B^0

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

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

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

See the Notes "Experimental Highlights of B Meson Production and Decay" and "Semileptonic Decays of B Mesons" at the beginning of the $B^\pm$ Full Listings and the Note on "B^0-$\overline{B}^0$ Mixing and CP Violation in B Decay" near the end of the B^0 Full Listings.

B^0 MASS

The fit uses m_{B^+} and $(m_{B^0} - m_{B^+})$ to determine m_{B^0}. m_{B^0} data are excluded from the fit because they are not independent. These experiments actually measure the difference between half of E_{cm} and the B mass.

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
5279.0±2.0 OUR FIT					
5278.9±2.0 OUR AVERAGE					
5279.2±0.54±2.0	340	[1] ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
5278.0±0.4 ±2.0		[1] BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
5279.6±0.7 ±2.0	40	[1,2] ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
5280.6±0.8 ±2.0		[1] BEBEK	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
5278.2±1.0 ±3.0	40	ALBRECHT	87C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
5279.5±1.6 ±3.0	7	[3] ALBRECHT	87D	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[1] These experiments all report a common systematic error 2.0 MeV. We have artificially increased the systematic error to allow the experiments to be treated as independent measurements in our average. See "Treatment of Errors" section of the Introductory Text.

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

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

$m_{B^0} - m_{B^+}$

The mass difference measurements are not independent of the $B^\pm$ and B^0 mass measurement by the same experimenters.

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
0.34±0.29 OUR FIT Error includes scale factor of 1.1.				
0.34±0.32 OUR AVERAGE Error includes scale factor of 1.2.				
0.41±0.25±0.19	ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
−0.4 ±0.6 ±0.5	BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
−0.9 ±1.2 ±0.5	ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
2.0 ±1.1 ±0.3	[4] BEBEK	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[4] BEBEK 87 actually measure the difference between half of E_{cm} and the $B^\pm$ or B^0 mass, so the $m_{B^0} - m_{B^\pm}$ is more accurate. Assume $m_{\Upsilon(4S)}$ = 10580 MeV.

$m_{B^0_H} - m_{B^0_L}$

See the B^0-$\overline{B}^0$ MIXING section near the end of these B^0 Listings.

*CITATION: L. Montanet et al., Physical Review D50, 1173 (1994) and 1995 off-year partial update for the 1996 edition (URL: http://pdg.lbl.gov/)

B^0 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.

VALUE (10^{-12} s)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.50±0.11 OUR AVERAGE					
1.57±0.18±0.08	121	[5] ABE	94D	CDF	$p\overline{p}$ at 1.8 TeV
$1.17^{+0.29}_{-0.23}\pm0.16$	96	[6] ABREU	93D	DLPH	$e^+e^- \rightarrow Z$
1.55±0.25±0.18	76	[7] ABREU	93G	DLPH	$e^+e^- \rightarrow Z$
$1.51^{+0.24}_{-0.23}{}^{+0.12}_{-0.14}$	78	[6] ACTON	93C	OPAL	$e^+e^- \rightarrow Z$
$1.52^{+0.20}_{-0.18}{}^{+0.07}_{-0.13}$	77	[6] BUSKULIC	93D	ALEP	$e^+e^- \rightarrow Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.20^{+0.52}_{-0.36}{}^{+0.16}_{-0.14}$	15	[8] WAGNER	90	MRK2	E^{ee}_{cm}= 29 GeV
$0.82^{+0.57}_{-0.37}\pm0.27$		[9] AVERILL	89	HRS	E^{ee}_{cm}= 29 GeV

[5] ABE 94D measured mean life using fully reconstructed decays.
[6] Data analyzed using D / $D^* \ell$anything event vertices.
[7] ABREU 93G data analyzed using charged and neutral vertices.
[8] WAGNER 90 tagged B^0 mesons by their decays into $D^{*-} e^+ \nu$ and $D^{*-} \mu^+ \nu$ where the D^{*-} is tagged by its decay into $\pi^- \overline{D}^0$.
[9] AVERILL 89 is an estimate of the B^0 mean lifetime assuming that $B^0 \rightarrow D^{*+} + X$ always.

MEAN LIFE RATIO τ_{B^+}/τ_{B^0}

τ_{B^+}/τ_{B^0} (average of direct and inferred)

VALUE	*DOCUMENT ID*
0.98±0.08 OUR AVERAGE	Includes data from the 2 datablocks that follow this one.

τ_{B^+}/τ_{B^0} (direct measurements)

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
The data in this block is included in the average printed for a previous datablock.					
$1.01^{+0.12}_{-0.10}$ OUR AVERAGE					
1.02±0.16±0.05	269	[10] ABE	94D	CDF	$p\overline{p}$ at 1.8 TeV
$1.11^{+0.51}_{-0.39}\pm0.11$	188	[11] ABREU	93D	DLPH	$e^+e^- \rightarrow Z$
$1.01^{+0.29}_{-0.22}\pm0.12$	253	[12] ABREU	93G	DLPH	$e^+e^- \rightarrow Z$
$1.0\ ^{+0.33}_{-0.25}\pm0.08$	130	ACTON	93C	OPAL	$e^+e^- \rightarrow Z$
$0.96^{+0.19}_{-0.15}{}^{+0.18}_{-0.12}$	154	[11] BUSKULIC	93D	ALEP	$e^+e^- \rightarrow Z$

[10] ABE 94D is a direct measurement using fully reconstructed decays.
[11] Data analyzed using D / $D^* \ell$anything event vertices.
[12] ABREU 93G data analyzed using charged and neutral vertices.

τ_{B^+}/τ_{B^0} (inferred from branching fractions)

These measurements are inferred from the branching fractions for semileptonic decay or other spectator-dominated decays by assuming that the rates for such decays are equal for B^0 and B^+.

VALUE	*CL%*	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
The data in this block is included in the average printed for a previous datablock.						
0.94±0.12 OUR AVERAGE						
0.93±0.18±0.12			[13] ATHANAS	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
0.91±0.27±0.21			[14] ALBRECHT	92C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
1.0 ±0.4		29	[14,15] ALBRECHT	92G	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.89±0.19±0.13			[14] FULTON	91	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
1.00±0.23±0.14			[14] ALBRECHT	89L	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
0.49 to 2.3	90		[16] BEAN	87B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[13] ATHANAS 94 uses events tagged by fully reconstructed B^- decays and partially or fully reconstructed B^0 decays.
[14] Assumes equal production of B^0 and B^+.
[15] ALBRECHT 92G data analyzed using $B \rightarrow D_s\overline{D}$, $D_s\overline{D}^*$, $D^*_s\overline{D}$, $D^*_s\overline{D}^*$ events.
[16] BEAN 87B assume the fraction of $B^0\overline{B}^0$ events at the $\Upsilon(4S)$ is 0.41.

B^0 DECAY MODES

$\overline{B}^0$ modes are charge conjugates of the modes below. Reactions indicate the weak decay vertex and do not include mixing. 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]	(10.3 ± 1.0) %	
Γ_2	$D^-\ell^+\nu_\ell$	[a]	(1.9 ± 0.5) %	
Γ_3	$D^*(2010)^-\ell^+\nu_\ell$	[a]	(4.4 ± 0.4) %	
Γ_4	$\rho^-\ell^+\nu_\ell$	[a]	$< 4.1 \times 10^{-4}$	CL=90%
Γ_5	$\pi^-\mu^+\nu_\mu$		seen	
	D, D^*, or D_s modes			
Γ_6	$D^-\pi^+$		$(3.0 \pm 0.4) \times 10^{-3}$	
Γ_7	$D^-\rho^+$		$(7.8 \pm 1.4) \times 10^{-3}$	
Γ_8	$\overline{D}^0\pi^+\pi^-$		$< 1.6 \times 10^{-3}$	CL=90%
Γ_9	$D^*(2010)^-\pi^+$		$(2.6 \pm 0.4) \times 10^{-3}$	
Γ_{10}	$D^-\pi^+\pi^+\pi^-$		$(8.0 \pm 2.5) \times 10^{-3}$	
Γ_{11}	$(D^-\pi^+\pi^+\pi^-)$ nonresonant		$(3.9 \pm 1.9) \times 10^{-3}$	
Γ_{12}	$D^-\pi^+\rho^0$		$(1.1 \pm 1.0) \times 10^{-3}$	
Γ_{13}	$D^-a_1(1260)^+$		$(6.0 \pm 3.3) \times 10^{-3}$	
Γ_{14}	$D^*(2010)^-\pi^+\pi^0$		(1.5 ± 0.5) %	
Γ_{15}	$D^*(2010)^-\rho^+$		$(7.3 \pm 1.5) \times 10^{-3}$	
Γ_{16}	$D^*(2010)^-\pi^+\pi^+\pi^-$		$(7.6 \pm 1.7) \times 10^{-3}$	S=1.3
Γ_{17}	$(D^*(2010)^-\pi^+\pi^+\pi^-)$ non-resonant		$(0.0 \pm 2.5) \times 10^{-3}$	
Γ_{18}	$D^*(2010)^-\pi^+\rho^0$		$(5.7 \pm 3.2) \times 10^{-3}$	
Γ_{19}	$D^*(2010)^-a_1(1260)^+$		(1.30 ± 0.27) %	
Γ_{20}	$D^*(2010)^-\pi^+\pi^+\pi^-\pi^0$		(3.4 ± 1.8) %	
Γ_{21}	$\overline{D}_2^*(2460)^-\pi^+$		$< 2.2 \times 10^{-3}$	CL=90%
Γ_{22}	$\overline{D}_2^*(2460)^-\rho^+$		$< 4.9 \times 10^{-3}$	CL=90%
Γ_{23}	$D^-D_s^+$		$(8 \pm 4) \times 10^{-3}$	
Γ_{24}	$D^*(2010)^-D_s^+$		(1.2 ± 0.6) %	
Γ_{25}	$D^-D_s^{*+}$		(2.1 ± 1.5) %	
Γ_{26}	$D^*(2010)^-D_s^{*+}$		(2.0 ± 1.2) %	
Γ_{27}	$D_s^+\pi^-$		$< 2.9 \times 10^{-4}$	CL=90%
Γ_{28}	$D_s^{*+}\pi^-$		$< 5 \times 10^{-4}$	CL=90%
Γ_{29}	$D_s^+\rho^-$		$< 7 \times 10^{-4}$	CL=90%
Γ_{30}	$D_s^{*+}\rho^-$		$< 8 \times 10^{-4}$	CL=90%
Γ_{31}	$D_s^+a_1(1260)^-$		$< 2.7 \times 10^{-3}$	CL=90%
Γ_{32}	$D_s^{*+}a_1(1260)^-$		$< 2.2 \times 10^{-3}$	CL=90%
Γ_{33}	$D_s^-K^+$		$< 2.4 \times 10^{-4}$	CL=90%
Γ_{34}	$D_s^{*-}K^+$		$< 1.8 \times 10^{-4}$	CL=90%
Γ_{35}	$D_s^-K^*(892)^+$		$< 1.0 \times 10^{-3}$	CL=90%

