

B^0 – THIS IS PART 1 OF 3

To reduce the size of this section's PostScript file, we have divided it into three PostScript files. We present the following index:

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

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

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

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

B^0 MASS

The fit uses m_{B^+} , $(m_{B^0} - m_{B^+})$, $m_{B_s^0}$, and $(m_{B_s^0} - (m_{B^+} + m_{B^0})/2)$ to determine m_{B^+} , m_{B^0} , $m_{B_s^0}$, and the mass differences. m_{B^0} data are excluded from the fit because they are not independent.

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
5279.2±1.8				OUR FIT
5279.8±1.6				OUR AVERAGE
5281.3±2.2 ±1.4	51	1 ABE	96B CDF	$p\bar{p}$ at 1.8 TeV
5279.2±0.54±2.0	340	2 ALAM	94 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
5278.0±0.4 ±2.0		2 BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
5279.6±0.7 ±2.0	40	2,3 ALBRECHT	90J ARG	$e^+e^- \rightarrow \Upsilon(4S)$
5280.6±0.8 ±2.0		2 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	4 ALBRECHT	87D ARG	$e^+e^- \rightarrow \Upsilon(4S)$

¹Excluded from fit because it is not independent of ABE 96B B_s^0 mass and B_s^0-B mass difference.

²These 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. These experiments actually measure the difference between half of E_{cm} and the B mass.

³ALBRECHT 90J assumes 10580 for $\Upsilon(4S)$ mass. Supersedes ALBRECHT 87C and ALBRECHT 87D.

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

$$m_{B^0} - m_{B^\pm}$$

The mass difference measurements are not independent of the B^\pm and B^0 mass measurement by the same experimenters. The fit uses m_{B^\pm} , $(m_{B^0} - m_{B^\pm})$, $m_{B_s^0}$, and $(m_{B_s^0} - (m_{B^\pm} + m_{B^0})/2)$ to determine m_{B^\pm} , m_{B^0} , $m_{B_s^0}$, and the mass differences.

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
0.35 ± 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	BORTOLETTO92	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	⁵ BEBEK	87 CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
⁵ 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.			

$$m_{B_H^0} - m_{B_L^0}$$

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

B^0 MEAN LIFE

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

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

VALUE (10^{-12} s)	EVTS	DOCUMENT ID	TECN	COMMENT
1.56 ± 0.04 OUR EVALUATION				
1.58 ± 0.09 ± 0.02		⁶ ABE	98B CDF	$p\bar{p}$ at 1.8 TeV
1.64 ± 0.08 ± 0.08		⁷ ABE	97J SLD	$e^+e^- \rightarrow Z$
1.532 ± 0.041 ± 0.040		⁸ ABREU	97F DLPH	$e^+e^- \rightarrow Z$
1.54 ± 0.08 ± 0.06		⁹ ABE	96C CDF	$p\bar{p}$ at 1.8 TeV
1.61 ± 0.07 ± 0.04		⁹ BUSKULIC	96J ALEP	$e^+e^- \rightarrow Z$
1.25 ^{+0.15} / _{-0.13} ± 0.05	121	⁶ BUSKULIC	96J ALEP	$e^+e^- \rightarrow Z$
1.49 ^{+0.17} / _{-0.15} ± 0.08		¹⁰ BUSKULIC	96J ALEP	$e^+e^- \rightarrow Z$
1.61 ^{+0.14} / _{-0.13} ± 0.08		^{9,11} ABREU	95Q DLPH	$e^+e^- \rightarrow Z$
1.63 ± 0.14 ± 0.13		¹² ADAM	95 DLPH	$e^+e^- \rightarrow Z$
1.53 ± 0.12 ± 0.08		^{9,13} AKERS	95T OPAL	$e^+e^- \rightarrow Z$

