline{D}^{*-} \ell^+ \nu_\ell$ SANGHERA 93 test $V-A$ structure and fit the decay angular distributions to obtain $A_{FB} = 3/4*(\Gamma^- - \Gamma^+)/\Gamma = 0.14 \pm 0.06 \pm 0.03$. Assuming a value of V_{cb}, they measure V, A_1, and A_2, the three form factors for the $D^* \ell \nu_\ell$ decay, where results are slightly dependent on model assumptions.

[18] Assumes equal production of $B^0 \overline{B}^0$ and $B^+ B^-$ at the $\Upsilon(4S)$. Uncorrected for D and D^* branching ratio assumptions.

[19] ANTREASYAN 90B is average over B and $\overline{D}^*(2010)$ charge states.

$\Gamma(\overline{D}_1(2420)^0 \ell^+ \nu_\ell)/\Gamma_{total}$ Γ_4/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.0056±0.0013±0.0009	[20] ANASTASSOV 98	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[20] ANASTASSOV 98 result is derived from the measurement of $B(B^+ \rightarrow \overline{D}^0_1 \ell^+ \nu_\ell) \times B(\overline{D}^0_1 \rightarrow D^{*+} \pi^-) = (0.373 \pm 0.085 \pm 0.052 \pm 0.024)\%$ by assuming $B(\overline{D}^0_1 \rightarrow D^{*+} \pi^-) = 67\%$, where the third error includes theoretical uncertainties.

$\Gamma(\overline{D}^*_2(2460)^0 \ell^+ \nu_\ell)/\Gamma_{total}$ Γ_5/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<8 \times 10^{-3}$	90	[21] ANASTASSOV 98	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[21] ANASTASSOV 98 result is derived from the meausrement of $B(B^+ \rightarrow \overline{D}^{*0}_2 \ell^+ \nu_\ell) \times B(\overline{D}^{*0}_2 \rightarrow D^{*+} \pi^-) < 0.16\%$ at 90% CL by assuming $B(\overline{D}^{*0}_2 \rightarrow D^{*+} \pi^-) = 20\%$.

$\Gamma(\pi^0 e^+ \nu_e)/\Gamma_{total}$ Γ_6/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
0.9 ±0.2 ±0.2		[22] ALEXANDER 96T	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<22	90	ANTREASYAN 90B	CBAL	$e^+ e^- \rightarrow \Upsilon(4S)$

[22] Derived based in the reported B^0 result by assuming isospin symmetry: $\Gamma(B^0 \rightarrow \pi^- \ell^+ \nu) = 2\Gamma(B^+ \rightarrow \pi^0 \ell^+ \nu)$.

$\Gamma(\omega \ell^+ \nu_\ell)/\Gamma_{total}$ Γ_7/Γ

$\ell = e$ or μ, not sum over e and μ modes.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<2.1 \times 10^{-4}$	90	[23] BEAN 93B	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[23] BEAN 93B limit set using ISGW Model. Using isospin and the quark model to combine $\Gamma(\rho^0 \ell^+ \nu_\ell)$ and $\Gamma(\rho^- \ell^+ \nu_\ell)$ with this result, they obtain a limit $<(1.6\text{–}2.7) \times 10^{-4}$ at 90% CL for $B^+ \rightarrow \omega \ell^+ \nu_\ell$. The range corresponds to the ISGW, WSB, and KS models. An upper limit on $|V_{ub}/V_{cb}| < 0.8\text{–}0.13$ at 90% CL is derived as well.

$\Gamma(\omega \mu^+ \nu_\mu)/\Gamma_{total}$ Γ_8/Γ

VALUE	DOCUMENT ID	TECN
• • • We do not use the following data for averages, fits, limits, etc. • • •		
seen	[24] ALBRECHT 91C	ARG

[24] In ALBRECHT 91C, one event is fully reconstructed providing evidence for the $b \rightarrow u$ transition.

$\Gamma(\rho^0 \ell^+ \nu_\ell)/\Gamma_{total}$ Γ_9/Γ

$\ell = e$ or μ, not sum over e and μ modes.

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
$1.34 \pm 0.15^{+0.28}_{-0.32}$		[25] BEHRENS 00	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

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

$1.40 \pm 0.21 {}^{+0.32}_{-0.33}$		[25] BEHRENS	00	CLE2	$e^+ e^- \to \Upsilon(4S)$
$1.2 \pm 0.2 {}^{+0.3}_{-0.4}$		[25] ALEXANDER	96T	CLE2	$e^+ e^- \to \Upsilon(4S)$
<2.1	90	[26] BEAN	93B	CLE2	$e^+ e^- \to \Upsilon(4S)$

[25] Derived based in the reported B^0 result by assuming isospin symmetry: $\Gamma(B^0 \to \rho^- \ell^+ \nu) = 2\Gamma(B^+ \to \rho^0 \ell^+ \nu) \approx 2\Gamma(B^+ \to \omega \ell^+ \nu)$.

[26] BEAN 93B limit set using ISGW Model. Using isospin and the quark model to combine $\Gamma(\omega^0 \ell^+ \nu_\ell)$ and $\Gamma(\rho^- \ell^+ \nu_\ell)$ with this result, they obtain a limit $<(1.6–2.7) \times 10^{-4}$ at 90% CL for $B^+ \to \rho^0 \ell^+ \nu_\ell$. The range corresponds to the ISGW, WSB, and KS models. An upper limit on $|V_{ub}/V_{cb}| < 0.8–0.13$ at 90% CL is derived as well.

$\Gamma(e^+ \nu_e)/\Gamma_{total}$ — Γ_{10}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.5 \times 10^{-5}$	90	ARTUSO	95	CLE2	$e^+ e^- \to \Upsilon(4S)$

$\Gamma(\mu^+ \nu_\mu)/\Gamma_{total}$ — Γ_{11}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.1 \times 10^{-5}$	90	ARTUSO	95	CLE2	$e^+ e^- \to \Upsilon(4S)$

$\Gamma(\tau^+ \nu_\tau)/\Gamma_{total}$ — Γ_{12}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.7 \times 10^{-4}$	90	[27] ACCIARRI	97F	L3	$e^+ e^- \to Z$

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

$<1.04 \times 10^{-2}$	90	[28] ALBRECHT	95D	ARG	$e^+ e^- \to \Upsilon(4S)$
$<2.2 \times 10^{-3}$	90	ARTUSO	95	CLE2	$e^+ e^- \to \Upsilon(4S)$
$<1.8 \times 10^{-3}$	90	[29] BUSKULIC	95	ALEP	$e^+ e^- \to Z$

[27] ACCIARRI 97F uses missing-energy technique and $f(b \to B^-) = (38.2 \pm 2.5)\%$.

[28] ALBRECHT 95D use full reconstruction of one B decay as tag.

[29] BUSKULIC 95 uses same missing-energy technique as in $\overline{b} \to \tau^+ \nu_\tau X$, but analysis is restricted to endpoint region of missing-energy distribution.

$\Gamma(e^+ \nu_e \gamma)/\Gamma_{total}$ — Γ_{13}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.0 \times 10^{-4}$	90	[30] BROWDER	97	CLE2	$e^+ e^- \to \Upsilon(4S)$

[30] BROWDER 97 uses the hermiticity of the CLEO II detector to reconstruct the neutrino energy and momentum.

$\Gamma(\mu^+ \nu_\mu \gamma)/\Gamma_{total}$ — Γ_{14}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.2 \times 10^{-5}$	90	[31] BROWDER	97	CLE2	$e^+ e^- \to \Upsilon(4S)$

[31] BROWDER 97 uses the hermiticity of the CLEO II detector to reconstruct the neutrino energy and momentum.

$\Gamma(\overline{D}^0\pi^+)/\Gamma_{total}$ — Γ_{15}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0053±0.0005 OUR AVERAGE					
0.0055±0.0004±0.0005	304	[32] ALAM	94	CLE2	$e^+e^- \to \Upsilon(4S)$
0.0050±0.0007±0.0006	54	[33] BORTOLETTO	92	CLEO	$e^+e^- \to \Upsilon(4S)$
$0.0054^{+0.0018}_{-0.0015}{}^{+0.0012}_{-0.0009}$	14	[34] BEBEK	87	CLEO	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0020±0.0008±0.0006	12	[33] ALBRECHT	90J	ARG	$e^+e^- \to \Upsilon(4S)$
0.0019±0.0010±0.0006	7	[35] ALBRECHT	88K	ARG	$e^+e^- \to \Upsilon(4S)$

[32] ALAM 94 assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the CLEO II absolute B($D^0 \to K^-\pi^+$) and the PDG 1992 B($D^0 \to K^-\pi^+\pi^0$)/B($D^0 \to K^-\pi^+$) and B($D^0 \to K^-\pi^+\pi^+\pi^-$)/B($D^0 \to K^-\pi^+$).

[33] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses the Mark III branching fractions for the D.

[34] BEBEK 87 value has been updated in BERKELMAN 91 to use same assumptions as noted for BORTOLETTO 92.

[35] ALBRECHT 88K assumes $B^0\overline{B}^0$:B^+B^- ratio is 45:55. Superseded by ALBRECHT 90J.

$\Gamma(\overline{D}^0\rho^+)/\Gamma_{total}$ — Γ_{16}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0134±0.0018 OUR AVERAGE					
0.0135±0.0012±0.0015	212	[36] ALAM	94	CLE2	$e^+e^- \to \Upsilon(4S)$
0.013 ±0.004 ±0.004	19	[37] ALBRECHT	90J	ARG	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.021 ±0.008 ±0.009	10	[38] ALBRECHT	88K	ARG	$e^+e^- \to \Upsilon(4S)$

[36] ALAM 94 assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the CLEO II absolute B($D^0 \to K^-\pi^+$) and the PDG 1992 B($D^0 \to K^-\pi^+\pi^0$)/B($D^0 \to K^-\pi^+$) and B($D^0 \to K^-\pi^+\pi^+\pi^-$)/B($D^0 \to K^-\pi^+$).

[37] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses the Mark III branching fractions for the D.

[38] ALBRECHT 88K assumes $B^0\overline{B}^0$:B^+B^- ratio is 45:55.