Γ_{36}	$D_s^{*-} K^*(892)^+$	$<$ 1.2	$\times 10^{-3}$	CL=90%
Γ_{37}	$D_s^- \pi^+ K^0$	$<$ 6	$\times 10^{-3}$	CL=90%
Γ_{38}	$D_s^{*-} \pi^+ K^0$	$<$ 3.2	$\times 10^{-3}$	CL=90%
Γ_{39}	$D_s^- \pi^+ K^*(892)^0$	$<$ 4	$\times 10^{-3}$	CL=90%
Γ_{40}	$D_s^{*-} \pi^+ K^*(892)^0$	$<$ 2.1	$\times 10^{-3}$	CL=90%
Γ_{41}	$\overline{D}^0 \pi^0$	$<$ 4.8	$\times 10^{-4}$	CL=90%
Γ_{42}	$\overline{D}^0 \rho^0$	$<$ 5.5	$\times 10^{-4}$	CL=90%
Γ_{43}	$\overline{D}^0 \eta$	$<$ 6.8	$\times 10^{-4}$	CL=90%
Γ_{44}	$\overline{D}^0 \eta'$	$<$ 8.6	$\times 10^{-4}$	CL=90%
Γ_{45}	$\overline{D}^0 \omega$	$<$ 6.3	$\times 10^{-4}$	CL=90%
Γ_{46}	$\overline{D}^*(2007)^0 \pi^0$	$<$ 9.7	$\times 10^{-4}$	CL=90%
Γ_{47}	$\overline{D}^*(2007)^0 \rho^0$	$<$ 1.17	$\times 10^{-3}$	CL=90%
Γ_{48}	$\overline{D}^*(2007)^0 \eta$	$<$ 6.9	$\times 10^{-4}$	CL=90%
Γ_{49}	$\overline{D}^*(2007)^0 \eta'$	$<$ 2.7	$\times 10^{-3}$	CL=90%
Γ_{50}	$\overline{D}^*(2007)^0 \omega$	$<$ 2.1	$\times 10^{-3}$	CL=90%
	Charmonium modes			
Γ_{51}	$J/\psi(1S) K^0$	(7.5 $\pm$2.1)	$\times 10^{-4}$	
Γ_{52}	$J/\psi(1S) K^+ \pi^-$	(1.2 $\pm$0.6)	$\times 10^{-3}$	
Γ_{53}	$J/\psi(1S) K^*(892)^0$	(1.58$\pm$0.28)	$\times 10^{-3}$	
Γ_{54}	$\psi(2S) K^0$	$<$ 8	$\times 10^{-4}$	CL=90%
Γ_{55}	$\psi(2S) K^+ \pi^-$	$<$ 1	$\times 10^{-3}$	CL=90%
Γ_{56}	$\psi(2S) K^*(892)^0$	(1.4 $\pm$0.9)	$\times 10^{-3}$	
Γ_{57}	$\chi_{c1}(1P) K^0$	$<$ 2.7	$\times 10^{-3}$	CL=90%
Γ_{58}	$\chi_{c1}(1P) K^*(892)^0$	$<$ 2.1	$\times 10^{-3}$	CL=90%
	***K* or *K** modes**			
Γ_{59}	$K^+ \pi^-$	$<$ 2.6	$\times 10^{-5}$	CL=90%
Γ_{60}	$K^+ K^-$	$<$ 7	$\times 10^{-6}$	CL=90%
Γ_{61}	$K^0 \pi^+ \pi^-$	$<$ 4.4	$\times 10^{-4}$	CL=90%
Γ_{62}	$K^0 \rho^0$	$<$ 3.2	$\times 10^{-4}$	CL=90%
Γ_{63}	$K^0 f_0(980)$	$<$ 3.6	$\times 10^{-4}$	CL=90%
Γ_{64}	$K^*(892)^+ \pi^-$	$<$ 3.8	$\times 10^{-4}$	CL=90%
Γ_{65}	$K_2^*(1430)^+ \pi^-$	$<$ 2.6	$\times 10^{-3}$	CL=90%
Γ_{66}	$K^0 K^+ K^-$	$<$ 1.3	$\times 10^{-3}$	CL=90%
Γ_{67}	$K^0 \phi$	$<$ 4.2	$\times 10^{-4}$	CL=90%
Γ_{68}	$K^*(892)^0 \pi^+ \pi^-$	$<$ 1.4	$\times 10^{-3}$	CL=90%
Γ_{69}	$K^*(892)^0 \rho^0$	$<$ 4.6	$\times 10^{-4}$	CL=90%
Γ_{70}	$K^*(892)^0 f_0(980)$	$<$ 1.7	$\times 10^{-4}$	CL=90%
Γ_{71}	$K_1(1400)^+ \pi^-$	$<$ 1.1	$\times 10^{-3}$	CL=90%
Γ_{72}	$K^*(892)^0 K^+ K^-$	$<$ 6.1	$\times 10^{-4}$	CL=90%
Γ_{73}	$K^*(892)^0 \phi$	$<$ 3.2	$\times 10^{-4}$	CL=90%
Γ_{74}	$K_1(1400)^0 \rho^0$	$<$ 3.0	$\times 10^{-3}$	CL=90%
Γ_{75}	$K_1(1400)^0 \phi$	$<$ 5.0	$\times 10^{-3}$	CL=90%
Γ_{76}	$K_2^*(1430)^0 \rho^0$	$<$ 1.1	$\times 10^{-3}$	CL=90%
Γ_{77}	$K_2^*(1430)^0 \phi$	$<$ 1.4	$\times 10^{-3}$	CL=90%
Γ_{78}	$K^*(892)^0 \gamma$	(4.0 $\pm$1.9)	$\times 10^{-5}$	
Γ_{79}	$K_1(1270)^0 \gamma$	$<$ 7.0	$\times 10^{-3}$	CL=90%
Γ_{80}	$K_1(1400)^0 \gamma$	$<$ 4.3	$\times 10^{-3}$	CL=90%
Γ_{81}	$K_2^*(1430)^0 \gamma$	$<$ 4.0	$\times 10^{-4}$	CL=90%
Γ_{82}	$K^*(1680)^0 \gamma$	$<$ 2.0	$\times 10^{-3}$	CL=90%
Γ_{83}	$K_3^*(1780)^0 \gamma$	$<$ 1.0	%	CL=90%
Γ_{84}	$K_4^*(2045)^0 \gamma$	$<$ 4.3	$\times 10^{-3}$	CL=90%

Light unflavored meson modes

Γ_{85}	$\pi^+\pi^-$			$<$ 2.9	$\times 10^{-5}$	CL=90%
Γ_{86}	$\pi^+\pi^-\pi^0$			$<$ 7.2	$\times 10^{-4}$	CL=90%
Γ_{87}	$\rho^0\pi^0$			$<$ 4.0	$\times 10^{-4}$	CL=90%
Γ_{88}	$\rho^{\mp}\pi^{\pm}$		[b]	$<$ 5.2	$\times 10^{-4}$	CL=90%
Γ_{89}	$\pi^+\pi^-\pi^+\pi^-$			$<$ 6.7	$\times 10^{-4}$	CL=90%
Γ_{90}	$\rho^0\rho^0$			$<$ 2.8	$\times 10^{-4}$	CL=90%
Γ_{91}	$a_1(1260)^{\mp}\pi^{\pm}$		[b]	$<$ 4.9	$\times 10^{-4}$	CL=90%
Γ_{92}	$a_2(1320)^{\mp}\pi^{\pm}$		[b]	$<$ 3.0	$\times 10^{-4}$	CL=90%
Γ_{93}	$\pi^+\pi^-\pi^0\pi^0$			$<$ 3.1	$\times 10^{-3}$	CL=90%
Γ_{94}	$\rho^+\rho^-$			$<$ 2.2	$\times 10^{-3}$	CL=90%
Γ_{95}	$a_1(1260)^0\pi^0$			$<$ 1.1	$\times 10^{-3}$	CL=90%
Γ_{96}	$\omega\pi^0$			$<$ 4.6	$\times 10^{-4}$	CL=90%
Γ_{97}	$\eta\pi^0$			$<$ 1.8	$\times 10^{-3}$	CL=90%
Γ_{98}	$\pi^+\pi^+\pi^-\pi^-\pi^0$			$<$ 9.0	$\times 10^{-3}$	CL=90%
Γ_{99}	$a_1(1260)^+\rho^-$			$<$ 3.4	$\times 10^{-3}$	CL=90%
Γ_{100}	$a_1(1260)^0\rho^0$			$<$ 2.4	$\times 10^{-3}$	CL=90%
Γ_{101}	$\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-$			$<$ 3.0	$\times 10^{-3}$	CL=90%
Γ_{102}	$a_1(1260)^+a_1(1260)^-$			$<$ 2.8	$\times 10^{-3}$	CL=90%
Γ_{103}	$\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\pi^0$			$<$ 1.1	%	CL=90%

Baryon modes

Γ_{104}	$p\overline{p}$			$<$ 3.4	$\times 10^{-5}$	CL=90%
Γ_{105}	$p\overline{p}\pi^+\pi^-$			$<$ 2.5	$\times 10^{-4}$	CL=90%
Γ_{106}	$p\overline{\Lambda}\pi^-$			$<$ 1.8	$\times 10^{-4}$	CL=90%
Γ_{107}	$\Delta^0\overline{\Delta}^0$			$<$ 1.5	$\times 10^{-3}$	CL=90%
Γ_{108}	$\Delta^{++}\Delta^{--}$			$<$ 1.1	$\times 10^{-4}$	CL=90%
Γ_{109}	$\overline{\Sigma}_c^{--}\Delta^{++}$			$<$ 1.2	$\times 10^{-3}$	CL=90%

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

Γ_{110}	e^+e^-	$B1$		$<$ 5.9	$\times 10^{-6}$	CL=90%
Γ_{111}	$\mu^+\mu^-$	$B1$		$<$ 5.9	$\times 10^{-6}$	CL=90%
Γ_{112}	$K^0e^+e^-$	$B1$		$<$ 3.0	$\times 10^{-4}$	CL=90%
Γ_{113}	$K^0\mu^+\mu^-$	$B1$		$<$ 3.6	$\times 10^{-4}$	CL=90%
Γ_{114}	$K^*(892)^0e^+e^-$	$B1$		$<$ 2.9	$\times 10^{-4}$	CL=90%
Γ_{115}	$K^*(892)^0\mu^+\mu^-$	$B1$		$<$ 2.3	$\times 10^{-5}$	CL=90%
Γ_{116}	$e^{\pm}\mu^{\mp}$	LF	[b]	$<$ 5.9	$\times 10^{-6}$	CL=90%
Γ_{117}	$e^{\pm}\tau^{\mp}$	LF	[b]	$<$ 5.3	$\times 10^{-4}$	CL=90%
Γ_{118}	$\mu^{\pm}\tau^{\mp}$	LF	[b]	$<$ 8.3	$\times 10^{-4}$	CL=90%

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

[b] The value is for the sum of the charge states indicated.

B^0 BRANCHING RATIOS

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

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.103±0.010 OUR AVERAGE				
0.093±0.011±0.015	ALBRECHT	94	ARG	$e^+e^- \to \Upsilon(4S)$
0.109±0.007±0.011	ATHANAS	94	CLE2	$e^+e^- \to \Upsilon(4S)$
0.099±0.030±0.009	HENDERSON	92	CLEO	$e^+e^- \to \Upsilon(4S)$

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

ℓ denotes e or μ, not the sum.

VALUE	DOCUMENT ID		TECN	COMMENT
0.019±0.005 OUR AVERAGE				
0.018±0.006±0.003	[17] FULTON	91	CLEO	$e^+e^- \to \Upsilon(4S)$
0.020±0.007±0.006	[18] ALBRECHT	89J	ARG	$e^+e^- \to \Upsilon(4S)$

[17] FULTON 91 assumes assuming equal production of B^0 and B^+ at the $\Upsilon(4S)$ and uses Mark III D and D^* branching ratios.

[18] ALBRECHT 89J reports $0.018 \pm 0.006 \pm 0.005$. We rescale using the method described in STONE 94 but with the updated PDG 94 B($D^0 \rightarrow K^- \pi^+$).

$\Gamma(D^*(2010)^- \ell^+ \nu_\ell)/\Gamma_{\rm total}$ — Γ_3/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.044±0.004 OUR AVERAGE					
0.045±0.003±0.004		[19] ALBRECHT	94	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
0.047±0.005±0.005	235	[20] ALBRECHT	93	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
0.040±0.004±0.006		[21] BORTOLETTO	89B	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen	398	[22] SANGHERA	93	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
0.070±0.018±0.014		[23] ANTREASYAN	90B	CBAL	$e^+ e^- \rightarrow \Upsilon(4S)$
		[24] ALBRECHT	89C	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
0.060±0.010±0.014		[25] ALBRECHT	89J	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
0.070±0.012±0.019	47	[26] ALBRECHT	87J	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$

[19] ALBRECHT 94 assumes B($D^{*+} \rightarrow D^0 \pi^+$) = $68.1 \pm 1.0 \pm 1.3\%$. Uses partial reconstruction of D^{*+} and is independent of D^0 branching ratios.