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

1.55 ± 0.06 ± 0.03		14	BUSKULIC	96J	ALEP	$e^+e^- \rightarrow Z$
1.62 ± 0.12			15	ADAM	95	DLPH $e^+e^- \rightarrow Z$
1.57 ± 0.18 ± 0.08	121		6	ABE	94D	CDF Repl. by ABE 98B
1.17 $\begin{smallmatrix} +0.29 \\ -0.23 \end{smallmatrix}$ ± 0.16		96	9	ABREU	93D	DLPH Sup. by ABREU 95Q
1.55 ± 0.25 ± 0.18		76	12	ABREU	93G	DLPH Sup. by ADAM 95
1.51 $\begin{smallmatrix} +0.24 \\ -0.23 \end{smallmatrix}$ $\begin{smallmatrix} +0.12 \\ -0.14 \end{smallmatrix}$		78	9	ACTON	93C	OPAL Sup. by AKERS 95T
1.52 $\begin{smallmatrix} +0.20 \\ -0.18 \end{smallmatrix}$ $\begin{smallmatrix} +0.07 \\ -0.13 \end{smallmatrix}$		77	9	BUSKULIC	93D	ALEP Sup. by BUSKULIC 96J
1.20 $\begin{smallmatrix} +0.52 \\ -0.36 \end{smallmatrix}$ $\begin{smallmatrix} +0.16 \\ -0.14 \end{smallmatrix}$		15	16	WAGNER	90	MRK2 $E_{cm}^{ee} = 29$ GeV
0.82 $\begin{smallmatrix} +0.57 \\ -0.37 \end{smallmatrix}$ ± 0.27			17	AVERILL	89	HRS $E_{cm}^{ee} = 29$ GeV

⁶ Measured mean life using fully reconstructed decays.

⁷ Data analyzed using charge of secondary vertex.

⁸ Data analyzed using inclusive $D/D^* \ell X$.

⁹ Data analyzed using $D/D^* \ell X$ event vertices.

¹⁰ Measured mean life using partially reconstructed $D^{*-} \pi^+ X$ vertices.

¹¹ ABREU 95Q assumes $B(B^0 \rightarrow D^{*-} \ell^+ \nu_\ell) = 3.2 \pm 1.7\%$.

¹² Data analyzed using vertex-charge technique to tag B charge.

¹³ AKERS 95T assumes $B(B^0 \rightarrow D_s^{(*)} D^0)^{(*)} = 5.0 \pm 0.9\%$ to find B^+/B^0 yield.

¹⁴ Combined result of $D/D^* \ell X$ analysis, fully reconstructed B analysis, and partially reconstructed $D^{*-} \pi^+ X$ analysis.

¹⁵ Combined ABREU 95Q and ADAM 95 result.

¹⁶ 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 $\pi^- \bar{D}^0$.

¹⁷ 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)

<u>VALUE</u>	<u>DOCUMENT ID</u>
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1.02 ± 0.04 OUR AVERAGE Includes data from the 2 datablocks that follow this one.

τ_{B^+}/τ_{B^0} (direct measurements)

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

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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The data in this block is included in the average printed for a previous datablock.

1.04 ± 0.04 OUR EVALUATION

1.06 ± 0.07 ± 0.02	18	ABE	98B	CDF	$p\bar{p}$ at 1.8 TeV
1.01 ± 0.07 ± 0.06	19	ABE	97J	SLD	$e^+e^- \rightarrow Z$
1.01 ± 0.11 ± 0.02	20	ABE	96C	CDF	$p\bar{p}$ at 1.8 TeV
0.98 ± 0.08 ± 0.03	20	BUSKULIC	96J	ALEP	$e^+e^- \rightarrow Z$

$1.27^{+0.23+0.03}_{-0.19-0.02}$		18	BUSKULIC	96J	ALEP	$e^+e^- \rightarrow Z$
$1.00^{+0.17}_{-0.15} \pm 0.10$		20,21	ABREU	95Q	DLPH	$e^+e^- \rightarrow Z$
$1.06^{+0.13}_{-0.10} \pm 0.10$		22	ADAM	95	DLPH	$e^+e^- \rightarrow Z$
$0.99 \pm 0.14^{+0.05}_{-0.04}$		20,23	AKERS	95T	OPAL	$e^+e^- \rightarrow Z$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●						
$1.03 \pm 0.08 \pm 0.02$		24	BUSKULIC	96J	ALEP	$e^+e^- \rightarrow Z$
$1.02 \pm 0.16 \pm 0.05$	269	18	ABE	94D	CDF	Repl. by ABE 98B
$1.11^{+0.51}_{-0.39} \pm 0.11$	188	20	ABREU	93D	DLPH	Sup. by ABREU 95Q
$1.01^{+0.29}_{-0.22} \pm 0.12$	253	22	ABREU	93G	DLPH	Sup. by ADAM 95
$1.0^{+0.33}_{-0.25} \pm 0.08$	130		ACTON	93C	OPAL	Sup. by AKERS 95T
$0.96^{+0.19+0.18}_{-0.15-0.12}$	154	20	BUSKULIC	93D	ALEP	Sup. by BUSKULIC 96J