$\Gamma(\overline{D}^0K^+)/\Gamma_{total}$ — Γ_{17}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
2.92±0.80±0.28	[39] ATHANAS	98	CLE2	$e^+e^- \to \Upsilon(4S)$

[39] ATHANAS 98 reports [B($B^+ \to \overline{D}^0K^+$)]/[B($B^+ \to \overline{D}^0\pi^+$)] =0.055±0.014±0.005. We multiply by our best value B($B^+ \to \overline{D}^0\pi^+$)= $(5.3 \pm 0.5) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\overline{D}^0\pi^+\pi^+\pi^-)/\Gamma_{total}$ — Γ_{18}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.0115±0.0029±0.0021	[40] BORTOLETTO	92	CLEO	$e^+e^- \to \Upsilon(4S)$

[40] BORTOLETTO 92 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D.

$\Gamma(\overline{D}^0\pi^+\pi^+\pi^-$ nonresonant$)/\Gamma_{total}$ — Γ_{19}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.0051±0.0034±0.0023	[41] BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[41] BORTOLETTO 92 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D.

$\Gamma(\overline{D}^0\pi^+\rho^0)/\Gamma_{total}$ — Γ_{20}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.0042±0.0023±0.0020	[42] BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[42] BORTOLETTO 92 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D.

$\Gamma(\overline{D}^0 a_1(1260)^+)/\Gamma_{total}$ — Γ_{21}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.0045±0.0019±0.0031	[43] BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[43] BORTOLETTO 92 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D.

$\Gamma(D^*(2010)^-\pi^+\pi^+)/\Gamma_{total}$ — Γ_{22}/Γ

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.0021±0.0006 OUR AVERAGE						
0.0019±0.0007±0.0003		14	[44] ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
0.0026±0.0014±0.0007		11	[45] ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
$0.0024^{+0.0017}_{-0.0016}{}^{+0.0010}_{-0.0006}$		3	[46] BEBEK	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.004	90		[47] BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
0.005 ±0.002 ±0.003		7	[48] ALBRECHT	87C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[44] ALAM 94 assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the CLEO II B($D^*(2010)^+ \rightarrow D^0\pi^+$) and absolute B($D^0 \rightarrow K^-\pi^+$) and the PDG 1992 B($D^0 \rightarrow K^-\pi^+\pi^0$)/B($D^0 \rightarrow K^-\pi^+$) and B($D^0 \rightarrow K^-\pi^+\pi^+\pi^-$)/B($D^0 \rightarrow K^-\pi^+$).

[45] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses the Mark III branching fractions for the D.

[46] BEBEK 87 value has been updated in BERKELMAN 91 to use same assumptions as noted for BORTOLETTO 92.

[47] BORTOLETTO 92 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D and $D^*(2010)$. The authors also find the product branching fraction into $D^{**}\pi$ followed by $D^{**} \rightarrow D^*(2010)\pi$ to be $0.0014^{+0.0008}_{-0.0006} \pm 0.0003$ where D^{**} represents all orbitally excited D mesons.

[48] ALBRECHT 87C use PDG 86 branching ratios for D and $D^*(2010)$ and assume B($\Upsilon(4S) \rightarrow B^+B^-$) = 55% and B($\Upsilon(4S) \rightarrow B^0\overline{B}^0$) = 45%. Superseded by ALBRECHT 90J.

$\Gamma(D^- \pi^+ \pi^+)/\Gamma_{total}$ — Γ_{23}/Γ

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.0014	90		[49] ALAM	94	CLE2	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.007	90		[50] BORTOLETTO	92	CLEO	$e^+ e^- \to \Upsilon(4S)$
$0.0025^{+0.0041}_{-0.0023}{}^{+0.0024}_{-0.0008}$		1	[51] BEBEK	87	CLEO	$e^+ e^- \to \Upsilon(4S)$

[49] ALAM 94 assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the Mark III $B(D^+ \to K^- \pi^+ \pi^+)$.

[50] BORTOLETTO 92 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D. The product branching fraction into $D_0^*(2340)\pi$ followed by $D_0^*(2340) \to D\pi$ is < 0.005 at 90%CL and into $D_2^*(2460)$ followed by $D_2^*(2460) \to D\pi$ is < 0.004 at 90%CL.

[51] BEBEK 87 assume the $\Upsilon(4S)$ decays 43% to $B^0 \overline{B}^0$. $B(D^- \to K^+ \pi^- \pi^-) = (9.1 \pm 1.3 \pm 0.4)\%$ is assumed.

$\Gamma(\overline{D}^*(2007)^0 \pi^+)/\Gamma_{total}$ — Γ_{24}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0046 ±0.0004 OUR AVERAGE					
0.00434±0.00047±0.00018		[52] BRANDENB...	98	CLE2	$e^+ e^- \to \Upsilon(4S)$
0.0052 ±0.0007 ±0.0007	71	[53] ALAM	94	CLE2	$e^+ e^- \to \Upsilon(4S)$
0.0072 ±0.0018 ±0.0016		[54] BORTOLETTO	92	CLEO	$e^+ e^- \to \Upsilon(4S)$
0.0040 ±0.0014 ±0.0012	9	[54] ALBRECHT	90J	ARG	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0027 ±0.0044		[55] BEBEK	87	CLEO	$e^+ e^- \to \Upsilon(4S)$

[52] BRANDENBURG 98 assume equal production of B^+ and B^0 at $\Upsilon(4S)$ and use the D^* reconstruction technique. The first error is their experiment's error and the second error is the systematic error from the PDG 96 value of $B(D^* \to D\pi)$.

[53] ALAM 94 assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the CLEO II $B(D^*(2007)^0 \to D^0 \pi^0)$ and absolute $B(D^0 \to K^- \pi^+)$ and the PDG 1992 $B(D^0 \to K^- \pi^+ \pi^0)/B(D^0 \to K^- \pi^+)$ and $B(D^0 \to K^- \pi^+ \pi^+ \pi^-)/B(D^0 \to K^- \pi^+)$.

[54] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D and $D^*(2010)$.

[55] This is a derived branching ratio, using the inclusive pion spectrum and other two-body B decays. BEBEK 87 assume the $\Upsilon(4S)$ decays 43% to $B^0 \overline{B}^0$.

$\Gamma(D^*(2010)^+ \pi^0)/\Gamma_{total}$ — Γ_{25}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.00017	90	[56] BRANDENB...	98	CLE2	$e^+ e^- \to \Upsilon(4S)$

[56] BRANDENBURG 98 assume equal production of B^+ and B^0 at $\Upsilon(4S)$ and use the D^* partial reconstruction technique. The first error is their experiment's error and the second error is the systematic error from the PDG 96 value of $B(D^* \to D\pi)$.

$\Gamma(\overline{D}^*(2007)^0 \rho^+)/\Gamma_{total}$ — Γ_{26}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0155±0.0031 OUR AVERAGE					
0.0168±0.0021±0.0028	86	[57] ALAM	94	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
0.010 ±0.006 ±0.004	7	[58] ALBRECHT	90J	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$

[57] ALAM 94 assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the CLEO II B($D^*(2007)^0 \rightarrow D^0\pi^0$) and absolute B($D^0 \rightarrow K^-\pi^+$) and the PDG 1992 B($D^0 \rightarrow K^-\pi^+\pi^0$)/B($D^0 \rightarrow K^-\pi^+$) and B($D^0 \rightarrow K^-\pi^+\pi^+\pi^-$)/B($D^0 \rightarrow K^-\pi^+$). The nonresonant $\pi^+\pi^0$ contribution under the ρ^+ is negligible.

[58] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D and $D^*(2010)$.

$\Gamma(\overline{D}^*(2007)^0 \pi^+\pi^+\pi^-)/\Gamma_{total}$ — Γ_{27}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0094±0.0020±0.0017	48	[59,60] ALAM	94	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[59] ALAM 94 assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the CLEO II B($D^*(2007)^0 \rightarrow D^0\pi^0$) and absolute B($D^0 \rightarrow K^-\pi^+$) and the PDG 1992 B($D^0 \rightarrow K^-\pi^+\pi^0$)/B($D^0 \rightarrow K^-\pi^+$) and B($D^0 \rightarrow K^-\pi^+\pi^+\pi^-$)/B($D^0 \rightarrow K^-\pi^+$).

[60] The three pion mass is required to be between 1.0 and 1.6 GeV consistent with an a_1 meson. (If this channel is dominated by a_1^+, the branching ratio for $\overline{D}^{*0} a_1^+$ is twice that for $\overline{D}^{*0}\pi^+\pi^+\pi^-$.)

$\Gamma(\overline{D}^*(2007)^0 a_1(1260)^+)/\Gamma_{total}$ — Γ_{28}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.0188±0.0040±0.0034	[61,62] ALAM	94	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[61] ALAM 94 value is twice their $\Gamma(\overline{D}^*(2007)^0\pi^+\pi^+\pi^-)/\Gamma_{total}$ value based on their observation that the three pions are dominantly in the $a_1(1260)$ mass range 1.0 to 1.6 GeV.

[62] ALAM 94 assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the CLEO II B($D^*(2007)^0 \rightarrow D^0\pi^0$) and absolute B($D^0 \rightarrow K^-\pi^+$) and the PDG 1992 B($D^0 \rightarrow K^-\pi^+\pi^0$)/B($D^0 \rightarrow K^-\pi^+$) and B($D^0 \rightarrow K^-\pi^+\pi^+\pi^-$)/B($D^0 \rightarrow K^-\pi^+$).

$\Gamma(D^*(2010)^- \pi^+\pi^+\pi^0)/\Gamma_{total}$ — Γ_{29}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0152±0.0071±0.0001	26	[63] ALBRECHT	90J	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.043 ±0.013 ±0.026	24	[64] ALBRECHT	87C	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$

[63] ALBRECHT 90J reports $0.018 \pm 0.007 \pm 0.005$ for B($D^*(2010)^+ \rightarrow D^0\pi^+$) = 0.57 ± 0.06. We rescale to our best value B($D^*(2010)^+ \rightarrow D^0\pi^+$) = $(67.7 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D.

[64] ALBRECHT 87C use PDG 86 branching ratios for D and $D^*(2010)$ and assume B($\Upsilon(4S) \rightarrow B^+B^-$) = 55% and B($\Upsilon(4S) \rightarrow B^0\overline{B}^0$) = 45%. Superseded by ALBRECHT 90J.

$\Gamma(D^*(2010)^- \pi^+ \pi^+ \pi^+ \pi^-)/\Gamma_{total}$ Γ_{30}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.01	90	[65] ALBRECHT	90J	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$

[65] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D and $D^*(2010)$.