[20] ALBRECHT 93 reports $0.052 \pm 0.005 \pm 0.006$. We rescale using the method described in STONE 94 but with the updated PDG 94 B($D^0 \rightarrow K^- \pi^+$). We have taken their average e and μ value. They also obtain $\alpha = 2*\Gamma^0/(\Gamma^- + \Gamma^+)-1 = 1.1 \pm 0.4 \pm 0.2$, $A_{AF} = 3/4*(\Gamma^- - \Gamma^+)/\Gamma = 0.2 \pm 0.08 \pm 0.06$ and a value of $|V_{cb}| = 0.036$–0.045 depending on model assumptions.

[21] We have taken average of the the BORTOLETTO 89B values for electrons and muons, $0.046 \pm 0.005 \pm 0.007$. We rescale using the method described in STONE 94 but with the updated PDG 94 B($D^0 \rightarrow K^- \pi^+$). The measurement suggests a D^* polarization parameter value $\alpha = 0.65 \pm 0.66 \pm 0.25$.

[22] 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.

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

[24] The measurement of ALBRECHT 89C suggests a D^* polarization γ_L/γ_T of 0.85 ± 0.45. or $\alpha = 0.7 \pm 0.9$.

[25] ALBRECHT 89J is ALBRECHT 87J value rescaled using B($D^*(2010)^- \rightarrow D^0 \pi^-$) = $0.57 \pm 0.04 \pm 0.04$. Superseded by ALBRECHT 93.

[26] ALBRECHT 87J assume μ-e universality, the B($\Upsilon(4S) \rightarrow B^0 \overline{B}^0$) = 0.45, the B($D^0 \rightarrow K^- \pi^+$) = $(0.042 \pm 0.004 \pm 0.004)$, and the B($D^*(2010)^- \rightarrow D^0 \pi^-$) = 0.49 ± 0.08. Superseded by ALBRECHT 89J.

$\Gamma(\rho^- \ell^+ \nu_\ell)/\Gamma_{\rm total}$ — Γ_4/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<4.1 × 10⁻⁴	90	[27] BEAN	93B	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

[27] BEAN 93B limit set using ISGW Model. Using isospin and the quark model to combine $\Gamma(\rho^0 \ell^+ \nu_\ell)$ and $\Gamma(\omega \ell^+ \nu_\ell)$ with this result, they obtain a limit $<(1.6$–$2.7) \times 10^{-4}$ at 90% CL for $B^+ \rightarrow (\omega$ or $\rho^0) \ell^+ \nu_\ell$. 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.

$\Gamma(\pi^- \mu^+ \nu_\mu)/\Gamma_{\rm total}$ — Γ_5/Γ

VALUE	DOCUMENT ID		TECN
seen	[28] ALBRECHT	91C	ARG

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

$\Gamma(D^- \pi^+)/\Gamma_{\rm total}$ — Γ_6/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0030±0.0004 OUR AVERAGE					
0.0029±0.0004±0.0002	81	[29] ALAM	94	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
0.0027±0.0006±0.0005		[30] BORTOLETTO	92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$
0.0048±0.0011±0.0011	22	[31] ALBRECHT	90J	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.0051^{+0.0028+0.0013}_{-0.0025-0.0012}$	4	[32] BEBEK	87	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0031±0.0013±0.0010	7	[31] ALBRECHT	88K	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$

[29] ALAM 94 reports [B($B^0 \to D^- \pi^+$) × B($D^+ \to K^- \pi^+ \pi^+$)] = 0.000265 ± 0.000032 ± 0.000023. We divide by our best value B($D^+ \to K^- \pi^+ \pi^+$) = (9.1 ± 0.6) × 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 $\Upsilon(4S)$.

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

[31] ALBRECHT 88K assumes $B^0 \overline{B}{}^0$:$B^+ B^-$ production ratio is 45:55. Superseded by ALBRECHT 90J which assumes 50:50.

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

$\Gamma(D^- \rho^+)/\Gamma_{\text{total}}$ — Γ_7/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0078±0.0014 OUR AVERAGE					
0.0078±0.0013±0.0005	79	[33] ALAM	94	CLE2	$e^+ e^- \to \Upsilon(4S)$
0.009 ±0.005 ±0.003	9	[34] ALBRECHT	90J	ARG	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.022 ±0.012 ±0.009	6	[34] ALBRECHT	88K	ARG	$e^+ e^- \to \Upsilon(4S)$

[33] ALAM 94 reports [B($B^0 \to D^- \rho^+$) × B($D^+ \to K^- \pi^+ \pi^+$)] = 0.000704 ± 0.000096 ± 0.000070. We divide by our best value B($D^+ \to K^- \pi^+ \pi^+$) = (9.1 ± 0.6) × 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 $\Upsilon(4S)$.

[34] ALBRECHT 88K assumes $B^0 \overline{B}{}^0$:$B^+ B^-$ production ratio is 45:55. Superseded by ALBRECHT 90J which assumes 50:50.

$\Gamma(\overline{D}{}^0 \pi^+ \pi^-)/\Gamma_{\text{total}}$ — Γ_8/Γ

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.0016	90		[35] ALAM	94	CLE2	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.007	90		[36] BORTOLETTO	92	CLEO	$e^+ e^- \to \Upsilon(4S)$
<0.034	90		[37] BEBEK	87	CLEO	$e^+ e^- \to \Upsilon(4S)$
0.07 ±0.05		5	[38] BEHRENDS	83	CLEO	$e^+ e^- \to \Upsilon(4S)$

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

[36] 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 $D_0^*(2340) \to D^0 \pi$ is < 0.0001 at 90% CL and into $D_2^*(2460)$ followed by $D_2^*(2460) \to D^0 \pi$ is < 0.0004 at 90% CL.

[37] BEBEK 87 assume the $\Upsilon(4S)$ decays 43% to $B^0 \overline{B}{}^0$. We rescale to 50%. B($D^0 \to K^- \pi^+$) = (4.2 ± 0.4 ± 0.4)% and B($D^0 \to K^- \pi^+ \pi^+ \pi^-$) = (9.1 ± 0.8 ± 0.8)% were used.

[38] Corrected by us using assumptions: B($D^0 \to K^- \pi^+$) = (0.042 ± 0.006) and B($\Upsilon(4S) \to B^0 \overline{B}{}^0$) = 50%. The product branching ratio is B($B^0 \to \overline{D}{}^0 \pi^+ \pi^-$)B($\overline{D}{}^0 \to K^+ \pi^-$) = (0.39 ± 0.26) × 10^{-2}.

$\Gamma(D^*(2010)^- \pi^+)/\Gamma_{\text{total}}$ — Γ_9/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0026±0.0004 OUR AVERAGE					
0.0026±0.0003±0.0004	82	[39] ALAM	94	CLE2	$e^+ e^- \to \Upsilon(4S)$
0.0033±0.0010±0.0001		[40] BORTOLETTO	92	CLEO	$e^+ e^- \to \Upsilon(4S)$
0.0023±0.0009±0.0001	12	[41] ALBRECHT	90J	ARG	$e^+ e^- \to \Upsilon(4S)$
$0.0023^{+0.0015}_{-0.0011}$±0.0001	5	[42] BEBEK	87	CLEO	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.010 ±0.004 ±0.001	8	[43] AKERS	94J	OPAL	$e^+ e^- \to Z$
0.0027±0.0014±0.0010	5	[44] ALBRECHT	87C	ARG	$e^+ e^- \to \Upsilon(4S)$
0.0035±0.002 ±0.002		[45] ALBRECHT	86F	ARG	$e^+ e^- \to \Upsilon(4S)$
0.017 ±0.005 ±0.005	41	[46] GILES	84	CLEO	$e^+ e^- \to \Upsilon(4S)$

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

[40] BORTOLETTO 92 reports 0.0040 ± 0.0010 ± 0.0007 for B($D^*(2010)^+ \to D^0 \pi^+$) = 0.57 ± 0.06. We rescale to our best value B($D^*(2010)^+ \to D^0 \pi^+$) = (68.1 ± 1.6) × 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.

[41] ALBRECHT 90J reports $0.0028 \pm 0.0009 \pm 0.0006$ for $B(D^*(2010)^+ \rightarrow D^0\pi^+) = 0.57 \pm 0.06$. We rescale to our best value $B(D^*(2010)^+ \rightarrow D^0\pi^+) = (68.1 \pm 1.6) \times 10^{-2}$. 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.

[42] BEBEK 87 reports $0.0028^{+0.0015+0.0010}_{-0.0012-0.0006}$ for $B(D^*(2010)^+ \rightarrow D^0\pi^+) = 0.57 \pm 0.06$. We rescale to our best value $B(D^*(2010)^+ \rightarrow D^0\pi^+) = (68.1 \pm 1.6) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Updated in BERKELMAN 91 to use same assumptions as noted for BORTOLETTO 92 and ALBRECHT 90J.

[43] Assumes $B(Z \rightarrow b\overline{b}) = 0.217$ and 38% B_d production fraction.

[44] 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.

[45] ALBRECHT 86F uses pseudomass that is independent of D^0 and D^+ branching ratios.

[46] Assumes $B(D^*(2010)^+ \rightarrow D^0\pi^+) = 0.60^{+0.08}_{-0.15}$. Assumes $B(\Upsilon(4S) \rightarrow B^0\overline{B}^0) = 0.40 \pm 0.02$ Does not depend on D branching ratios.

$\Gamma(D^-\pi^+\pi^+\pi^-)/\Gamma_{total}$ — Γ_{10}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.0080±0.0021±0.0014	[47] BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma((D^-\pi^+\pi^+\pi^-)\text{ nonresonant})/\Gamma_{total}$ — Γ_{11}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.0039±0.0014±0.0013	[48] BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(D^-\pi^+\rho^0)/\Gamma_{total}$ — Γ_{12}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.0011±0.0009±0.0004	[49] BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(D^-a_1(1260)^+)/\Gamma_{total}$ — Γ_{13}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.0060±0.0022±0.0024	[50] BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(D^*(2010)^-\pi^+\pi^0)/\Gamma_{total}$ — Γ_{14}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0151±0.0051±0.0004	51	[51] ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.015 ±0.008 ±0.008	8	[52] ALBRECHT	87C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[51] ALBRECHT 90J reports $0.018 \pm 0.004 \pm 0.005$ for $B(D^*(2010)^+ \rightarrow D^0\pi^+) = 0.57 \pm 0.06$. We rescale to our best value $B(D^*(2010)^+ \rightarrow D^0\pi^+) = (68.1 \pm 1.6) \times 10^{-2}$. 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.

[52] 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.

$\Gamma(D^*(2010)^-\rho^+)/\Gamma_{total}$ — Γ_{15}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0073±0.0015 OUR AVERAGE					
0.0074±0.0010±0.0014	76	[53,54] ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
0.0159±0.0113±0.0004		[55] BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
0.0059±0.0035±0.0001	19	[56] ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.081 ±0.029 $^{+0.059}_{-0.024}$	19	[57] CHEN	85	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[53] 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($D^0 \rightarrow K^-\pi^+$).

[54] This decay is nearly completely longitudinally polarized, $\Gamma_L/\Gamma = (93 \pm 5 \pm 5)\%$, as expected from the factorization hypothesis (ROSNER 90). The nonresonant $\pi^+\pi^0$ contribution under the ρ^+ is less than 9% at 90% CL.

[55] BORTOLETTO 92 reports $0.019 \pm 0.008 \pm 0.011$ for B($D^*(2010)^+ \rightarrow D^0\pi^+$) = 0.57 ± 0.06. We rescale to our best value B($D^*(2010)^+ \rightarrow D^0\pi^+$) = $(68.1 \pm 1.6) \times 10^{-2}$. 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.

[56] ALBRECHT 90J reports $0.007 \pm 0.003 \pm 0.003$ for B($D^*(2010)^+ \rightarrow D^0\pi^+$) = 0.57 ± 0.06. We rescale to our best value B($D^*(2010)^+ \rightarrow D^0\pi^+$) = $(68.1 \pm 1.6) \times 10^{-2}$. 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.