$\Gamma(\overline{D}{}_1^*(2420)^0 \pi^+)/\Gamma_{total}$ Γ_{31}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0015±0.0006 OUR AVERAGE	Error includes scale factor of 1.3.				
0.0011±0.0005±0.0002	8	[66] ALAM	94	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
0.0025±0.0007±0.0006		[67] ALBRECHT	94D	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$

[66] ALAM 94 assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the CLEO II $B(D^*(2010)^+ \rightarrow D^0 \pi^+)$ and absolute $B(D^0 \rightarrow K^- \pi^+)$ and the PDG 1992 $B(D^0 \rightarrow K^- \pi^+ \pi^0)/B(D^0 \rightarrow K^- \pi^+)$ and assuming $B(D_1(2420)^0 \rightarrow D^*(2010)^+ \pi^-) = 67\%$.

[67] ALBRECHT 94D assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the CLEO II $B(D^*(2010)^+ \rightarrow D^0 \pi^+)$ assuming $B(D_1(2420)^0 \rightarrow D^*(2010)^+ \pi^-) = 67\%$.

$\Gamma(\overline{D}{}_1^*(2420)^0 \rho^+)/\Gamma_{total}$ Γ_{32}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0014	90	[68] ALAM	94	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[68] ALAM 94 assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the CLEO II $B(D^*(2010)^+ \rightarrow D^0 \pi^+)$ assuming $B(D_1(2420)^0 \rightarrow D^*(2010)^+ \pi^-) = 67\%$.

$\Gamma(\overline{D}{}_2^*(2460)^0 \pi^+)/\Gamma_{total}$ Γ_{33}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0013	90	[69] ALAM	94	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0028	90	[70] ALAM	94	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
<0.0023	90	[71] ALBRECHT	94D	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$

[69] ALAM 94 assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the Mark III $B(D^+ \rightarrow K^- \pi^+ \pi^+)$ and $B(D_2^*(2460)^0 \rightarrow D^+ \pi^-) = 30\%$.

[70] ALAM 94 assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the Mark III $B(D^+ \rightarrow K^- \pi^+ \pi^+)$, the CLEO II $B(D^*(2010)^+ \rightarrow D^0 \pi^+)$ and $B(D_2^*(2460)^0 \rightarrow D^*(2010)^+ \pi^-) = 20\%$.

[71] ALBRECHT 94D assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the CLEO II $B(D^*(2010)^+ \rightarrow D^0 \pi^+)$ and $B(D_2^*(2460)^0 \rightarrow D^*(2010)^+ \pi^-) = 30\%$.

$\Gamma(\overline{D}{}_2^*(2460)^0 \rho^+)/\Gamma_{total}$ Γ_{34}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0047	90	[72] ALAM	94	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
<0.005	90	[73] ALAM	94	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[72] ALAM 94 assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the Mark III $B(D^+ \rightarrow K^- \pi^+ \pi^+)$ and $B(D_2^*(2460)^0 \rightarrow D^+ \pi^-) = 30\%$.

[73] ALAM 94 assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the Mark III $B(D^+ \rightarrow K^- \pi^+ \pi^+)$, the CLEO II $B(D^*(2010)^+ \rightarrow D^0 \pi^+)$ and $B(D_2^*(2460)^0 \rightarrow D^*(2010)^+ \pi^-) = 20\%$.

$\Gamma(\overline{D}^0 D_s^+)/\Gamma_{total}$ Γ_{35}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.013 ±0.004 OUR AVERAGE					
$0.0122 \pm 0.0032 {}^{+0.0029}_{-0.0030}$		[74] GIBAUT	96	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.018 \pm 0.009 \pm 0.004$		[75] ALBRECHT	92G	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.016 \pm 0.007 \pm 0.004$	5	[76] BORTOLETTO	90	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$

[74] GIBAUT 96 reports $0.0126 \pm 0.0022 \pm 0.0025$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.035$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[75] ALBRECHT 92G reports $0.024 \pm 0.012 \pm 0.004$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes PDG 1990 D^0 branching ratios, e.g., $B(D^0 \rightarrow K^- \pi^+) = 3.71 \pm 0.25\%$.

[76] BORTOLETTO 90 reports 0.029 ± 0.013 for $B(D_s^+ \rightarrow \phi\pi^+) = 0.02$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\overline{D}^0 D_s^{*+})/\Gamma_{total}$ Γ_{36}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.009 ±0.004 OUR AVERAGE				
$0.0084 \pm 0.0031 {}^{+0.0020}_{-0.0021}$	[77] GIBAUT	96	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.012 \pm 0.009 \pm 0.003$	[78] ALBRECHT	92G	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$

[77] GIBAUT 96 reports $0.0087 \pm 0.0027 \pm 0.0017$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.035$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[78] ALBRECHT 92G reports $0.016 \pm 0.012 \pm 0.003$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes PDG 1990 D^0 branching ratios, e.g., $B(D^0 \rightarrow K^- \pi^+) = 3.71 \pm 0.25\%$.

$\Gamma(\overline{D}^*(2007)^0 D_s^+)/\Gamma_{total}$ Γ_{37}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.012±0.005 OUR AVERAGE				
$0.014 \pm 0.005 \pm 0.003$	[79] GIBAUT	96	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.010 \pm 0.007 \pm 0.002$	[80] ALBRECHT	92G	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$

[79] GIBAUT 96 reports $0.0140 \pm 0.0043 \pm 0.0035$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.035$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[80] ALBRECHT 92G reports $0.013 \pm 0.009 \pm 0.002$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes PDG 1990 D^0 and $D^*(2007)^0$ branching ratios, e.g., $B(D^0 \rightarrow K^- \pi^+) = 3.71 \pm 0.25\%$ and $B(D^*(2007)^0 \rightarrow D^0 \pi^0) = 55 \pm 6\%$.

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.027±0.010 OUR AVERAGE				
$0.030\pm0.011\pm0.007$	[81] GIBAUT	96	CLE2	$e^+e^- \to \Upsilon(4S)$
$0.023\pm0.013\pm0.006$	[82] ALBRECHT	92G	ARG	$e^+e^- \to \Upsilon(4S)$

[81] GIBAUT 96 reports $0.0310 \pm 0.0088 \pm 0.0065$ for $B(D_s^+ \to \phi\pi^+) = 0.035$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[82] ALBRECHT 92G reports $0.031 \pm 0.016 \pm 0.005$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes PDG 1990 D^0 and $D^*(2007)^0$ branching ratios, e.g., $B(D^0 \to K^-\pi^+) = 3.71 \pm 0.25\%$ and $B(D^*(2007)^0 \to D^0\pi^0) = 55 \pm 6\%$.

$\Gamma(D_s^{(*)+}\overline{D}^{**0})/\Gamma_{total}$ — Γ_{39}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$(2.73 \pm 0.93 \pm 0.68) \times 10^{-2}$	[83] AHMED	00B	CLE2	$e^+e^- \to \Upsilon(4S)$

[83] AHMED 00B reports their experiment's uncertainties ($\pm0.78 \pm 0.48 \pm 0.68$)%, where the first error is statistical, the second is systematic, and the third is the uncertainty in the $D_s \to \phi\pi$ branching fraction. We combine the first two in quadrature.

$\Gamma(\overline{D}^*(2007)^0 D^*(2010)^+)/\Gamma_{total}$ — Γ_{40}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.011	90	BARATE	98Q	ALEP	$e^+e^- \to Z$

$[\Gamma(\overline{D}^0 D^*(2010)^+) + \Gamma(\overline{D}^*(2007)^0 D^+)]/\Gamma_{total}$ — Γ_{41}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.013	90	BARATE	98Q	ALEP	$e^+e^- \to Z$

$\Gamma(\overline{D}^0 D^+)/\Gamma_{total}$ — Γ_{42}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0067	90	BARATE	98Q	ALEP	$e^+e^- \to Z$

$\Gamma(D_s^+\pi^0)/\Gamma_{total}$ — Γ_{43}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.00020	90	[84] ALEXANDER	93B	CLE2	$e^+e^- \to \Upsilon(4S)$

[84] ALEXANDER 93B reports $< 2.0 \times 10^{-4}$ for $B(D_s^+ \to \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

$[\Gamma(D_s^+\pi^0) + \Gamma(D_s^{*+}\pi^0)]/\Gamma_{total}$ — $(\Gamma_{43}+\Gamma_{44})/\Gamma$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0007	90	[85] ALBRECHT	93E	ARG	$e^+e^- \to \Upsilon(4S)$

[85] ALBRECHT 93E reports $< 0.9 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

$\Gamma(D_s^{*+}\pi^0)/\Gamma_{total}$ — Γ_{44}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.00033	90	[86] ALEXANDER 93B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[86] ALEXANDER 93B reports $< 3.2 \times 10^{-4}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.036$.

$\Gamma(D_s^{+}\eta)/\Gamma_{total}$ — Γ_{45}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0005	90	[87] ALEXANDER 93B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[87] ALEXANDER 93B reports $< 4.6 \times 10^{-4}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.036$.

$\Gamma(D_s^{*+}\eta)/\Gamma_{total}$ — Γ_{46}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0008	90	[88] ALEXANDER 93B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[88] ALEXANDER 93B reports $< 7.5 \times 10^{-4}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.036$.

$\Gamma(D_s^{+}\rho^0)/\Gamma_{total}$ — Γ_{47}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0004	90	[89] ALEXANDER 93B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[89] ALEXANDER 93B reports $< 3.7 \times 10^{-4}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.036$.

$\left[\Gamma(D_s^{+}\rho^0) + \Gamma(D_s^{+}\overline{K}^*(892)^0)\right]/\Gamma_{total}$ — $(\Gamma_{47}+\Gamma_{57})/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0025	90	[90] ALBRECHT 93E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[90] ALBRECHT 93E reports $< 3.4 \times 10^{-3}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.036$.

$\Gamma(D_s^{*+}\rho^0)/\Gamma_{total}$ — Γ_{48}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0005	90	[91] ALEXANDER 93B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[91] ALEXANDER 93B reports $< 4.8 \times 10^{-4}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.036$.

$\left[\Gamma(D_s^{*+}\rho^0) + \Gamma(D_s^{*+}\overline{K}^*(892)^0)\right]/\Gamma_{total}$ — $(\Gamma_{48}+\Gamma_{58})/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0015	90	[92] ALBRECHT 93E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[92] ALBRECHT 93E reports $< 2.0 \times 10^{-3}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.036$.