[57] Uses B($D^* \rightarrow D^0\pi^+$) = 0.6 ± 0.15 and B($\Upsilon(4S) \rightarrow B^0\overline{B}^0$) = 0.4. Does not depend on D branching ratios.

$\Gamma(D^*(2010)^-\pi^+\pi^+\pi^-)/\Gamma_{\text{total}}$ $\qquad\Gamma_{16}/\Gamma$

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.0076±0.0017 OUR AVERAGE			Error includes scale factor of 1.3. See the ideogram below.			
0.0063±0.0010±0.0011		49	[58,59] ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
0.0133±0.0036±0.0003			[60] BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
0.0100±0.0040±0.0002		26	[61] ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
0.033 ±0.009 ±0.016		27	[62] ALBRECHT	87C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
<0.042	90		[63] BEBEK	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[58] 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($D^0 \rightarrow K^-\pi^+$).

[59] 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 $\overline{D}^{*-}a_1^+$ is twice that for $\overline{D}^{*-}\pi^+\pi^+\pi^-$.)

[60] BORTOLETTO 92 reports $0.0159 \pm 0.0028 \pm 0.0037$ for B($D^*(2010)^+ \rightarrow D^0\pi^+$) = 0.57 ± 0.06. We rescale to our best value B($D^*(2010)^+ \rightarrow D^0\pi^+$) = $(68.1 \pm 1.6) \times 10^{-2}$. 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.

[61] ALBRECHT 90J reports $0.012 \pm 0.003 \pm 0.004$ for B($D^*(2010)^+ \rightarrow D^0\pi^+$) = 0.57 ± 0.06. We rescale to our best value B($D^*(2010)^+ \rightarrow D^0\pi^+$) = $(68.1 \pm 1.6) \times 10^{-2}$. 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.

[62] 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.

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

$\Gamma\left(D^*(2010)^- \pi^+ \pi^+ \pi^-\right)/\Gamma_{\text{total}}$

$\Gamma\left(\left(D^*(2010)^- \pi^+ \pi^+ \pi^-\right) \text{nonresonant}\right)/\Gamma_{\text{total}}$ $\qquad \Gamma_{17}/\Gamma$

VALUE	*DOCUMENT ID*	*TECN*	*COMMENT*
0.0000±0.0019±0.0016	[64] BORTOLETTO92	CLEO	$e^+ e^- \to \Upsilon(4S)$

[64] BORTOLETTO 92 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D and $D^*(2010)$.

$\Gamma\left(D^*(2010)^- \pi^+ \rho^0\right)/\Gamma_{\text{total}}$ $\qquad \Gamma_{18}/\Gamma$

VALUE	*DOCUMENT ID*	*TECN*	*COMMENT*
0.0057±0.0031±0.0001	[65] BORTOLETTO92	CLEO	$e^+ e^- \to \Upsilon(4S)$

[65] BORTOLETTO 92 reports $0.0068 \pm 0.0032 \pm 0.0021$ for $B(D^*(2010)^+ \to D^0 \pi^+) = 0.57 \pm 0.06$. We rescale to our best value $B(D^*(2010)^+ \to D^0 \pi^+) = (68.1 \pm 1.6) \times 10^{-2}$. 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.

$\Gamma\left(D^*(2010)^- a_1(1260)^+\right)/\Gamma_{\text{total}}$ $\qquad \Gamma_{19}/\Gamma$

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
0.0130±0.0027 OUR AVERAGE				
0.0126±0.0020±0.0022	[66,67] ALAM	94	CLE2	$e^+ e^- \to \Upsilon(4S)$
0.0151±0.0069±0.0004	[68] BORTOLETTO	92	CLEO	$e^+ e^- \to \Upsilon(4S)$

[66] ALAM 94 value is twice their $\Gamma(D^*(2010)^- \pi^+ \pi^+ \pi^-)/\Gamma_{\text{total}}$ value based on their observation that the three pions are dominantly in the $a_1(1260)$ mass range 1.0 to 1.6 GeV.

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

[68] BORTOLETTO 92 reports $0.018 \pm 0.006 \pm 0.006$ for $B(D^*(2010)^+ \to D^0 \pi^+) = 0.57 \pm 0.06$. We rescale to our best value $B(D^*(2010)^+ \to D^0 \pi^+) = (68.1 \pm 1.6) \times 10^{-2}$. 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.

$\Gamma\left(D^*(2010)^- \pi^+ \pi^+ \pi^- \pi^0\right)/\Gamma_{\text{total}}$ $\qquad \Gamma_{20}/\Gamma$

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.034±0.018±0.001	28	[69] ALBRECHT	90J	ARG	$e^+ e^- \to \Upsilon(4S)$

[69] ALBRECHT 90J reports $0.041 \pm 0.015 \pm 0.016$ for $B(D^*(2010)^+ \to D^0 \pi^+) = 0.57 \pm 0.06$. We rescale to our best value $B(D^*(2010)^+ \to D^0 \pi^+) = (68.1 \pm 1.6) \times 10^{-2}$. 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.

$\Gamma(\overline{D}_2^*(2460)^- \pi^+)/\Gamma_{total}$ Γ_{21}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0022	90	[70] ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[70] ALAM 94 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the CLEO II absolute B($D^0 \rightarrow K^-\pi^+$) and B($D_2^*(2460)^+ \rightarrow D^0\pi^+$) = 30%.

$\Gamma(\overline{D}_2^*(2460)^- \rho^+)/\Gamma_{total}$ Γ_{22}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0049	90	[71] ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.008±0.004 OUR AVERAGE					
0.013±0.011±0.002		[72] ALBRECHT	92G	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.007±0.004±0.001		[73] BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.012±0.007	3	[74] BORTOLETTO	90	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[72] ALBRECHT 92G reports 0.017 ± 0.013 ± 0.006 for B($D_s^+ \rightarrow \phi\pi^+$) = 0.027. We rescale to our best value B($D_s^+ \rightarrow \phi\pi^+$) = (3.5 ± 0.4) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes PDG 1990 D^+ branching ratios, e.g., B($D^+ \rightarrow K^-\pi^+\pi^+$) = 7.7 ± 1.0%.

[73] BORTOLETTO 92 reports 0.0080 ± 0.0045 ± 0.0030 for B($D_s^+ \rightarrow \phi\pi^+$) = 0.030 ± 0.011. We rescale to our best value B($D_s^+ \rightarrow \phi\pi^+$) = (3.5 ± 0.4) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D.

[74] BORTOLETTO 90 assume B($D_s \rightarrow \phi\pi^+$) = 2%. Superseded by BORTOLETTO 92.

$\Gamma(D^*(2010)^- D_s^+)/\Gamma_{total}$ Γ_{24}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.012±0.006 OUR AVERAGE					
0.011±0.008±0.001		[75] ALBRECHT	92G	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.014±0.008±0.002		[76] BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.024±0.014	3	[77] BORTOLETTO	90	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[75] ALBRECHT 92G reports 0.014 ± 0.010 ± 0.003 for B($D_s^+ \rightarrow \phi\pi^+$) = 0.027. We rescale to our best value B($D_s^+ \rightarrow \phi\pi^+$) = (3.5 ± 0.4) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes PDG 1990 D^+ and $D^*(2010)^+$ branching ratios, e.g., B($D^0 \rightarrow K^-\pi^+$) = 3.71 ± 0.25%, B($D^+ \rightarrow K^-\pi^+\pi^+$) = 7.1 ± 1.0%, and B($D^*(2010)^+ \rightarrow D^0\pi^+$) = 55 ± 4%.

[76] BORTOLETTO 92 reports 0.016 ± 0.009 ± 0.006 for B($D_s^+ \rightarrow \phi\pi^+$) = 0.030 ± 0.011. We rescale to our best value B($D_s^+ \rightarrow \phi\pi^+$) = (3.5 ± 0.4) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D and $D^*(2010)$.

[77] BORTOLETTO 90 assume B($D_s \rightarrow \phi\pi^+$) = 2%. Superseded by BORTOLETTO 92.

$\Gamma(D^- D_s^{*+})/\Gamma_{total}$ Γ_{25}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.021±0.015±0.002	[78] ALBRECHT	92G	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[78] ALBRECHT 92G reports 0.027 ± 0.017 ± 0.009 for B($D_s^+ \rightarrow \phi\pi^+$) = 0.027. We rescale to our best value B($D_s^+ \rightarrow \phi\pi^+$) = (3.5 ± 0.4) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes PDG 1990 D^+ branching ratios, e.g., B($D^+ \rightarrow K^-\pi^+\pi^+$) = 7.7 ± 1.0%.

$\left[\Gamma(D^*(2010)^- D_s^+) + \Gamma(D^*(2010)^- D_s^{*+})\right]/\Gamma_{total}$ $(\Gamma_{24}+\Gamma_{26})/\Gamma$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
4.3±1.1±0.5	22	[79] BORTOLETTO90	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[79] BORTOLETTO 90 reports 7.5 ± 2.0 for $B(D_s^+ \rightarrow \phi\pi^+) = 0.02$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.5 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(D^*(2010)^- D_s^{*+})/\Gamma_{total}$ Γ_{26}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.020±0.012±0.002	[80] ALBRECHT 92G	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[80] ALBRECHT 92G reports 0.026 ± 0.014 ± 0.006 for $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.5 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes PDG 1990 D^+ and $D^*(2010)^+$ branching ratios, e.g., $B(D^0 \rightarrow K^-\pi^+) = 3.71 \pm 0.25\%$, $B(D^+ \rightarrow K^-\pi^+\pi^+) = 7.1 \pm 1.0\%$, and $B(D^*(2010)^+ \rightarrow D^0\pi^+) = 55 \pm 4\%$.

$\Gamma(D_s^+\pi^-)/\Gamma_{total}$ Γ_{27}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.00029	90	[81] ALEXANDER 93B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.0013	90	[82] BORTOLETTO90	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[81] ALEXANDER 93B reports $< 2.7 \times 10^{-4}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.035$.

[82] BORTOLETTO 90 assume $B(D_s \rightarrow \phi\pi^+) = 2\%$.

$\Gamma(D_s^{*+}\pi^-)/\Gamma_{total}$ Γ_{28}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0005	90	[83] ALEXANDER 93B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[83] ALEXANDER 93B reports $< 4.4 \times 10^{-4}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.035$.

$\left[\Gamma(D_s^+\pi^-) + \Gamma(D_s^- K^+)\right]/\Gamma_{total}$ $(\Gamma_{27}+\Gamma_{33})/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0013	90	[84] ALBRECHT 93E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[84] ALBRECHT 93E reports $< 1.7 \times 10^{-3}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.035$.

$\left[\Gamma(D_s^{*+}\pi^-) + \Gamma(D_s^{*-} K^+)\right]/\Gamma_{total}$ $(\Gamma_{28}+\Gamma_{34})/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0009	90	[85] ALBRECHT 93E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[85] ALBRECHT 93E reports $< 1.2 \times 10^{-3}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.035$.

$\Gamma(D_s^+\rho^-)/\Gamma_{total}$ Γ_{29}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0007	90	[86] ALEXANDER 93B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.0017	90	[87] ALBRECHT 93E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[86] ALEXANDER 93B reports $< 6.6 \times 10^{-4}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.035$.

[87] ALBRECHT 93E reports $< 2.2 \times 10^{-3}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.035$.

$\Gamma(D_s^{*+}\rho^-)/\Gamma_{total}$ — Γ_{30}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0008	90	[88] ALEXANDER	93B	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0019	90	[89] ALBRECHT	93E	ARG	$e^+e^- \to \Upsilon(4S)$

[88] ALEXANDER 93B reports $< 7.4 \times 10^{-4}$ for $B(D_s^+ \to \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.035$.

[89] ALBRECHT 93E reports $< 2.5 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.035$.

$\Gamma(D_s^+ a_1(1260)^-)/\Gamma_{total}$ — Γ_{31}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0027	90	[90] ALBRECHT	93E	ARG	$e^+e^- \to \Upsilon(4S)$

[90] ALBRECHT 93E reports $< 3.5 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.035$.