$\Gamma(D_s^+ \omega)/\Gamma_{total}$ — Γ_{49}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0005	90	[93] ALEXANDER 93B	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.0025	90	[94] ALBRECHT 93E	ARG	$e^+e^- \to \Upsilon(4S)$

[93] ALEXANDER 93B reports $< 4.8 \times 10^{-4}$ for $B(D_s^+ \to \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

[94] ALBRECHT 93E reports $< 3.4 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

$\Gamma(D_s^{*+} \omega)/\Gamma_{total}$ — Γ_{50}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0007	90	[95] ALEXANDER 93B	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.0014	90	[96] ALBRECHT 93E	ARG	$e^+e^- \to \Upsilon(4S)$

[95] ALEXANDER 93B reports $< 6.8 \times 10^{-4}$ for $B(D_s^+ \to \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

[96] ALBRECHT 93E reports $< 1.9 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

$\Gamma(D_s^+ a_1(1260)^0)/\Gamma_{total}$ — Γ_{51}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0022	90	[97] ALBRECHT 93E	ARG	$e^+e^- \to \Upsilon(4S)$

[97] ALBRECHT 93E reports $< 3.0 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

$\Gamma(D_s^{*+} a_1(1260)^0)/\Gamma_{total}$ — Γ_{52}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0016	90	[98] ALBRECHT 93E	ARG	$e^+e^- \to \Upsilon(4S)$

[98] ALBRECHT 93E reports $< 2.2 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

$\Gamma(D_s^+ \phi)/\Gamma_{total}$ — Γ_{53}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.00032	90	[99] ALEXANDER 93B	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.0013	90	[100] ALBRECHT 93E	ARG	$e^+e^- \to \Upsilon(4S)$

[99] ALEXANDER 93B reports $< 3.1 \times 10^{-4}$ for $B(D_s^+ \to \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

[100] ALBRECHT 93E reports $< 1.7 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

$\Gamma(D_s^{*+}\phi)/\Gamma_{total}$ — Γ_{54}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0004	90	[101] ALEXANDER	93B	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0016	90	[102] ALBRECHT	93E	ARG	$e^+e^- \to \Upsilon(4S)$

[101] ALEXANDER 93B reports $< 4.2 \times 10^{-4}$ for $B(D_s^+ \to \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

[102] ALBRECHT 93E reports $< 2.1 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

$\Gamma(D_s^+\overline{K}^0)/\Gamma_{total}$ — Γ_{55}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0011	90	[103] ALEXANDER	93B	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0019	90	[104] ALBRECHT	93E	ARG	$e^+e^- \to \Upsilon(4S)$

[103] ALEXANDER 93B reports $< 10.3 \times 10^{-4}$ for $B(D_s^+ \to \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

[104] ALBRECHT 93E reports $< 2.5 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

$\Gamma(D_s^{*+}\overline{K}^0)/\Gamma_{total}$ — Γ_{56}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0011	90	[105] ALEXANDER	93B	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0023	90	[106] ALBRECHT	93E	ARG	$e^+e^- \to \Upsilon(4S)$

[105] ALEXANDER 93B reports $< 10.9 \times 10^{-4}$ for $B(D_s^+ \to \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

[106] ALBRECHT 93E reports $< 3.1 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

$\Gamma(D_s^+\overline{K}^*(892)^0)/\Gamma_{total}$ — Γ_{57}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0005	90	[107] ALEXANDER	93B	CLE2	$e^+e^- \to \Upsilon(4S)$

[107] ALEXANDER 93B reports $< 4.4 \times 10^{-4}$ for $B(D_s^+ \to \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

$\Gamma(D_s^{*+}\overline{K}^*(892)^0)/\Gamma_{total}$ — Γ_{58}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0004	90	[108] ALEXANDER	93B	CLE2	$e^+e^- \to \Upsilon(4S)$

[108] ALEXANDER 93B reports $< 4.3 \times 10^{-4}$ for $B(D_s^+ \to \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

$\Gamma(D_s^- \pi^+ K^+)/\Gamma_{total}$ — Γ_{59}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0008	90	[109] ALBRECHT	93E	ARG	$e^+e^- \to \Upsilon(4S)$

[109] ALBRECHT 93E reports $< 1.1 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

$\Gamma(D_s^{*-} \pi^+ K^+)/\Gamma_{total}$ — Γ_{60}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0012	90	[110] ALBRECHT	93E	ARG	$e^+e^- \to \Upsilon(4S)$

[110] ALBRECHT 93E reports $< 1.6 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

$\Gamma(D_s^- \pi^+ K^*(892)^+)/\Gamma_{total}$ — Γ_{61}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.006	90	[111] ALBRECHT	93E	ARG	$e^+e^- \to \Upsilon(4S)$

[111] ALBRECHT 93E reports $< 8.6 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

$\Gamma(D_s^{*-} \pi^+ K^*(892)^+)/\Gamma_{total}$ — Γ_{62}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.008	90	[112] ALBRECHT	93E	ARG	$e^+e^- \to \Upsilon(4S)$

[112] ALBRECHT 93E reports $< 1.1 \times 10^{-2}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.036$.

$\Gamma(\eta_c K^+)/\Gamma_{total}$ — Γ_{63}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{(6.9^{+2.6}_{-2.1} \pm 2.2) \times 10^{-4}}$	[113] EDWARDS	01	CLE2	$e^+e^- \to \Upsilon(4S)$

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

$\Gamma(J/\psi(1S) K^+)/\Gamma_{total}$ — Γ_{64}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
10.0± 1.0 OUR AVERAGE					
10.2± 0.8±0.7		[114] JESSOP	97	CLE2	$e^+e^- \to \Upsilon(4S)$
9.3± 3.1±0.2		[115] BORTOLETTO	92	CLEO	$e^+e^- \to \Upsilon(4S)$
8.1± 3.5±0.1	6	[116] ALBRECHT	90J	ARG	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
11.0± 1.5±0.9	59	[117] ALAM	94	CLE2	Repl. by JESSOP 97
22 ±10 ±2		BUSKULIC	92G	ALEP	$e^+e^- \to Z$
7 ± 4	3	[118] ALBRECHT	87D	ARG	$e^+e^- \to \Upsilon(4S)$
10 ± 7 ±2	3	[119] BEBEK	87	CLEO	$e^+e^- \to \Upsilon(4S)$
9 ± 5	3	[120] ALAM	86	CLEO	$e^+e^- \to \Upsilon(4S)$

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

[115] BORTOLETTO 92 reports $8 \pm 2 \pm 2$ for $B(J/\psi(1S) \rightarrow e^+e^-) = 0.069 \pm 0.009$. We rescale to our best value $B(J/\psi(1S) \rightarrow e^+e^-) = (5.93 \pm 0.10) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

[116] ALBRECHT 90J reports $7 \pm 3 \pm 1$ for $B(J/\psi(1S) \rightarrow e^+e^-) = 0.069 \pm 0.009$. We rescale to our best value $B(J/\psi(1S) \rightarrow e^+e^-) = (5.93 \pm 0.10) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

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

[118] ALBRECHT 87D assume $B^+B^-/B^0\overline{B}^0$ ratio is 55/45. Superseded by ALBRECHT 90J.

[119] BEBEK 87 value has been updated in BERKELMAN 91 to use same assumptions as noted for BORTOLETTO 92.

[120] ALAM 86 assumes $B^\pm/B^0$ ratio is 60/40.

$\Gamma(J/\psi(1S)K^+\pi^+\pi^-)/\Gamma_{total}$ — Γ_{65}/Γ

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.0014 ±0.0006 OUR AVERAGE						
0.00140±0.00082±0.00002			[121] BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
0.00140±0.00091±0.00002		6	[122] ALBRECHT	87D	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.0019	90		[123] ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[121] BORTOLETTO 92 reports $0.0012 \pm 0.0006 \pm 0.0004$ for $B(J/\psi(1S) \rightarrow e^+e^-) = 0.069 \pm 0.009$. We rescale to our best value $B(J/\psi(1S) \rightarrow e^+e^-) = (5.93 \pm 0.10) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

[122] ALBRECHT 87D reports 0.0012 ± 0.0008 for $B(J/\psi(1S) \rightarrow e^+e^-) = 0.069 \pm 0.009$. We rescale to our best value $B(J/\psi(1S) \rightarrow e^+e^-) = (5.93 \pm 0.10) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. They actually report 0.0011 ± 0.0007 assuming $B^+B^-/B^0\overline{B}^0$ ratio is 55/45. We rescale to 50/50. Analysis explicitly removes $B^+ \rightarrow \psi(2S)K^+$.

[123] ALBRECHT 90J reports < 0.0016 for $B(J/\psi(1S) \rightarrow e^+e^-) = 0.069$. We rescale to our best value $B(J/\psi(1S) \rightarrow e^+e^-) = 0.0593$. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

$\Gamma(J/\psi(1S)K^*(892)^+)/\Gamma_{total}$ — Γ_{66}/Γ

For polarization information see the Listings at the end of the "B^0 Branching Ratios" section.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.00148±0.00027 OUR AVERAGE					
0.00141±0.00023±0.00024		[124] JESSOP	97	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
0.00158±0.00047±0.00027		[125] ABE	96H	CDF	$p\overline{p}$ at 1.8 TeV
0.00151±0.00109±0.00002		[126] BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
0.00186±0.00130±0.00003	2	[127] ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.00178±0.00051±0.00023	13	[128] ALAM	94	CLE2	Sup. by JESSOP 97

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

[125] ABE 96H assumes that $B(B^+ \rightarrow J/\psi K^+) = (1.02 \pm 0.14) \times 10^{-3}$.

[126] BORTOLETTO 92 reports $0.0013 \pm 0.0009 \pm 0.0003$ for $B(J/\psi(1S) \rightarrow e^+e^-) = 0.069 \pm 0.009$. We rescale to our best value $B(J/\psi(1S) \rightarrow e^+e^-) = (5.93 \pm 0.10) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[127] ALBRECHT 90J reports $0.0016 \pm 0.0011 \pm 0.0003$ for $B(J/\psi(1S) \rightarrow e^+e^-) = 0.069 \pm 0.009$. We rescale to our best value $B(J/\psi(1S) \rightarrow e^+e^-) = (5.93 \pm 0.10) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[128] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

$\Gamma(J/\psi(1S)K^*(892)^+)/\Gamma(J/\psi(1S)K^+)$ — Γ_{66}/Γ_{64}

VALUE	DOCUMENT ID		TECN	COMMENT
1.52±0.24 OUR AVERAGE				
1.45±0.20±0.17	[129] JESSOP	97	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
1.92±0.60±0.17	ABE	96Q	CDF	$p\overline{p}$

[129] JESSOP 97 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. The measurement is actually measured as an average over kaon charged and neutral states.

$\Gamma(J/\psi(1S)\phi K^+)/\Gamma_{total}$ — Γ_{67}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$(8.8^{+3.5}_{-3.0}\pm1.3) \times 10^{-5}$	[130] ANASTASSOV	00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[130] ANASTASSOV 00 finds 10 events on a background of 0.5 ± 0.2. Assumes equal production of B^0 and B^+ at the $\Upsilon(4S)$, a uniform Dalitz plot distribution, isotropic $J/\psi(1S)$ and ϕ decays, and $B(B^+ \rightarrow J/\psi(1S)\phi K^+) = B(B^0 \rightarrow J/\psi(1S)\phi K^0)$.

$\Gamma(J/\psi(1S)\pi^+)/\Gamma(J/\psi(1S)K^+)$ — Γ_{68}/Γ_{64}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.051±0.014 OUR AVERAGE					
$0.05\ ^{+0.019}_{-0.017}\pm0.001$		ABE	96R	CDF	$p\overline{p}$ 1.8 TeV
0.052±0.024		BISHAI	96	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.043±0.023	5	[131] ALEXANDER	95	CLE2	Sup. by BISHAI 96

[131] Assumes equal production of B^+B^- and $B^0\overline{B}^0$ on $\Upsilon(4S)$.

$\Gamma(J/\psi(1S)\rho^+)/\Gamma_{total}$ — Γ_{69}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<7.7 \times 10^{-4}$	90	BISHAI	96	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(J/\psi(1S)a_1(1260)^+)/\Gamma_{total}$ — Γ_{70}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.2 \times 10^{-3}$	90	BISHAI	96	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(\psi(2S)K^+)/\Gamma_{total}$ — Γ_{71}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
5.8± 1.0 OUR AVERAGE						
5.5± 1.0±0.6			[132] ABE	98O	CDF	$p\overline{p}$ 1.8 TeV
6.1± 2.3±0.9		7	[133] ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
18 ± 8 ±4		5	[133] ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<$ 5	90		[133] BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
22 ±17		3	[134] ALBRECHT	87D	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[132] ABE 98O reports $[B(B^+ \rightarrow \psi(2S)K^+)]/[B(B^+ \rightarrow J/\psi(1S)K^+)] = 0.558 \pm 0.082 \pm 0.056$. We multiply by our best value $B(B^+ \rightarrow J/\psi(1S)K^+) = (9.9 \pm 1.0) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

[134] ALBRECHT 87D assume $B^+B^-/B^0\overline{B}^0$ ratio is 55/45. Superseded by ALBRECHT 90J.

$\Gamma(\psi(2S)K^*(892)^+)/\Gamma_{total}$ — Γ_{72}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0030	90	[135] ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0035	90	[135] BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
<0.0049	90	[135] ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(\psi(2S)K^+\pi^+\pi^-)/\Gamma_{total}$ — Γ_{73}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0019±0.0011±0.0004	3	[136] ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(\chi_{c0}(1P)K^+)/\Gamma_{total}$ — Γ_{74}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<4.8 × 10^{-4}	90	[137] EDWARDS	01	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(\chi_{c1}(1P)K^+)/\Gamma_{total}$ — Γ_{75}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0010 ±0.0004 OUR AVERAGE					
0.00097±0.00040±0.00009	6	[138] ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
0.0019 ±0.0013 ±0.0006		[139] ALBRECHT	92E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

[139] ALBRECHT 92E assumes no $\chi_{c2}(1P)$ production and $B(\Upsilon(4S) \rightarrow B^+B^-) = 50\%$.

$\Gamma(\chi_{c1}(1P)K^*(892)^+)/\Gamma_{\text{total}}$ — Γ_{76}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0021	90	[140] ALAM	94	CLE2	$e^+e^- \to \Upsilon(4S)$

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

$\Gamma(K^0\pi^+)/\Gamma_{\text{total}}$ — Γ_{77}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
$\mathbf{1.82^{+0.46}_{-0.40}\pm0.16}$		[141] CRONIN-HEN...	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$2.3\ ^{+1.1}_{-1.0}\ \pm0.36$		GODANG	98	CLE2	Repl. by CRONIN-HENNESSY 00
$<\ 4.8$	90	ASNER	96	CLE2	Repl. by GODANG 98
<19	90	ALBRECHT	91B	ARG	$e^+e^- \to \Upsilon(4S)$
<10	90	[142] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$
<68	90	AVERY	87	CLEO	$e^+e^- \to \Upsilon(4S)$

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

[142] AVERY 89B reports $< 9\times10^{-5}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K^+\pi^0)/\Gamma_{\text{total}}$ — Γ_{78}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
$\mathbf{1.16^{+0.30}_{-0.27}{}^{+0.14}_{-0.13}}$		[143] CRONIN-HEN...	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.6	90	GODANG	98	CLE2	Repl. by CRONIN-HENNESSY 00
<1.4	90	ASNER	96	CLE2	Repl. by GODANG 98

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

$\Gamma(\eta' K^+)/\Gamma_{\text{total}}$ — Γ_{79}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
$\mathbf{8.0^{+1.0}_{-0.9}\pm0.7}$	[144] RICHICHI	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$6.5^{+1.5}_{-1.4}\pm0.9$	BEHRENS	98	CLE2	Repl. by RICHICHI 00

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

$\Gamma(\eta' K^*(892)^+)/\Gamma_{\text{total}}$ — Γ_{80}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$\mathbf{<3.5\times10^{-5}}$	90	[145] RICHICHI	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.3\times10^{-4}$	90	BEHRENS	98	CLE2	Repl. by RICHICHI 00

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

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

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<6.9 \times 10^{-6}$	90	[146] RICHICHI 00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<1.4 \times 10^{-5}$	90	BEHRENS 98	CLE2	Repl. by RICHICHI 00

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

$\Gamma(\eta K^*(892)^+)/\Gamma_{total}$ — Γ_{82}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
$2.64^{+0.96}_{-0.82} \pm 0.33$		[147] RICHICHI 00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<3.0	90	BEHRENS 98	CLE2	Repl. by RICHICHI 00

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

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

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
<0.79	90	[148] JESSOP 00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.5\ ^{+0.7}_{-0.6} \pm 0.2$		[148] BERGFELD 98	CLE2	Repl. by JESSOP 00

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

$\Gamma(\omega K^*(892)^+)/\Gamma_{total}$ — Γ_{84}/Γ

VALUE	CL%	DOCUMENT ID	TECN
$<8.7 \times 10^{-5}$	90	[149] BERGFELD 98	CLE2

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

$\Gamma(K^*(892)^0\pi^+)/\Gamma_{total}$ — Γ_{85}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<1.6 \times 10^{-5}$	90	[150] JESSOP 00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<1.19 \times 10^{-4}$	90	[151] ABE 00C	SLD	$e^+e^- \rightarrow Z$
$<3.9 \times 10^{-4}$	90	[152] ADAM 96D	DLPH	$e^+e^- \rightarrow Z$
$<4.1 \times 10^{-5}$	90	ASNER 96	CLE2	Repl. by JESSOP 00
$<4.8 \times 10^{-4}$	90	[153] ABREU 95N	DLPH	Sup. by ADAM 96D
$<1.7 \times 10^{-4}$	90	ALBRECHT 91B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
$<1.5 \times 10^{-4}$	90	[154] AVERY 89B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
$<2.6 \times 10^{-4}$	90	AVERY 87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

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

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

[152] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$.

[153] Assumes a B^0, B^- production fraction of 0.39 and a B_s production fraction of 0.12.

[154] AVERY 89B reports $< 1.3 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K^*(892)^+\pi^0)/\Gamma_{total}$ — Γ_{86}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.1 × 10^{-5}	90	[155] JESSOP	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<9.9 \times 10^{-5}$	90	ASNER	96	CLE2	Repl. by JESSOP 00

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

$\Gamma(K^+\pi^-\pi^+ \text{nonresonant})/\Gamma_{total}$ — Γ_{87}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.8 × 10^{-5}	90	BERGFELD	96B	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<3.3 \times 10^{-4}$	90	[156] ADAM	96D	DLPH	$e^+e^- \to Z$
$<4.0 \times 10^{-4}$	90	[157] ABREU	95N	DLPH	Sup. by ADAM 96D
$<3.3 \times 10^{-4}$	90	ALBRECHT	91E	ARG	$e^+e^- \to \Upsilon(4S)$
$<1.9 \times 10^{-4}$	90	[158] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$

[156] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$.

[157] Assumes a B^0, B^- production fraction of 0.39 and a B_s production fraction of 0.12.

[158] AVERY 89B reports $< 1.7 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K^-\pi^+\pi^+ \text{nonresonant})/\Gamma_{total}$ — Γ_{88}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.6 × 10^{-5}	90	BERGFELD	96B	CLE2	$e^+e^- \to \Upsilon(4S)$

$\Gamma(K_1(1400)^0\pi^+)/\Gamma_{total}$ — Γ_{89}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.6 × 10^{-3}	90	ALBRECHT	91B	ARG	$e^+e^- \to \Upsilon(4S)$

$\Gamma(K_2^*(1430)^0\pi^+)/\Gamma_{total}$ — Γ_{90}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<6.8 × 10^{-4}	90	ALBRECHT	91B	ARG	$e^+e^- \to \Upsilon(4S)$

$\Gamma(K^+\rho^0)/\Gamma_{total}$ — Γ_{91}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.7 × 10^{-5}	90	[159] JESSOP	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<8.6 \times 10^{-5}$	90	[160] ABE	00C	SLD	$e^+e^- \to Z$
$<1.2 \times 10^{-4}$	90	[161] ADAM	96D	DLPH	$e^+e^- \to Z$
$<1.9 \times 10^{-5}$	90	ASNER	96	CLE2	Repl. by JESSOP 00
$<1.9 \times 10^{-4}$	90	[162] ABREU	95N	DLPH	Sup. by ADAM 96D
$<1.8 \times 10^{-4}$	90	ALBRECHT	91B	ARG	$e^+e^- \to \Upsilon(4S)$
$<8 \times 10^{-5}$	90	[163] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$
$<2.6 \times 10^{-4}$	90	AVERY	87	CLEO	$e^+e^- \to \Upsilon(4S)$

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

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

[161] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$.

[162] Assumes a B^0, B^- production fraction of 0.39 and a B_s production fraction of 0.12.
[163] AVERY 89B reports $< 7 \times 10^{-5}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0 \overline{B}^0$. We rescale to 50%.