$\Gamma(D_s^{*+} a_1(1260)^-)/\Gamma_{total}$ — Γ_{32}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0022	90	[91] ALBRECHT	93E	ARG	$e^+e^- \to \Upsilon(4S)$

[91] ALBRECHT 93E reports $< 2.9 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.035$.

$\Gamma(D_s^- K^+)/\Gamma_{total}$ — Γ_{33}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.00024	90	[92] ALEXANDER	93B	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0013	90	[93] BORTOLETTO	90	CLEO	$e^+e^- \to \Upsilon(4S)$

[92] ALEXANDER 93B reports $< 2.3 \times 10^{-4}$ for $B(D_s^+ \to \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.035$.

[93] BORTOLETTO 90 assume $B(D_s \to \phi\pi^+) = 2\%$.

$\Gamma(D_s^{*-} K^+)/\Gamma_{total}$ — Γ_{34}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.00018	90	[94] ALEXANDER	93B	CLE2	$e^+e^- \to \Upsilon(4S)$

[94] ALEXANDER 93B reports $< 1.7 \times 10^{-4}$ for $B(D_s^+ \to \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.035$.

$\Gamma(D_s^- K^*(892)^+)/\Gamma_{total}$ — Γ_{35}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0010	90	[95] ALEXANDER	93B	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.004	90	[96] ALBRECHT	93E	ARG	$e^+e^- \to \Upsilon(4S)$

[95] ALEXANDER 93B reports $< 9.7 \times 10^{-4}$ for $B(D_s^+ \to \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.035$.

[96] ALBRECHT 93E reports $< 4.6 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.035$.

$\Gamma(D_s^{*-} K^*(892)^+)/\Gamma_{total}$ — Γ_{36}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0012	90	[97] ALEXANDER	93B	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.004	90	[98] ALBRECHT	93E	ARG	$e^+e^- \to \Upsilon(4S)$

[97] ALEXANDER 93B reports $< 11.0 \times 10^{-4}$ for $B(D_s^+ \to \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.035$.

[98] ALBRECHT 93E reports $< 5.8 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.035$.

$\Gamma(D_s^- \pi^+ K^0)/\Gamma_{total}$ Γ_{37}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.006	90	[99] ALBRECHT	93E	ARG	$e^+ e^- \to \Upsilon(4S)$

[99] ALBRECHT 93E reports $< 7.3 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.035$.

$\Gamma(D_s^{*-} \pi^+ K^0)/\Gamma_{total}$ Γ_{38}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0032	90	[100] ALBRECHT	93E	ARG	$e^+ e^- \to \Upsilon(4S)$

[100] ALBRECHT 93E reports $< 4.2 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.035$.

$\Gamma(D_s^- \pi^+ K^*(892)^0)/\Gamma_{total}$ Γ_{39}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.004	90	[101] ALBRECHT	93E	ARG	$e^+ e^- \to \Upsilon(4S)$

[101] ALBRECHT 93E reports $< 5.0 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.035$.

$\Gamma(D_s^{*-} \pi^+ K^*(892)^0)/\Gamma_{total}$ Γ_{40}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0021	90	[102] ALBRECHT	93E	ARG	$e^+ e^- \to \Upsilon(4S)$

[102] ALBRECHT 93E reports $< 2.7 \times 10^{-3}$ for $B(D_s^+ \to \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \to \phi\pi^+) = 0.035$.

$\Gamma(\overline{D}^0 \pi^0)/\Gamma_{total}$ Γ_{41}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.00048	90	[103] ALAM	94	CLE2	$e^+ e^- \to \Upsilon(4S)$

[103] 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 $B(D^0 \to K^- \pi^+ \pi^+ \pi^-)/B(D^0 \to K^- \pi^+)$.

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.00055	90		[104] ALAM	94	CLE2	$e^+ e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.0006	90		[105] BORTOLETTO	92	CLEO	$e^+ e^- \to \Upsilon(4S)$
<0.0027	90	4	[106] ALBRECHT	88K	ARG	$e^+ e^- \to \Upsilon(4S)$

[104] 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 $B(D^0 \to K^- \pi^+ \pi^+ \pi^-)/B(D^0 \to K^- \pi^+)$.

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

[106] ALBRECHT 88K reports < 0.003 assuming $B^0 \overline{B}^0 : B^+ B^-$ production ratio is 45:55. We rescale to 50%.

$\Gamma(\overline{D}^0 \eta)/\Gamma_{total}$ Γ_{43}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.00068	90	[107] ALAM	94	CLE2	$e^+ e^- \to \Upsilon(4S)$

[107] 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 $B(D^0 \to K^- \pi^+ \pi^+ \pi^-)/B(D^0 \to K^- \pi^+)$.

$\Gamma(\overline{D}^0 \eta')/\Gamma_{total}$ Γ_{44}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.00086	90	[108] ALAM	94	CLE2	$e^+ e^- \to \Upsilon(4S)$

[108] 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 $B(D^0 \to K^- \pi^+ \pi^+ \pi^-)/B(D^0 \to K^- \pi^+)$.

$\Gamma(\overline{D}^0\omega)/\Gamma_{\rm total}$ Γ_{45}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.00063	90	[109] ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[109] ALAM 94 assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the CLEO II 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($D^0 \rightarrow K^-\pi^+$).

$\Gamma(\overline{D}^*(2007)^0\pi^0)/\Gamma_{\rm total}$ Γ_{46}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.00097	90	[110] ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[110] 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($D^0 \rightarrow K^-\pi^+$).

$\Gamma(\overline{D}^*(2007)^0\rho^0)/\Gamma_{\rm total}$ Γ_{47}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.00117	90	[111] ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[111] 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($D^0 \rightarrow K^-\pi^+$).

$\Gamma(\overline{D}^*(2007)^0\eta)/\Gamma_{\rm total}$ Γ_{48}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.00069	90	[112] ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[112] 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($D^0 \rightarrow K^-\pi^+$).

$\Gamma(\overline{D}^*(2007)^0\eta')/\Gamma_{\rm total}$ Γ_{49}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0027	90	[113] ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[113] 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($D^0 \rightarrow K^-\pi^+$).

$\Gamma(\overline{D}^*(2007)^0\omega)/\Gamma_{\rm total}$ Γ_{50}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0021	90	[114] ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[114] 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($D^0 \rightarrow K^-\pi^+$).

$\Gamma(J/\psi(1S)K^0)/\Gamma_{\rm total}$ Γ_{51}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
7.5±2.1 OUR AVERAGE						
7.5±2.4±0.8		10	[115] ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
6.9±4.1±0.3			[115] BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
9.2±7.2±0.4		2	[116] ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<50	90		ALAM	86	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[115] BORTOLETTO 92 reports $6 \pm 3 \pm 2$ for B($J/\psi(1S) \rightarrow e^+e^-$) = 0.069 ± 0.009. We rescale to our best value B($J/\psi(1S) \rightarrow e^+e^-$) = $(5.99 \pm 0.25) \times 10^{-2}$. 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 $8 \pm 6 \pm 2$ for B($J/\psi(1S) \rightarrow e^+e^-$) = 0.069 ± 0.009. We rescale to our best value B($J/\psi(1S) \rightarrow e^+e^-$) = $(5.99 \pm 0.25) \times 10^{-2}$. 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 $\Upsilon(4S)$.

$\Gamma(J/\psi(1S)K^+\pi^-)/\Gamma_{\text{total}}$ Γ_{52}/Γ

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
0.00115±0.00056±0.00005			[117] BORTOLETTO 92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0013	90		[118] ALBRECHT 87D	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
<0.0063	90	2	GILES 84	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[117] BORTOLETTO 92 reports $0.0010 \pm 0.0004 \pm 0.0003$ for $B(J/\psi(1S) \rightarrow e^+e^-) = 0.069 \pm 0.009$. We rescale to our best value $B(J/\psi(1S) \rightarrow e^+e^-) = (5.99 \pm 0.25) \times 10^{-2}$. 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 $\Upsilon(4S)$.

[118] ALBRECHT 87D assume $B^+B^-/B^0\overline{B}^0$ ratio is 55/45. $K\pi$ system is specifically selected as nonresonant.

$\Gamma(J/\psi(1S)K^*(892)^0)/\Gamma_{\text{total}}$ Γ_{53}/Γ

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.00158±0.00028 OUR AVERAGE				
0.00169±0.00031±0.00018	29	[119] ALAM 94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
0.0013 ±0.0007 ±0.0001		[120] BORTOLETTO 92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
0.0013 ±0.0006 ±0.0001	6	[121] ALBRECHT 90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.0040 ±0.0018 ±0.0002	5	[122] BEBEK 87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
		[123] ALBRECHT 94G	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.0040 ±0.0030		[124] ALBAJAR 91E	UA1	$E_{\text{cm}}^{p\overline{p}}$= 630 GeV
0.0033 ±0.0018	5	[125] ALBRECHT 87D	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.0041 ±0.0018	5	[126] ALAM 86	CLEO	Repl. by BEBEK 87

[119] The neutral and charged B events together are predominantly longitudinally polarized, $\Gamma_L/\Gamma = 0.080 \pm 0.08 \pm 0.05$. This can be compared with a prediction using HQET, 0.73 (KRAMER 92). This polarization indicates that the $B \rightarrow \psi K^*$ decay is dominated by the $CP = -1$ CP eigenstate. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

[120] BORTOLETTO 92 reports $0.0011 \pm 0.0005 \pm 0.0003$ for $B(J/\psi(1S) \rightarrow e^+e^-) = 0.069 \pm 0.009$. We rescale to our best value $B(J/\psi(1S) \rightarrow e^+e^-) = (5.99 \pm 0.25) \times 10^{-2}$. 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 $\Upsilon(4S)$.

[121] ALBRECHT 90J reports $0.0011 \pm 0.0005 \pm 0.0002$ for $B(J/\psi(1S) \rightarrow e^+e^-) = 0.069 \pm 0.009$. We rescale to our best value $B(J/\psi(1S) \rightarrow e^+e^-) = (5.99 \pm 0.25) \times 10^{-2}$. 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] BEBEK 87 reports $0.0035 \pm 0.0016 \pm 0.0003$ for $B(J/\psi(1S) \rightarrow e^+e^-) = 0.069 \pm 0.009$. We rescale to our best value $B(J/\psi(1S) \rightarrow e^+e^-) = (5.99 \pm 0.25) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Updated in BORTOLETTO 92 to use the same assumptions.

[123] ALBRECHT 94G measures the polarization in the vector-vector decay to be predominantly longitudinal, $\Gamma_T/\Gamma = 0.03 \pm 0.16 \pm 0.15$ making the neutral decay a CP eigenstate when the K^{*0} decays through $K_S^0\pi^0$.

[124] ALBAJAR 91E assumes B_d^0 production fraction of 36%.

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

[126] ALAM 86 assumes $B^{\pm}/B^0$ ratio is 60/40. The observation of the decay $B^+ \rightarrow J/\psi K^*(892)^+$ (HAAS 85) has been retracted in this paper.

$\Gamma(\psi(2S)K^0)/\Gamma_{\text{total}}$ Γ_{54}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0008	90	[127] ALAM 94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.0015	90	[127] BORTOLETTO 92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
<0.0028	90	[127] ALBRECHT 90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(\psi(2S)K^+\pi^-)/\Gamma_{\text{total}}$ Γ_{55}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.001	90	[128] ALBRECHT 90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(\psi(2S)K^*(892)^0)/\Gamma_{total}$ — Γ_{56}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
0.0014±0.0008±0.0004		[129] BORTOLETTO	92	CLEO	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0019	90	[129] ALAM	94	CLE2	$e^+e^- \to \Upsilon(4S)$
<0.0023	90	[129] ALBRECHT	90J	ARG	$e^+e^- \to \Upsilon(4S)$

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

$\Gamma(\chi_{c1}(1P)K^0)/\Gamma_{total}$ — Γ_{57}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0027	90	[130] ALAM	94	CLE2	$e^+e^- \to \Upsilon(4S)$

[130] BORTOLETTO 92 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

$\Gamma(\chi_{c1}(1P)K^*(892)^0)/\Gamma_{total}$ — Γ_{58}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0021	90	[131] ALAM	94	CLE2	$e^+e^- \to \Upsilon(4S)$

[131] BORTOLETTO 92 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.6 x 10^{-5}	90	[132] BATTLE	93	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<8.1 \times 10^{-5}$	90	[133] AKERS	94L	OPAL	$e^+e^- \to Z$
$<1.8 \times 10^{-4}$	90	ALBRECHT	91B	ARG	$e^+e^- \to \Upsilon(4S)$
$<9 \times 10^{-5}$	90	[134] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$
$<3.2 \times 10^{-4}$	90	AVERY	87	CLEO	$e^+e^- \to \Upsilon(4S)$

[132] BATTLE 93 assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.
[133] Assumes B($Z \to b\overline{b}$) = 0.217 and B^0_d (B^0_s) fraction 39.5% (12%).
[134] Assumes the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$.