$\Gamma(K^0 \rho^+)/\Gamma_{total}$ — Γ_{92}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.8 \times 10^{-5}$	90	ASNER	96	CLE2	$e^+ e^- \to \Upsilon(4S)$

$\Gamma(K^*(892)^+ \pi^+ \pi^-)/\Gamma_{total}$ — Γ_{93}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.1 \times 10^{-3}$	90	ALBRECHT	91E	ARG	$e^+ e^- \to \Upsilon(4S)$

$\Gamma(K^*(892)^+ \rho^0)/\Gamma_{total}$ — Γ_{94}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<9.0 \times 10^{-4}$	90	ALBRECHT	91B	ARG	$e^+ e^- \to \Upsilon(4S)$

$\Gamma(K_1(1400)^+ \rho^0)/\Gamma_{total}$ — Γ_{95}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<7.8 \times 10^{-4}$	90	ALBRECHT	91B	ARG	$e^+ e^- \to \Upsilon(4S)$

$\Gamma(K_2^*(1430)^+ \rho^0)/\Gamma_{total}$ — Γ_{96}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.5 \times 10^{-3}$	90	ALBRECHT	91B	ARG	$e^+ e^- \to \Upsilon(4S)$

$\Gamma(K^+ \overline{K}^0)/\Gamma_{total}$ — Γ_{97}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.1 \times 10^{-6}$	90	[164] CRONIN-HEN..00		CLE2	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.1 \times 10^{-5}$	90	GODANG	98	CLE2	Repl. by CRONIN-HENNESSY 00

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

$\Gamma(K^+ K^- \pi^+ \text{nonresonant})/\Gamma_{total}$ — Γ_{98}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<7.5 \times 10^{-5}$	90	BERGFELD	96B	CLE2	$e^+ e^- \to \Upsilon(4S)$

$\Gamma(K^+ K^+ \pi^- \text{nonresonant})/\Gamma_{total}$ — Γ_{99}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<8.79 \times 10^{-5}$	90	ABBIENDI	00B	OPAL	$e^+ e^- \to Z$

$\Gamma(K^+ K^*(892)^0)/\Gamma_{total}$ — Γ_{100}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.3 \times 10^{-6}$	90	[165] JESSOP	00	CLE2	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.29 \times 10^{-4}$	90	ABBIENDI	00B	OPAL	$e^+ e^- \to Z$
$<1.38 \times 10^{-4}$	90	[166] ABE	00C	SLD	$e^+ e^- \to Z$

[165] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[166] ABE 00C assumes B($Z \to b\overline{b}$)=(21.7 ± 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})$% and $f_{B_s}=(10.5^{+1.8}_{-2.2})$%.

$\Gamma(K^+K^-K^+)/\Gamma_{total}$ Γ_{101}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.0 \times 10^{-4}$	90	[167] ADAM	96D	DLPH	$e^+e^- \rightarrow Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<3.1 \times 10^{-4}$	90	[168] ABREU	95N	DLPH	Sup. by ADAM 96D
$<3.5 \times 10^{-4}$	90	ALBRECHT	91E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[167] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$.

[168] Assumes a B^0, B^- production fraction of 0.39 and a B_s production fraction of 0.12.

$\Gamma(K^+\phi)/\Gamma_{total}$ Γ_{102}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<0.5 \times 10^{-5}$	90	[169] BERGFELD	98	CLE2	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.44 \times 10^{-4}$	90	[170] ABE	00C	SLD	$e^+e^- \rightarrow Z$
$<2.8 \times 10^{-4}$	90	[171] ADAM	96D	DLPH	$e^+e^- \rightarrow Z$
$<1.2 \times 10^{-5}$	90	ASNER	96	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
$<4.4 \times 10^{-4}$	90	[172] ABREU	95N	DLPH	Sup. by ADAM 96D
$<1.8 \times 10^{-4}$	90	ALBRECHT	91B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
$<9 \times 10^{-5}$	90	[173] AVERY	89B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
$<2.1 \times 10^{-4}$	90	AVERY	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

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

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

[171] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$.

[172] Assumes a B^0, B^- production fraction of 0.39 and a B_s production fraction of 0.12.

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

$\Gamma(K^+K^-K^+\text{nonresonant})/\Gamma_{total}$ Γ_{103}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.8 \times 10^{-5}$	90	BERGFELD	96B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(K^*(892)^+K^+K^-)/\Gamma_{total}$ Γ_{104}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.6 \times 10^{-3}$	90	ALBRECHT	91E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(K^*(892)^+\phi)/\Gamma_{total}$ Γ_{105}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.1 \times 10^{-5}$	90	[174] BERGFELD	98	CLE2	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<7.0 \times 10^{-5}$	90	ASNER	96	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
$<1.3 \times 10^{-3}$	90	ALBRECHT	91B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(K_1(1400)^+\phi)/\Gamma_{total}$ Γ_{106}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.1 \times 10^{-3}$	90	ALBRECHT	91B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(K_2^*(1430)^+\phi)/\Gamma_{total}$ — Γ_{107}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.4\times10^{-3}$	90	ALBRECHT	91B	ARG	$e^+e^-\to\Upsilon(4S)$

$\Gamma(K^+f_0(980))/\Gamma_{total}$ — Γ_{108}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<8\times10^{-5}$	90	[175] AVERY	89B	CLEO	$e^+e^-\to\Upsilon(4S)$

[175] AVERY 89B reports $<7\times10^{-5}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K^*(892)^+\gamma)/\Gamma_{total}$ — Γ_{109}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$3.76^{+0.89}_{-0.83}\pm0.28$			[176] COAN	00	CLE2	$e^+e^-\to\Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$5.7\ \pm3.1\ \pm1.1$		5	[177] AMMAR	93	CLE2	Repl. by COAN 00
$<\ 55$	90		[178] ALBRECHT	89G	ARG	$e^+e^-\to\Upsilon(4S)$
$<\ 55$	90		[179] AVERY	89B	CLEO	$e^+e^-\to\Upsilon(4S)$
<180	90		AVERY	87	CLEO	$e^+e^-\to\Upsilon(4S)$

[176] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[177] AMMAR 93 observed 4.1 ± 2.3 events above background.
[178] Assumes the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$.
[179] Assumes the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$.

$\Gamma(K_1(1270)^+\gamma)/\Gamma_{total}$ — Γ_{110}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0073	90	[180] ALBRECHT	89G	ARG	$e^+e^-\to\Upsilon(4S)$

[180] ALBRECHT 89G reports <0.0066 assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K_1(1400)^+\gamma)/\Gamma_{total}$ — Γ_{111}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0022	90	[181] ALBRECHT	89G	ARG	$e^+e^-\to\Upsilon(4S)$

[181] ALBRECHT 89G reports <0.0020 assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K_2^*(1430)^+\gamma)/\Gamma_{total}$ — Γ_{112}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0014	90	[182] ALBRECHT	89G	ARG	$e^+e^-\to\Upsilon(4S)$

[182] ALBRECHT 89G reports <0.0013 assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K^*(1680)^+\gamma)/\Gamma_{total}$ — Γ_{113}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0019	90	[183] ALBRECHT	89G	ARG	$e^+e^- \to \Upsilon(4S)$

[183] ALBRECHT 89G reports < 0.0017 assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K_3^*(1780)^+\gamma)/\Gamma_{total}$ — Γ_{114}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0055	90	[184] ALBRECHT	89G	ARG	$e^+e^- \to \Upsilon(4S)$

[184] ALBRECHT 89G reports < 0.005 assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K_4^*(2045)^+\gamma)/\Gamma_{total}$ — Γ_{115}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0099	90	[185] ALBRECHT	89G	ARG	$e^+e^- \to \Upsilon(4S)$

[185] ALBRECHT 89G reports < 0.0090 assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(\rho^+\gamma)/\Gamma_{total}$ — Γ_{116}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.3 \times 10^{-5}$	90	[186] COAN	00	CLE2	$e^+e^- \to \Upsilon(4S)$

[186] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. No evidence for a nonresonant $K\pi\gamma$ contamination was seen; the central value assumes no contamination.

$\Gamma(\pi^+\pi^0)/\Gamma_{total}$ — Γ_{117}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<12.7 \times 10^{-6}$	90	[187] CRONIN-HEN...	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$< 2.0 \times 10^{-5}$	90	GODANG	98	CLE2	Repl. by CRONIN-HENNESSY 00
$< 1.7 \times 10^{-5}$	90	ASNER	96	CLE2	Repl. by GODANG 98
$< 2.4 \times 10^{-4}$	90	[188] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$
$< 2.3 \times 10^{-3}$	90	[189] BEBEK	87	CLEO	$e^+e^- \to \Upsilon(4S)$

[187] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[188] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.
[189] BEBEK 87 assume the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$.

$\Gamma(\pi^+\pi^+\pi^-)/\Gamma_{total}$ — Γ_{118}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.3 \times 10^{-4}$	90	[190] ADAM	96D	DLPH	$e^+e^- \to Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.2 \times 10^{-4}$	90	[191] ABREU	95N	DLPH	Sup. by ADAM 96D
$<4.5 \times 10^{-4}$	90	[192] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$
$<1.9 \times 10^{-4}$	90	[193] BORTOLETTO	89	CLEO	$e^+e^- \to \Upsilon(4S)$

[190] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$.
[191] Assumes a B^0, B^- production fraction of 0.39 and a B_s production fraction of 0.12.
[192] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.
[193] BORTOLETTO 89 reports $< 1.7 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(\rho^0\pi^+)/\Gamma_{total}$ — Γ_{119}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$1.04^{+0.33}_{-0.34}\pm0.21$			[194] JESSOP	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<$ 8.3	90		[195] ABE	00C	SLD	$e^+e^- \to Z$
$<$16	90		[196] ADAM	96D	DLPH	$e^+e^- \to Z$
$<$ 4.3	90		ASNER	96	CLE2	Repl. by JESSOP 00
$<$26	90		[197] ABREU	95N	DLPH	Sup. by ADAM 96D
$<$15	90		[198] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$
$<$17	90		[199] BORTOLETTO	89	CLEO	$e^+e^- \to \Upsilon(4S)$
$<$23	90		[199] BEBEK	87	CLEO	$e^+e^- \to \Upsilon(4S)$
$<$60	90	0	GILES	84	CLEO	Repl. by BEBEK 87

[194] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[195] ABE 00C assumes B($Z \to b\overline{b}$)=(21.7 ± 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})$% and $f_{B_s}=(10.5^{+1.8}_{-2.2})$%.
[196] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$.
[197] Assumes a B^0, B^- production fraction of 0.39 and a B_s production fraction of 0.12.
[198] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.
[199] Papers assume the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

$[\Gamma(K^*(892)^0\pi^+)+\Gamma(\rho^0\pi^+)]/\Gamma_{total}$ — $(\Gamma_{85}+\Gamma_{119})/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
$(17\ ^{+12}_{-\ 8}\ \pm2)\times10^{-5}$	[200] ADAM	96D	DLPH	$e^+e^- \to Z$

[200] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$.

$\Gamma(\pi^+f_0(980))/\Gamma_{total}$ — Γ_{120}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.4\times10^{-4}$	90	[201] BORTOLETTO	89	CLEO	$e^+e^- \to \Upsilon(4S)$

[201] BORTOLETTO 89 reports $< 1.2\times10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(\pi^+f_2(1270))/\Gamma_{total}$ — Γ_{121}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.4\times10^{-4}$	90	[202] BORTOLETTO	89	CLEO	$e^+e^- \to \Upsilon(4S)$

[202] BORTOLETTO 89 reports $< 2.1\times10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(\pi^+\pi^-\pi^+\ \text{nonresonant})/\Gamma_{total}$ — Γ_{122}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.1\times10^{-5}$	90	BERGFELD	96B	CLE2	$e^+e^- \to \Upsilon(4S)$

$\Gamma(\pi^+\pi^0\pi^0)/\Gamma_{total}$ — Γ_{123}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<8.9\times10^{-4}$	90	[203] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$

[203] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.

$\Gamma(\rho^+\pi^0)/\Gamma_{total}$ — Γ_{124}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.3 \times 10^{-5}$	90	[204] JESSOP	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<7.7 \times 10^{-5}$	90	ASNER	96	CLE2	Repl. by JESSOP 00
$<5.5 \times 10^{-4}$	90	[205] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$

[204] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$. Assumes no nonresonant contributions of $B^+ \to \pi^+\pi^0\pi^0$.
[205] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.

$\Gamma(\pi^+\pi^-\pi^+\pi^0)/\Gamma_{total}$ — Γ_{125}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.0 \times 10^{-3}$	90	[206] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$

[206] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.

$\Gamma(\rho^+\rho^0)/\Gamma_{total}$ — Γ_{126}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.0 \times 10^{-3}$	90	[207] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$

[207] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.

$\Gamma(a_1(1260)^+\pi^0)/\Gamma_{total}$ — Γ_{127}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.7 \times 10^{-3}$	90	[208] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$

[208] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.

$\Gamma(a_1(1260)^0\pi^+)/\Gamma_{total}$ — Γ_{128}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<9.0 \times 10^{-4}$	90	[209] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$

[209] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.

$\Gamma(\omega\pi^+)/\Gamma_{total}$ — Γ_{129}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
$1.13^{+0.33}_{-0.29} \pm 0.14$		[210] JESSOP	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<2.3	90	[210] BERGFELD	98	CLE2	Repl. by JESSOP 00
<40	90	[211] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$

[210] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[211] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.

$\Gamma(\omega\rho^+)/\Gamma_{total}$ — Γ_{130}/Γ

VALUE	CL%	DOCUMENT ID		TECN
$<6.1 \times 10^{-5}$	90	[212] BERGFELD	98	CLE2

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

$\Gamma(\eta\pi^+)/\Gamma_{total}$ Γ_{131}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<5.7 \times 10^{-6}$	90	[213] RICHICHI 00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<1.5 \times 10^{-5}$	90	BEHRENS 98	CLE2	Repl. by RICHICHI 00
$<7.0 \times 10^{-4}$	90	[214] ALBRECHT 90B	ARG	$e^+e^- \to \Upsilon(4S)$

[213] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[214] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.

$\Gamma(\eta'\pi^+)/\Gamma_{total}$ Γ_{132}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<1.2 \times 10^{-5}$	90	[215] RICHICHI 00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<3.1 \times 10^{-5}$	90	BEHRENS 98	CLE2	Repl. by RICHICHI 00

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

$\Gamma(\eta'\rho^+)/\Gamma_{total}$ Γ_{133}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3.3 \times 10^{-5}$	90	[216] RICHICHI 00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<4.7 \times 10^{-5}$	90	BEHRENS 98	CLE2	Repl. by RICHICHI 00

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

$\Gamma(\eta\rho^+)/\Gamma_{total}$ Γ_{134}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<1.5 \times 10^{-5}$	90	[217] RICHICHI 00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<3.2 \times 10^{-5}$	90	BEHRENS 98	CLE2	Repl. by RICHICHI 00

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

$\Gamma(\phi\pi^+)/\Gamma_{total}$ Γ_{135}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<0.5 \times 10^{-5}$	90	[218] BERGFELD 98	CLE2	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<1.53 \times 10^{-4}$	90	[219] ABE 00C	SLD	$e^+e^- \to Z$

[218] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[219] ABE 00C assumes B($Z \to b\overline{b}$)=(21.7 ± 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})$% and $f_{B_s}=(10.5^{+1.8}_{-2.2})$%.

$\Gamma(\phi\rho^+)/\Gamma_{total}$ Γ_{136}/Γ

VALUE	DOCUMENT ID	TECN
$<1.6 \times 10^{-5}$	[220] BERGFELD 98	CLE2

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

$\Gamma(\pi^+\pi^+\pi^+\pi^-\pi^-)/\Gamma_{total}$ — Γ_{137}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<8.6 \times 10^{-4}$	90	[221] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$

[221] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.

$\Gamma(\rho^0 a_1(1260)^+)/\Gamma_{total}$ — Γ_{138}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<6.2 \times 10^{-4}$	90	[222] BORTOLETTO	89	CLEO	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<6.0 \times 10^{-4}$	90	[223] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$
$<3.2 \times 10^{-3}$	90	[222] BEBEK	87	CLEO	$e^+e^- \to \Upsilon(4S)$

[222] BORTOLETTO 89 reports $< 5.4 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

[223] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.

$\Gamma(\rho^0 a_2(1320)^+)/\Gamma_{total}$ — Γ_{139}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<7.2 \times 10^{-4}$	90	[224] BORTOLETTO	89	CLEO	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.6 \times 10^{-3}$	90	[225] BEBEK	87	CLEO	$e^+e^- \to \Upsilon(4S)$

[224] BORTOLETTO 89 reports $< 6.3 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

[225] BEBEK 87reports $< 2.3 \times 10^{-3}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(\pi^+\pi^+\pi^+\pi^-\pi^-\pi^0)/\Gamma_{total}$ — Γ_{140}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<6.3 \times 10^{-3}$	90	[226] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$

[226] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.

$\Gamma(a_1(1260)^+ a_1(1260)^0)/\Gamma_{total}$ — Γ_{141}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.3 \times 10^{-2}$	90	[227] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$

[227] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.

$\Gamma(h^+\pi^0)/\Gamma_{total}$ — Γ_{142}/Γ

$h^+ = K^+$ or π^+

VALUE	DOCUMENT ID		TECN	COMMENT
$(1.6^{+0.6}_{-0.5} \pm 0.36) \times 10^{-5}$	GODANG	98	CLE2	$e^+e^- \to \Upsilon(4S)$

$\Gamma(\omega h^+)/\Gamma_{total}$ — Γ_{143}/Γ

$h^+ = K^+$ or π^+

VALUE	DOCUMENT ID		TECN	COMMENT
$(1.43^{+0.36}_{-0.32} \pm 0.20) \times 10^{-5}$	[228] JESSOP	00	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$(2.5\ ^{+0.8}_{-0.7}\ \pm 0.3\ ) \times 10^{-5}$	[228] BERGFELD	98	CLE2	Repl. by JESSOP 00

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

$\Gamma(p\overline{p}\pi^+)/\Gamma_{total}$ — Γ_{144}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 1.6 × 10⁻⁴	90	[229] BEBEK 89	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

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

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 5.0 \times 10^{-4}$	90	[230] ABREU 95N	DLPH	Sup. by ADAM 96D
$(5.7\pm1.5\pm2.1) \times 10^{-4}$		[231] ALBRECHT 88F	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[229] BEBEK 89 reports $< 1.4\times10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.
[230] Assumes a B^0, B^- production fraction of 0.39 and a B_s production fraction of 0.12.
[231] ALBRECHT 88F reports $(5.2 \pm 1.4 \pm 1.9) \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(p\overline{p}\pi^+ \text{ nonresonant})/\Gamma_{total}$ — Γ_{145}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<5.3 × 10⁻⁵	90	BERGFELD 96B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(p\overline{p}\pi^+\pi^+\pi^-)/\Gamma_{total}$ — Γ_{146}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<5.2 × 10⁻⁴	90	[232] ALBRECHT 88F	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[232] ALBRECHT 88F reports $< 4.7 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(p\overline{p}K^+ \text{ nonresonant})/\Gamma_{total}$ — Γ_{147}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<8.9 × 10⁻⁵	90	BERGFELD 96B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(p\overline{\Lambda})/\Gamma_{total}$ — Γ_{148}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<2.6 × 10⁻⁶	90	[233] COAN 99	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

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

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<6 \times 10^{-5}$	90	[234] AVERY 89B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
$<9.3 \times 10^{-5}$	90	[235] ALBRECHT 88F	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[233] Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.
[234] AVERY 89B reports $< 5\times10^{-5}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.
[235] ALBRECHT 88F reports $< 8.5 \times 10^{-5}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(p\overline{\Lambda}\pi^+\pi^-)/\Gamma_{total}$ — Γ_{149}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<2.0 × 10⁻⁴	90	[236] ALBRECHT 88F	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[236] ALBRECHT 88F reports $< 1.8 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(\overline{\Delta}^0 p)/\Gamma_{total}$ — Γ_{150}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<3.8 × 10⁻⁴	90	[237] BORTOLETTO 89	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[237] BORTOLETTO 89 reports $< 3.3 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(\Delta^{++}\overline{p})/\Gamma_{total}$ — Γ_{151}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.5 × 10^{-4}	90	[238] BORTOLETTO	89	CLEO	$e^+e^- \to \Upsilon(4S)$

[238] BORTOLETTO 89 reports $< 1.3 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(\overline{\Lambda}_c^- p\pi^+)/\Gamma_{total}$ — Γ_{152}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
$6.2^{+2.3}_{-2.0}\pm1.6$	[239] FU	97	CLE2	$e^+e^- \to \Upsilon(4S)$

[239] FU 97 uses PDG 96 values of Λ_c branching fraction.