$[\Gamma(K^+\pi^-)+\Gamma(\pi^+\pi^-)]/\Gamma_{total}$ — $(\Gamma_{59}+\Gamma_{85})/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
$(2.4^{+0.8}_{-0.7}\pm0.2) \times 10^{-5}$	[135] BATTLE	93	CLE2	$e^+e^- \to \Upsilon(4S)$

[135] BATTLE 93 assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.7 x 10^{-5}	90	[136] BATTLE	93	CLE2	$e^+e^- \to \Upsilon(4S)$

[136] BATTLE 93 assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.

$\Gamma(K^0\pi^+\pi^-)/\Gamma_{total}$ — Γ_{61}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<4.4 x 10^{-4}	90	ALBRECHT	91E	ARG	$e^+e^- \to \Upsilon(4S)$

$\Gamma(K^0\rho^0)/\Gamma_{total}$ — Γ_{62}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.2 x 10^{-4}	90	ALBRECHT	91B	ARG	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<5.0 \times 10^{-4}$	90	[137] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$
<0.064	90	[138] AVERY	87	CLEO	$e^+e^- \to \Upsilon(4S)$

[137] AVERY 89B reports $< 5.8 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.
[138] AVERY 87 reports < 0.08 assuming the $\Upsilon(4S)$ decays 40% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K^0 f_0(980))/\Gamma_{total}$ — Γ_{63}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.6 x 10^{-4}	90	[139] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$

[139] AVERY 89B reports $< 4.2 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K^*(892)^+\pi^-)/\Gamma_{total}$ Γ_{64}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<3.8 × 10⁻⁴	90	[140] AVERY 89B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<6.2 \times 10^{-4}$	90	ALBRECHT 91B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
$<5.6 \times 10^{-4}$	90	[141] AVERY 87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[140] AVERY 89B reports $< 4.4 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

[141] AVERY 87 reports $< 7 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 40% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K_2^*(1430)^+\pi^-)/\Gamma_{total}$ Γ_{65}/Γ

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

$\Gamma(K^0K^+K^-)/\Gamma_{total}$ Γ_{66}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<1.3 × 10⁻³	90	ALBRECHT 91E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(K^0\phi)/\Gamma_{total}$ Γ_{67}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<4.2 × 10⁻⁴	90	[142] AVERY 89B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<7.2 \times 10^{-4}$	90	ALBRECHT 91B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
$<1.0 \times 10^{-3}$	90	[143] AVERY 87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[142] AVERY 89B reports $< 4.9 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

[143] AVERY 87 reports $< 1.3 \times 10^{-3}$ assuming the $\Upsilon(4S)$ decays 40% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K^*(892)^0\pi^+\pi^-)/\Gamma_{total}$ Γ_{68}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<1.4 × 10⁻³	90	ALBRECHT 91E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(K^*(892)^0\rho^0)/\Gamma_{total}$ Γ_{69}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<4.6 × 10⁻⁴	90	ALBRECHT 91B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<5.8 \times 10^{-4}$	90	[144] AVERY 89B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
$<9.6 \times 10^{-4}$	90	[145] AVERY 87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

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

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

$\Gamma(K^*(892)^0 f_0(980))/\Gamma_{total}$ Γ_{70}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<1.7 × 10⁻⁴	90	[146] AVERY 89B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(K_1(1400)^+\pi^-)/\Gamma_{total}$ Γ_{71}/Γ

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

$\Gamma(K^*(892)^0K^+K^-)/\Gamma_{total}$ Γ_{72}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<6.1 × 10⁻⁴	90	ALBRECHT 91E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(K^*(892)^0\phi)/\Gamma_{total}$ Γ_{73}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<3.2 × 10⁻⁴	90	ALBRECHT 91B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<3.8 \times 10^{-4}$	90	[147] AVERY 89B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
$<3.8 \times 10^{-4}$	90	[148] AVERY 87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[147] AVERY 89B reports $< 4.4 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

[148] AVERY 87 reports $< 4.7 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 40% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K_1(1400)^0 \rho^0)/\Gamma_{total}$ Γ_{74}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<3.0 × 10^{-3}	90	ALBRECHT 91B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(K_1(1400)^0 \phi)/\Gamma_{total}$ Γ_{75}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<5.0 × 10^{-3}	90	ALBRECHT 91B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(K_2^*(1430)^0 \rho^0)/\Gamma_{total}$ Γ_{76}/Γ

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

$\Gamma(K_2^*(1430)^0 \phi)/\Gamma_{total}$ Γ_{77}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<1.4 × 10^{-3}	90	ALBRECHT 91B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(K^*(892)^0 \gamma)/\Gamma_{total}$ Γ_{78}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
4.0±1.7±0.8		8	[149] AMMAR 93	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 42	90		ALBRECHT 89G	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
< 24	90		[150] AVERY 89B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
<210	90		AVERY 87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[149] AMMAR 93 observed 6.6 ± 2.8 events above background.
[150] AVERY 89B reports $< 2.8 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K_1(1270)^0 \gamma)/\Gamma_{total}$ Γ_{79}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0070	90	[151] ALBRECHT 89G	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[151] ALBRECHT 89G reports < 0.0078 assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K_1(1400)^0 \gamma)/\Gamma_{total}$ Γ_{80}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0043	90	[152] ALBRECHT 89G	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[152] ALBRECHT 89G reports < 0.0048 assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K_2^*(1430)^0 \gamma)/\Gamma_{total}$ Γ_{81}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<4.0 × 10^{-4}	90	[153] ALBRECHT 89G	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[153] ALBRECHT 89G reports $< 4.4 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K^*(1680)^0 \gamma)/\Gamma_{total}$ Γ_{82}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0020	90	[154] ALBRECHT 89G	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[154] ALBRECHT 89G reports < 0.0022 assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K_3^*(1780)^0 \gamma)/\Gamma_{total}$ Γ_{83}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.010	90	[155] ALBRECHT 89G	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[155] ALBRECHT 89G reports < 0.011 assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K_4^*(2045)^0 \gamma)/\Gamma_{total}$ Γ_{84}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0043	90	[156] ALBRECHT 89G	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[156] ALBRECHT 89G reports < 0.0048 assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(\pi^+\pi^-)/\Gamma_{total}$ — Γ_{85}/Γ

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<2.9 × 10^{-5}	90		[157] BATTLE	93	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<4.7 \times 10^{-5}$	90		[158] AKERS	94L	OPAL	$e^+e^- \to Z$
$<1.3 \times 10^{-4}$	90		[157] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$
$<7.7 \times 10^{-5}$	90		[159] BORTOLETTO	89	CLEO	$e^+e^- \to \Upsilon(4S)$
$<2.6 \times 10^{-4}$	90		[159] BEBEK	87	CLEO	$e^+e^- \to \Upsilon(4S)$
$<5 \times 10^{-4}$	90	4	GILES	84	CLEO	$e^+e^- \to \Upsilon(4S)$

[157] Assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.
[158] Assumes B($Z \to b\overline{b}$) = 0.217 and B^0_d (B^0_s) fraction 39.5% (12%).
[159] Paper assumes the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<7.2 × 10^{-4}	90	[160] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$

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

$\Gamma(\rho^0\pi^0)/\Gamma_{total}$ — Γ_{87}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<4.0 × 10^{-4}	90	[161] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$

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

$\Gamma(\rho^\mp\pi^\pm)/\Gamma_{total}$ — Γ_{88}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.2 × 10^{-4}	90	[162] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<5.2 \times 10^{-3}$	90	[163] BEBEK	87	CLEO	$e^+e^- \to \Upsilon(4S)$

[162] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.
[163] BEBEK 87 reports $< 6.1 \times 10^{-3}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<6.7 × 10^{-4}	90	[164] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$

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

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.8 × 10^{-4}	90	[165] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.9 \times 10^{-4}$	90	[166] BORTOLETTO	89	CLEO	$e^+e^- \to \Upsilon(4S)$
$<4.3 \times 10^{-4}$	90	[166] BEBEK	87	CLEO	$e^+e^- \to \Upsilon(4S)$

[165] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.
[166] Paper assumes the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(a_1(1260)^\mp\pi^\pm)/\Gamma_{total}$ — Γ_{91}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<4.9 × 10^{-4}	90	[167] BORTOLETTO	89	CLEO	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<6.3 \times 10^{-4}$	90	[168] ALBRECHT	90B	ARG	$e^+e^- \to \Upsilon(4S)$
$<1.0 \times 10^{-3}$	90	[167] BEBEK	87	CLEO	$e^+e^- \to \Upsilon(4S)$

[167] Paper assumes the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.
[168] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.

$\Gamma(a_2(1320)^\mp\pi^\pm)/\Gamma_{total}$ — Γ_{92}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.0 × 10^{-4}	90	[169] BORTOLETTO	89	CLEO	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.4 \times 10^{-3}$	90	[169] BEBEK	87	CLEO	$e^+e^- \to \Upsilon(4S)$

[169] Paper assumes the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.1 × 10^−3	90	[170] ALBRECHT	90B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(\rho^+\rho^-)/\Gamma_{total}$ — Γ_{94}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.2 × 10^−3	90	[171] ALBRECHT	90B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(a_1(1260)^0\pi^0)/\Gamma_{total}$ — Γ_{95}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.1 × 10^−3	90	[172] ALBRECHT	90B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(\omega\pi^0)/\Gamma_{total}$ — Γ_{96}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<4.6 × 10^−4	90	[173] ALBRECHT	90B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(\eta\pi^0)/\Gamma_{total}$ — Γ_{97}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.8 × 10^−3	90	[174] ALBRECHT	90B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(\pi^+\pi^+\pi^-\pi^-\pi^0)/\Gamma_{total}$ — Γ_{98}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<9.0 × 10^−3	90	[175] ALBRECHT	90B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(a_1(1260)^+\rho^-)/\Gamma_{total}$ — Γ_{99}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.4 × 10^−3	90	[176] ALBRECHT	90B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(a_1(1260)^0\rho^0)/\Gamma_{total}$ — Γ_{100}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.4 × 10^−3	90	[177] ALBRECHT	90B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.0 × 10^−3	90	[178] ALBRECHT	90B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(a_1(1260)^+a_1(1260)^-)/\Gamma_{total}$ — Γ_{102}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.8 × 10^−3	90	[179] BORTOLETTO	89	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<6.0 × 10^−3	90	[180] ALBRECHT	90B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[179] BORTOLETTO 89 reports $< 3.2 \times 10^{-3}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.
[180] ALBRECHT 90B limit assumes equal production of $B^0\overline{B}^0$ and B^+B^- at $\Upsilon(4S)$.

$\Gamma(\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\pi^0)/\Gamma_{total}$ — Γ_{103}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.1 × 10^−2	90	[181] ALBRECHT	90B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(p\overline{p})/\Gamma_{\rm total}$ Γ_{104}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.4 × 10⁻⁵	90	[182] BORTOLETTO	89	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.2 \times 10^{-4}$	90	[183] ALBRECHT	88F	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
$<1.7 \times 10^{-4}$	90	[182] BEBEK	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[182] Paper assumes the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

[183] ALBRECHT 88F reports $< 1.3 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(p\overline{p}\pi^+\pi^-)/\Gamma_{\rm total}$ Γ_{105}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<2.5	90	[184] BEBEK	89	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$5.4 \pm 1.8 \pm 2.0$		[185] ALBRECHT	88F	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[184] BEBEK 89 reports $< 2.9 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

[185] ALBRECHT 88F reports $6.0 \pm 2.0 \pm 2.2$ assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(p\overline{\Lambda}\pi^-)/\Gamma_{\rm total}$ Γ_{106}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.8 × 10⁻⁴	90	[186] ALBRECHT	88F	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[186] ALBRECHT 88F reports $< 2.0 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(\Delta^0\overline{\Delta}^0)/\Gamma_{\rm total}$ Γ_{107}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0015	90	[187] BORTOLETTO	89	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[187] BORTOLETTO 89 reports < 0.0018 assuming $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(\Delta^{++}\Delta^{--})/\Gamma_{\rm total}$ Γ_{108}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.1 × 10⁻⁴	90	[188] BORTOLETTO	89	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(\overline{\Sigma}_c^{--}\Delta^{++})/\Gamma_{\rm total}$ Γ_{109}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0012	90	[189] PROCARIO	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[189] PROCARIO 94 reports < 0.0012 for $B(\Lambda_c^+ \rightarrow pK^-\pi^+) = 0.043$. We rescale to our best value $B(\Lambda_c^+ \rightarrow pK^-\pi^+) = 0.044$.

$\Gamma(e^+e^-)/\Gamma_{\rm total}$ Γ_{110}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.9 × 10⁻⁶	90	AMMAR	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.6 \times 10^{-5}$	90	[190] AVERY	89B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
$<7.6 \times 10^{-5}$	90	[191] ALBRECHT	87D	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
$<6.4 \times 10^{-5}$	90	[192] AVERY	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
$<3 \times 10^{-4}$	90	GILES	84	CLEO	Repl. by AVERY 87

[190] AVERY 89B reports $< 3 \times 10^{-5}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

[191] ALBRECHT 87D reports $< 8.5 \times 10^{-5}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

[192] AVERY 87 reports $< 8 \times 10^{-5}$ assuming the $\Upsilon(4S)$ decays 40% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(\mu^+\mu^-)/\Gamma_{\rm total}$ — Γ_{111}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.9 × 10^{-6}	90	AMMAR	94	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<8.3 \times 10^{-6}$	90	[193] ALBAJAR	91C	UA1	$E_{\rm cm}^{p\overline{p}}$= 630 GeV
$<1.2 \times 10^{-5}$	90	[194] ALBAJAR	91C	UA1	$E_{\rm cm}^{p\overline{p}}$= 630 GeV
$<4.3 \times 10^{-5}$	90	[195] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$
$<4.5 \times 10^{-5}$	90	[196] ALBRECHT	87D	ARG	$e^+e^- \to \Upsilon(4S)$
$<7.7 \times 10^{-5}$	90	[197] AVERY	87	CLEO	$e^+e^- \to \Upsilon(4S)$
$<2 \times 10^{-4}$	90	GILES	84	CLEO	Repl. by AVERY 87

[193] B^0 and B_s^0 are not separated.

[194] Obtained from unseparated B^0 and B_s^0 measurement by assuming a B^0:B_s^0 ratio 2:1.

[195] AVERY 89B reports $< 5 \times 10^{-3}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

[196] ALBRECHT 87D reports $< 5 \times 10^{-5}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

[197] AVERY 87 reports $< 9 \times 10^{-5}$ assuming the $\Upsilon(4S)$ decays 40% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K^0e^+e^-)/\Gamma_{\rm total}$ — Γ_{112}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.0 × 10^{-4}	90	ALBRECHT	91E	ARG	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<5.2 \times 10^{-4}$	90	[198] AVERY	87	CLEO	$e^+e^- \to \Upsilon(4S)$

[198] AVERY 87 reports $< 6.5 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 40% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K^0\mu^+\mu^-)/\Gamma_{\rm total}$ — Γ_{113}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.6 × 10^{-4}	90	[199] AVERY	87	CLEO	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<5.2 \times 10^{-4}$	90	ALBRECHT	91E	ARG	$e^+e^- \to \Upsilon(4S)$

[199] AVERY 87 reports $< 4.5 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 40% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(K^*(892)^0e^+e^-)/\Gamma_{\rm total}$ — Γ_{114}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.9 × 10^{-4}	90	ALBRECHT	91E	ARG	$e^+e^- \to \Upsilon(4S)$

$\Gamma(K^*(892)^0\mu^+\mu^-)/\Gamma_{\rm total}$ — Γ_{115}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.3 × 10^{-5}	90	[200] ALBAJAR	91C	UA1	$E_{\rm cm}^{p\overline{p}}$= 630 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<3.4 \times 10^{-4}$	90	ALBRECHT	91E	ARG	$e^+e^- \to \Upsilon(4S)$

[200] ALBAJAR 91C assumes 36% of $\overline{b}$ quarks give B^0 mesons.

$\Gamma(e^\pm\mu^\mp)/\Gamma_{\rm total}$ — Γ_{116}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.9 × 10^{-6}	90	AMMAR	94	CLE2	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<3.4 \times 10^{-5}$	90	[201] AVERY	89B	CLEO	$e^+e^- \to \Upsilon(4S)$
$<4.5 \times 10^{-5}$	90	[202] ALBRECHT	87D	ARG	$e^+e^- \to \Upsilon(4S)$
$<7.7 \times 10^{-5}$	90	[203] AVERY	87	CLEO	$e^+e^- \to \Upsilon(4S)$
$<3 \times 10^{-4}$	90	GILES	84	CLEO	Repl. by AVERY 87

[201] Paper assumes the $\Upsilon(4S)$ decays 43% to $B^0\overline{B}^0$. We rescale to 50%.

[202] ALBRECHT 87D reports $< 5 \times 10^{-5}$ assuming the $\Upsilon(4S)$ decays 45% to $B^0\overline{B}^0$. We rescale to 50%.

[203] AVERY 87 reports $< 9 \times 10^{-5}$ assuming the $\Upsilon(4S)$ decays 40% to $B^0\overline{B}^0$. We rescale to 50%.

$\Gamma(e^{\pm}\tau^{\mp})/\Gamma_{total}$ — Γ_{117}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.3 × 10^{-4}	90	AMMAR	94	CLE2	$e^+e^- \to \Upsilon(4S)$

$\Gamma(\mu^{\pm}\tau^{\mp})/\Gamma_{total}$ — Γ_{118}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<8.3 × 10^{-4}	90	AMMAR	94	CLE2	$e^+e^- \to \Upsilon(4S)$

B^0-$\overline{B}^0$ MIXING

For a discussion of B^0-$\overline{B}^0$ mixing see the note on "B^0-$\overline{B}^0$ Mixing and *CP* Violation in *B* Decay" below.

χ_d

This B^0-$\overline{B}^0$ mixing parameter measures the probability (integrated over time) that a produced B^0 (or $\overline{B}^0$) decays as a $\overline{B}^0$ (or B^0), e.g. for inclusive lepton decays

$$\chi_d = \Gamma(B^0 \to \ell^- X \text{ (via } \overline{B}^0))/\Gamma(B^0 \to \ell^{\pm} X)$$
$$= \Gamma(\overline{B}^0 \to \ell^+ X \text{ (via } B^0))/\Gamma(\overline{B}^0 \to \ell^{\pm} X)$$

Where experiments have measured the parameter $r = \chi/(1-\chi)$, we have converted to χ. Mixing violates the $\Delta B \neq 2$ rule.

Note that the measurement of χ at energies higher than the $\Upsilon(4S)$ have not separated χ_d from χ_s where the subscripts indicate $B^0(\overline{b}d)$ or $B^0_s(\overline{b}s)$. They are listed in the B^0_s-$\overline{B}^0_s$ MIXING section.

The experiments at $\Upsilon(4S)$ make an assumption about the $B^0\overline{B}^0$ fraction and about the ratio of the $B^{\pm}$ and B^0 semileptonic branching ratios (usually that it equals one).

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
0.156±0.024 OUR AVERAGE					
0.16 ±0.04 ±0.04		[204] ALBRECHT	94	ARG	$e^+e^- \to \Upsilon(4S)$
0.149±0.023±0.022		[205] BARTELT	93	CLE2	$e^+e^- \to \Upsilon(4S)$
0.171±0.048		[206] ALBRECHT	92L	ARG	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.24 ±0.12		[207] ELSEN	90	JADE	e^+e^- 35–44 GeV
$0.158^{+0.052}_{-0.059}$		ARTUSO	89	CLEO	$e^+e^- \to \Upsilon(4S)$
0.17 ±0.05		[208] ALBRECHT	87I	ARG	$e^+e^- \to \Upsilon(4S)$
<0.19	90	[209] BEAN	87B	CLEO	$e^+e^- \to \Upsilon(4S)$
<0.27	90	[210] AVERY	84	CLEO	$e^+e^- \to \Upsilon(4S)$

[204] ALBRECHT 94 reports r=0.194 ± 0.062 ± 0.054. We convert to χ for comparison. Uses tagged events (lepton + pion from D^*).

[205] BARTELT 93 analysis performed using tagged events (lepton+pion from D^*). Using dilepton events they obtain $0.157 \pm 0.016^{+0.033}_{-0.028}$.

[206] ALBRECHT 92L is a combined measurement employing several lepton-based techniques. It uses all previous ARGUS data in addition to new data and therefore supersedes ALBRECHT 87I. A value of r = 20.6 ± 7.0% is directly measured. The value can be used to measure $x = \Delta M/\Gamma = 0.72 \pm 0.15$ for the B_d meson. Assumes $f_{+-}/f_0 = 1.0 \pm 0.05$ and uses $\tau_{B^{\pm}}/\tau_{B^0} = (0.95 \pm 0.14)\,(f_{+-}/f_0)$.

[207] These experiments see a combination of B_s and B_d mesons.

[208] ALBRECHT 87I is inclusive measurement with like-sign dileptons, with tagged *B* decays plus leptons, and one fully reconstructed event. Measures r=0.21 ± 0.08. We convert to χ for comparison. Superseded by ALBRECHT 92L.

[209] BEAN 87B measured $r <$ 0.24; we converted to χ.

[210] Same-sign dilepton events. Limit assumes semileptonic BR for B^+ and B^0 equal. If $B^0/B^{\pm}$ ratio <0.58, no limit exists. The limit was corrected in BEAN 87B from $r <$ 0.30 to $r <$ 0.37. We converted this limit to χ.

$\Delta m_{B^0} = m_{B^0_H} - m_{B^0_L}$

Δm_{B^0} is a measure of the B^0-$\overline{B}^0$ oscillation frequency in time-dependent mixing experiments.

VALUE ($10^{12}\ \hbar\ s^{-1}$)	EVTS	DOCUMENT ID		TECN	COMMENT
0.52 ±0.05 OUR AVERAGE					
0.50 ±0.12 ±0.06		[211] ABREU	94M	DLPH	$e^+e^- \to Z$

$0.529 \pm 0.064 \pm 0.019$		[212] AKERS	94H	OPAL	$e^+ e^- \to Z$
$0.50\ ^{+0.07}_{-0.06}\ ^{+0.11}_{-0.10}$		[213] BUSKULIC	94B	ALEP	$e^+ e^- \to Z$
$0.52\ ^{+0.10}_{-0.11}\ ^{+0.04}_{-0.03}$		[214] BUSKULIC	93K	ALEP	$e^+ e^- \to Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.508 \pm 0.075 \pm 0.025$		[215] AKERS	94C	OPAL	$e^+ e^- \to Z$
$0.57\ \pm 0.11\ \pm 0.02$	153	[214] AKERS	94H	OPAL	$e^+ e^- \to Z$

[211] ABREU 94M uses $D^{*\pm}$ and hemisphere charges.
[212] This AKERS 94H value combines the jet charge measurement and $D^{*\pm}$ lepton correlation measurement from OPAL taking into account common systematic errors.
[213] BUSKULIC 94B uses dileptons.
[214] Uses $D^{*\pm}$ lepton correlations.
[215] AKERS 94C uses $D^{*\pm} \ell^{\mp}$ events and jet charge.