$\Gamma(\overline{\Lambda}_c^- p\pi^+\pi^0)/\Gamma_{total}$ — Γ_{153}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.12 × 10^{-3}	90	[240] FU	97	CLE2	$e^+e^- \to \Upsilon(4S)$

[240] FU 97 uses PDG 96 values of Λ_c branching ratio.

$\Gamma(\overline{\Lambda}_c^- p\pi^+\pi^+\pi^-)/\Gamma_{total}$ — Γ_{154}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.46 × 10^{-3}	90	[241] FU	97	CLE2	$e^+e^- \to \Upsilon(4S)$

[241] FU 97 uses PDG 96 values of Λ_c branching ratio.

$\Gamma(\overline{\Lambda}_c^- p\pi^+\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_{155}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.34 × 10^{-2}	90	[242] FU	97	CLE2	$e^+e^- \to \Upsilon(4S)$

[242] FU 97 uses PDG 96 values of Λ_c branching ratio.

$\Gamma(\pi^+e^+e^-)/\Gamma_{total}$ — Γ_{156}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0039	90	[243] WEIR	90B	MRK2	e^+e^- 29 GeV

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

$\Gamma(\pi^+\mu^+\mu^-)/\Gamma_{total}$ — Γ_{157}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0091	90	[244] WEIR	90B	MRK2	e^+e^- 29 GeV

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

$\Gamma(K^+e^+e^-)/\Gamma_{total}$ — Γ_{158}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<6 × 10^{-5}	90	[245] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$

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

$<9.9 \times 10^{-5}$	90	[246] ALBRECHT	91E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
$<6.8 \times 10^{-3}$	90	[247] WEIR	90B	MRK2	e^+e^- 29 GeV
$<2.5 \times 10^{-4}$	90	[248] AVERY	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[245] AVERY 89B reports $< 5 \times 10^{-5}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0 \overline{B}^0$. We rescale to 50%.
[246] ALBRECHT 91E reports $< 9.0 \times 10^{-5}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0 \overline{B}^0$. We rescale to 50%.
[247] WEIR 90B assumes B^+ production cross section from LUND.
[248] AVERY 87 reports $< 2.1 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 40% to $B^0 \overline{B}^0$. We rescale to 50%.

$\Gamma(K^+\mu^+\mu^-)/\Gamma_{total}$ Γ_{159}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.2 \times 10^{-6}$	90	[249] AFFOLDER	99B	CDF	$p\overline{p}$ at 1.8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.0 \times 10^{-5}$	90	[250] ABE	96L	CDF	Repl. by AFFOLDER 99B
$<2.4 \times 10^{-4}$	90	[251] ALBRECHT	91E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
$<6.4 \times 10^{-3}$	90	[252] WEIR	90B	MRK2	e^+e^- 29 GeV
$<1.7 \times 10^{-4}$	90	[253] AVERY	89B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
$<3.8 \times 10^{-4}$	90	[254] AVERY	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[249] AFFOLDER 99B measured relative to $B^+ \rightarrow J/\psi(1S)K^+$.
[250] ABE 96L measured relative to $B^+ \rightarrow J/\psi(1S)K^+$ using PDG 94 branching ratios.
[251] ALBRECHT 91E reports $< 2.2 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0 \overline{B}^0$. We rescale to 50%.
[252] WEIR 90B assumes B^+ production cross section from LUND.
[253] AVERY 89B reports $< 1.5 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0 \overline{B}^0$. We rescale to 50%.
[254] AVERY 87 reports $< 3.2 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 40% to $B^0 \overline{B}^0$. We rescale to 50%.

$\Gamma(K^*(892)^+e^+e^-)/\Gamma_{total}$ Γ_{160}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<6.9 \times 10^{-4}$	90	[255] ALBRECHT	91E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[255] ALBRECHT 91E reports $< 6.3 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0 \overline{B}^0$. We rescale to 50%.

$\Gamma(K^*(892)^+\mu^+\mu^-)/\Gamma_{total}$ Γ_{161}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.2 \times 10^{-3}$	90	[256] ALBRECHT	91E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[256] ALBRECHT 91E reports $< 1.1 \times 10^{-3}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0 \overline{B}^0$. We rescale to 50%.

$\Gamma(\pi^+ e^+ \mu^-)/\Gamma_{total}$ **Γ_{162}/Γ**

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0064	90	[257] WEIR 90B	MRK2	$e^+ e^-$ 29 GeV

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

$\Gamma(\pi^+ e^- \mu^+)/\Gamma_{total}$ **Γ_{163}/Γ**

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0064	90	[258] WEIR 90B	MRK2	$e^+ e^-$ 29 GeV

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

$\Gamma(K^+ e^+ \mu^-)/\Gamma_{total}$ **Γ_{164}/Γ**

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0064	90	[259] WEIR 90B	MRK2	$e^+ e^-$ 29 GeV

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

$\Gamma(K^+ e^- \mu^+)/\Gamma_{total}$ **Γ_{165}/Γ**

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0064	90	[260] WEIR 90B	MRK2	$e^+ e^-$ 29 GeV

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

$\Gamma(\pi^- e^+ e^+)/\Gamma_{total}$ **Γ_{166}/Γ**

Test of total lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0039	90	[261] WEIR 90B	MRK2	$e^+ e^-$ 29 GeV

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

$\Gamma(\pi^- \mu^+ \mu^+)/\Gamma_{total}$ **Γ_{167}/Γ**

Test of total lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0091	90	[262] WEIR 90B	MRK2	$e^+ e^-$ 29 GeV

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

$\Gamma(\pi^- e^+ \mu^+)/\Gamma_{total}$ **Γ_{168}/Γ**

Test of total lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0064	90	[263] WEIR 90B	MRK2	$e^+ e^-$ 29 GeV

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

$\Gamma(K^- e^+ e^+)/\Gamma_{total}$ **Γ_{169}/Γ**

Test of total lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0039	90	[264] WEIR 90B	MRK2	$e^+ e^-$ 29 GeV

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

$\Gamma(K^-\mu^+\mu^+)/\Gamma_{total}$ — Γ_{170}/Γ

Test of total lepton number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0091	90	[265] WEIR	90B	MRK2	e^+e^- 29 GeV

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

$\Gamma(K^-e^+\mu^+)/\Gamma_{total}$ — Γ_{171}/Γ

Test of total lepton number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0064	90	[266] WEIR	90B	MRK2	e^+e^- 29 GeV

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

CP VIOLATION

A_{CP} is defined as

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

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

$A_{CP}(B^+ \to J/\psi(1S)K^+)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.018±0.043±0.004	[267] BONVICINI	00	CLE2	$e^+e^- \to \Upsilon(4S)$

[267] A +0.3% correction is applied due to a slightly higher reconstruction efficiency for the positive kaons.

$A_{CP}(B^+ \to \psi(2S)K^+)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.02±0.091±0.01	[268] BONVICINI	00	CLE2	$e^+e^- \to \Upsilon(4S)$

[268] A +0.3% correction is applied due to a slightly higher reconstruction efficiency for the positive kaons.

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

VALUE	DOCUMENT ID		TECN	COMMENT
−0.29±0.23	[269] CHEN	00	CLE2	$e^+e^- \to \Upsilon(4S)$

[269] A 90%CL range is $-0.67 < A_{CP} < 0.09$.

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

VALUE	DOCUMENT ID		TECN	COMMENT
+0.18±0.24	[270] CHEN	00	CLE2	$e^+e^- \to \Upsilon(4S)$

[270] A 90%CL range is $-0.22 < A_{CP} < 0.56$.

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

VALUE	DOCUMENT ID		TECN	COMMENT
+0.03±0.12	[271] CHEN	00	CLE2	$e^+e^- \to \Upsilon(4S)$

[271] A 90%CL range is $-0.17 < A_{CP} < 0.23$.

$A_{CP}(B^+ \rightarrow \omega\pi^+)$

VALUE	DOCUMENT ID		TECN	COMMENT
−0.34±0.25	[272] CHEN	00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[272] A 90%CL range is $-0.75 < A_{CP} < 0.07$.

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Also	94H	PL B325 537 (errata)	D. Buskulic *et al.*	(ALEPH Collab.)
SANGHERA	93	PR D47 791	S. Sanghera *et al.*	(CLEO Collab.)
ALBRECHT	92C	PL B275 195	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	92E	PL B277 209	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	92G	ZPHY C54 1	H. Albrecht *et al.*	(ARGUS Collab.)
BORTOLETTO	92	PR D45 21	D. Bortoletto *et al.*	(CLEO Collab.)
BUSKULIC	92G	PL B295 396	D. Buskulic *et al.*	(ALEPH Collab.)
ALBRECHT	91B	PL B254 288	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	91C	PL B255 297	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	91E	PL B262 148	H. Albrecht *et al.*	(ARGUS Collab.)
BERKELMAN	91	ARNPS 41 1	K. Berkelman, S. Stone	(CORN, SYRA)
"Decays of *B* Mesons"				
FULTON	91	PR D43 651	R. Fulton *et al.*	(CLEO Collab.)
ALBRECHT	90B	PL B241 278	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	90J	ZPHY C48 543	H. Albrecht *et al.*	(ARGUS Collab.)
ANTREASYAN	90B	ZPHY C48 553	D. Antreasyan *et al.*	(Crystal Ball Collab.)
BORTOLETTO	90	PRL 64 2117	D. Bortoletto *et al.*	(CLEO Collab.)
Also	92	PR D45 21	D. Bortoletto *et al.*	(CLEO Collab.)
WEIR	90B	PR D41 1384	A.J. Weir *et al.*	(Mark II Collab.)
ALBRECHT	89G	PL B229 304	H. Albrecht *et al.*	(ARGUS Collab.)
AVERY	89B	PL B223 470	P. Avery *et al.*	(CLEO Collab.)
BEBEK	89	PRL 62 8	C. Bebek *et al.*	(CLEO Collab.)
BORTOLETTO	89	PRL 62 2436	D. Bortoletto *et al.*	(CLEO Collab.)
ALBRECHT	88F	PL B209 119	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	88K	PL B215 424	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	87C	PL B185 218	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	87D	PL B199 451	H. Albrecht *et al.*	(ARGUS Collab.)
AVERY	87	PL B183 429	P. Avery *et al.*	(CLEO Collab.)
BEBEK	87	PR D36 1289	C. Bebek *et al.*	(CLEO Collab.)
ALAM	86	PR D34 3279	M.S. Alam *et al.*	(CLEO Collab.)
PDG	86	PL 170B	M. Aguilar-Benitez *et al.*	(CERN, CIT+)
GILES	84	PR D30 2279	R. Giles *et al.*	(CLEO Collab.)