$x_d = \Delta m_{B^0} / \Gamma_{B^0}$

This section combines results from the previous two sections.

Time integrated mixing measurements of χ determine this quantity directly via

$$\frac{\Delta m_{B^0}}{\Gamma_{B^0}} = \left(\frac{\chi}{0.5-\chi}\right)^{1/2}$$

while time-dependent mixing measurements determine $\Delta m_{B^0} = m_{B^0_H} - m_{B^0_L}$ which are combined with τ_{B^0} to give

$$\frac{\Delta m_{B^0}}{\Gamma_{B^0}} = \frac{(m_{B^0_H} - m_{B^0_L})\ \tau_{B^0}}{\hbar} .$$

The averaging takes into account the common systematic errors on the LEP experiments due to τ_{B^0}.

VALUE	DOCUMENT ID		TECN	COMMENT
0.71±0.06 OUR AVERAGE				
$0.75 \pm 0.20 \pm 0.06$	[216] ABREU	94M	DLPH	$e^+ e^- \to Z$
$0.79 \pm 0.10 \pm 0.06$	[216] AKERS	94H	OPAL	$e^+ e^- \to Z$
0.69 ± 0.18	[217] ALBRECHT	94	ARG	$e^+ e^- \to \Upsilon(4S)$
$0.75^{+0.20}_{-0.18} \pm 0.06$	[216] BUSKULIC	94B	ALEP	$e^+ e^- \to Z$
0.65 ± 0.10	[217] BARTELT	93	CLE2	$e^+ e^- \to \Upsilon(4S)$
$0.78^{+0.16}_{-0.17} \pm 0.06$	[216] BUSKULIC	93K	ALEP	$e^+ e^- \to Z$
0.72 ± 0.15	[217] ALBRECHT	92L	ARG	$e^+ e^- \to \Upsilon(4S)$

[216] Value is their Δm_{B^0} measurement combined with $\tau_{B^0} = (1.50 \pm 0.11)$ ps, the average from this edition. The systematic error on τ_B and is common to experiments bearing this footnote. The averaging takes this into account.
[217] Derived from time-integrated mixing parameter χ.

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CP VIOLATION PARAMETERS

$|\mathrm{Re}(\epsilon_{B^0})|$

CP Impurity in B^0_d system. It is obtained from $a_{\ell\ell}$, the charge asymmetry in like-sign dilepton events at the $\Upsilon(4S)$.

$$\mathrm{Re}(\epsilon_{B^0}) \simeq \frac{1}{4} a_{\ell\ell} = \frac{1}{4}\ \frac{N(\ell^+\ell^+) - N(\ell^-\ell^-)}{N(\ell^+\ell^+) + N(\ell^-\ell^-)} .$$

VALUE	DOCUMENT ID		TECN	COMMENT
<0.045	[218] BARTELT	93	CLE2	$e^+ e^- \to \Upsilon(4S)$

[218] BARTELT 93 finds $a_{\ell\ell} = 0.031 \pm 0.096 \pm 0.032$ which corresponds to $|a_{\ell\ell}| < 0.18$, which yields the above $\mathrm{Re}(\epsilon_{B^0})$.

B^0 REFERENCES

ABE	94D	PRL 72 3456	+Albrow, Amidei, Anway-Wiese, Apollinari	(CDF Collab.)
ABREU	94M	PL B338 409	+Adam, Adye, Agasi, Ajinenko+	(DELPHI Collab.)
AKERS	94C	PL B327 411	+Alexander, Allison, Anderson, Arcelli+	(OPAL Collab.)
AKERS	94H	PL B336 585	+Alexander, Allison, Anderson, Arcelli+	(OPAL Collab.)
AKERS	94J	PL B337 196	+Alexander, Allison, Anderson, Arcelli+	(OPAL Collab.)
AKERS	94L	PL B337 393	+Alexander, Allison, Anderson, Arcelli+	(OPAL Collab.)
ALAM	94	PR D50 43	+Kim, Nemati, O'Neill, Severini+	(CLEO Collab.)
ALBRECHT	94	PL B324 249	+Ehrlichmann, Hamacher+	(ARGUS Collab.)
ALBRECHT	94G	PL B340 217	+Hamacher, Hofmann, Kirchhoff, Mankel+	(ARGUS Collab.)
AMMAR	94	PR D49 5701	+Ball, Baringer, Bean, Besson, Coppage+	(CLEO Collab.)
ATHANAS	94	PRL 73 3503	+Brower, Masek, Paar, Gronberg+	(CLEO Collab.)
Also	95	PRL 74 3090 (erratum)		
BUSKULIC	94B	PL B322 441	+De Bonis, Decamp, Ghez, Goy, Lees+	(ALEPH Collab.)
PDG	94	PR D50 1173	Montanet+	(CERN, LBL, BOST, IFIC+)
PROCARIO	94	PRL 73 1306	+Balest, Cho, Daoudi, Ford+	(CLEO Collab.)
STONE	94	HEPSY 93-11		
ABREU	93D	ZPHY C57 181	+Adam, Adye, Agasi, Alekseev+	(DELPHI Collab.)
ABREU	93G	PL B312 253	+Adam, Adye, Agasi, Ajinenko+	(DELPHI Collab.)
ACTON	93C	PL B307 247	+Alexander, Allison, Allport, Anderson+	(OPAL Collab.)
ALBRECHT	93	ZPHY C57 533	+Ehrlichmann, Hamacher, Hofmann+	(ARGUS Collab.)
ALBRECHT	93E	ZPHY C60 11	+Ehrlichmann, Hamacher, Hofmann+	(ARGUS Collab.)
ALEXANDER	93B	PL B319 365	+Bebek, Berkelman, Bloom, Browder+	(CLEO Collab.)
AMMAR	93	PRL 71 674	+Ball, Baringer, Coppage, Copty+	(CLEO Collab.)
BARTELT	93	PRL 71 1680	+Csorna, Egyed, Jain, Sheldon+	(CLEO Collab.)
BATTLE	93	PRL 71 3922	+Ernst, Kroha, Kwon, Roberts+	(CLEO Collab.)
BEAN	93B	PRL 70 2681	+Gronberg, Kutschke, Menary, Morrison+	(CLEO Collab.)
BUSKULIC	93D	PL B307 194	+Decamp, Goy, Lees, Minard+	(ALEPH Collab.)
Also	94H	PL B325 537 (errata)		
BUSKULIC	93K	PL B313 498	+De Bonis, Decamp, Ghez, Goy+	(ALEPH Collab.)
SANGHERA	93	PR D47 791	+Skwarnicki, Stroynowski, Artuso, Goldberg+	(CLEO Collab.)
ALBRECHT	92C	PL B275 195	+Ehrlichmann, Hamacher, Krueger, Nau+	(ARGUS Collab.)
ALBRECHT	92G	ZPHY C54 1	+Ehrlichmann, Hamacher, Krueger, Nau+	(ARGUS Collab.)
ALBRECHT	92L	ZPHY C55 357	+Ehrlichmann, Hamacher, Krueger, Nau+	(ARGUS Collab.)
BORTOLETTO	92	PR D45 21	+Brown, Dominick, McIlwain+	(CLEO Collab.)
HENDERSON	92	PR D45 2212	+Kinoshita, Pipkin, Procario+	(CLEO Collab.)
KRAMER	92	PL B279 181	+Palmer	(HAMB, OSU)
ALBAJAR	91C	PL B262 163	+Albrow, Allkofer, Ankoviak, Apsimon+	(UA1 Collab.)
ALBAJAR	91E	PL B273 540	+Albrow, Allkofer, Ankoviak+	(UA1 Collab.)
ALBRECHT	91B	PL B254 288	+Glaeser, Harder, Krueger, Nippe+	(ARGUS Collab.)
ALBRECHT	91C	PL B255 297	+Ehrlichmann, Glaeser, Harder, Krueger+	(ARGUS Collab.)
ALBRECHT	91E	PL B262 148	+Glaeser, Harder, Krueger, Nippe+	(ARGUS Collab.)
BERKELMAN	91	ARNPS 41 1	+Stone	(CORN, SYRA)
"Decays of *B* Mesons"				
FULTON	91	PR D43 651	+Jensen, Johnson, Kagan, Kass+	(CLEO Collab.)
ALBRECHT	90B	PL B241 278	+Glaeser, Harder, Krueger, Nilsson+	(ARGUS Collab.)
ALBRECHT	90J	ZPHY C48 543	+Ehrlichmann, Harder, Krueger+	(ARGUS Collab.)
ANTREASYAN	90B	ZPHY C48 553	+Bartels, Bieler, Bienlein, Bizzeti+	(Crystal Ball Collab.)
BORTOLETTO	90	PRL 64 2117	+Goldberg, Horwitz, Jain, Mestayer+	(CLEO Collab.)
ELSEN	90	ZPHY C46 349	+Allison, Ambrus, Barlow, Bartel+	(JADE Collab.)
ROSNER	90	PR D42 3732		
WAGNER	90	PRL 64 1095	+Hinshaw, Ong, Snyder+	(Mark II Collab.)
ALBRECHT	89C	PL B219 121	+Boeckmannn, Glaeser, Harder+	(ARGUS Collab.)
ALBRECHT	89G	PL B229 304	+Glaeser, Harder, Krueger+	(ARGUS Collab.)
ALBRECHT	89J	PL B229 175	+Glaser, Harder+	(ARGUS Collab.)
ALBRECHT	89L	PL B232 554	+Glaeser, Harder, Krueger, Nippe, Oest+	(ARGUS Collab.)
ARTUSO	89	PRL 62 2233	+Bebek, Berkelman, Blucher+	(CLEO Collab.)
AVERILL	89	PR D39 123	+Blockus, Brabson+	(HRS Collab.)
AVERY	89B	PL B223 470	+Besson, Garren, Yelton+	(CLEO Collab.)
BEBEK	89	PRL 62 8	+Berkelman, Blucher+	(CLEO Collab.)
BORTOLETTO	89	PRL 62 2436	+Goldberg, Horwitz, Mestayer+	(CLEO Collab.)
BORTOLETTO	89B	PRL 63 1667	+Goldberg, Horwitz, Mestayer+	(CLEO Collab.)
ALBRECHT	88F	PL B209 119	+Boeckmann, Glaeser+	(ARGUS Collab.)
ALBRECHT	88K	PL B215 424	+Boeckmann, Glaeser+	(ARGUS Collab.)
ALBRECHT	87C	PL B185 218	+Binder, Boeckmann, Glaser+	(ARGUS Collab.)
ALBRECHT	87D	PL B199 451	+Andam, Binder, Boeckmann+	(ARGUS Collab.)
ALBRECHT	87I	PL B192 245	+Andam, Binder, Boeckmann+	(ARGUS Collab.)
ALBRECHT	87J	PL B197 452	+Andam, Binder, Boeckmann+	(ARGUS Collab.)
AVERY	87	PL B183 429	+Besson, Bowcock, Giles+	(CLEO Collab.)
BEAN	87B	PRL 58 183	+Bobbink, Brock, Engler+	(CLEO Collab.)
BEBEK	87	PR D36 1289	+Berkelman, Blucher, Cassel+	(CLEO Collab.)
ALAM	86	PR D34 3279	+Katayama, Kim, Sun+	(CLEO Collab.)
ALBRECHT	86F	PL B182 95	+Binder, Boeckmann, Glaser+	(ARGUS Collab.)
PDG	86	PL 170B	Aguilar-Benitez, Porter+	(CERN, CIT+)
CHEN	85	PR D31 2386	+Goldberg, Horwitz, Jawahery+	(CLEO Collab.)
HAAS	85	PRL 55 1248	+Hempstead, Jensen, Kagan+	(CLEO Collab.)
AVERY	84	PRL 53 1309	+Bebek, Berkelman, Cassel+	(CLEO Collab.)
GILES	84	PR D30 2279	+Hassard, Hempstead, Kinoshita+	(CLEO Collab.)
BEHRENDS	83	PRL 50 881	+Chadwick, Chauveau, Ganci+	(CLEO Collab.)

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EPS Conference – Uppsala, Proc., Vol. 2, p. 791				

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