¹⁸ Measured using fully reconstructed decays.

¹⁹ Data analyzed using charge of secondary vertex.

²⁰ Data analyzed using $D/D^* \ell X$ vertices.

²¹ ABREU 95Q assumes $B(B^0 \rightarrow D^{*-} \ell^+ \nu_\ell) = 3.2 \pm 1.7\%$.

²² Data analyzed using vertex-charge technique to tag B charge.

²³ AKERS 95T assumes $B(B^0 \rightarrow D_s^{(*)} D^0)^{(*)} = 5.0 \pm 0.9\%$ to find B^+/B^0 yield.

²⁴ Combined result of $D/D^* \ell X$ analysis and fully reconstructed B analysis.

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^+ . We do not use measurements which assume equal production of B^0 and B^+ because of the large uncertainty in the production ratio.

<u>VALUE</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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The data in this block is included in the average printed for a previous datablock.

$0.95^{+0.117}_{-0.080} \pm 0.091$		25	ARTUSO	97	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
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● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●

$1.15 \pm 0.17 \pm 0.06$		26	JESSOP	97	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$	
$0.93 \pm 0.18 \pm 0.12$		27	ATHANAS	94	CLE2	Sup. by AR-TUSO 97	
$0.91 \pm 0.27 \pm 0.21$		28	ALBRECHT	92C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$	
1.0 ± 0.4		29	28,29	ALBRECHT	92G	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
$0.89 \pm 0.19 \pm 0.13$		28	FULTON	91	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$	
$1.00 \pm 0.23 \pm 0.14$		28	ALBRECHT	89L	ARG	$e^+e^- \rightarrow \Upsilon(4S)$	
0.49 to 2.3	90	30	BEAN	87B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$	

²⁵ ARTUSO 97 uses partial reconstruction of $B \rightarrow D^* \ell \nu_\ell$ and independent of B^0 and B^+ production fraction.

²⁶ Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

²⁷ ATHANAS 94 uses events tagged by fully reconstructed B^- decays and partially or fully reconstructed B^0 decays.

²⁸ Assumes equal production of B^0 and B^+ .

²⁹ ALBRECHT 92G data analyzed using $B \rightarrow D_s \bar{D}, D_s \bar{D}^*, D_s^* \bar{D}, D_s^* \bar{D}^*$ events.

³⁰ BEAN 87B assume the fraction of $B^0 \bar{B}^0$ events at the $\Upsilon(4S)$ is 0.41.

B^0 DECAY MODES

\bar{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% $B^0 \bar{B}^0$ 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
Γ_1 $\ell^+ \nu_\ell$ anything	[a] (10.5 \pm 0.8) %	
Γ_2 $D^- \ell^+ \nu_\ell$	[a] (2.00 \pm 0.25) %	
Γ_3 $D^*(2010)^- \ell^+ \nu_\ell$	[a] (4.60 \pm 0.27) %	
Γ_4 $\rho^- \ell^+ \nu_\ell$	[a] (2.5 $\begin{smallmatrix} + \\ - \end{smallmatrix}$ $\begin{smallmatrix} 0.8 \\ 1.0 \end{smallmatrix}$) $\times 10^{-4}$	
Γ_5 $\pi^- \ell^+ \nu_\ell$	(1.8 \pm 0.6) $\times 10^{-4}$	
Inclusive modes		
Γ_6 $\pi^- \mu^+ \nu_\mu$		
Γ_7 K^+ anything	(78 \pm 80) %	
D, D^*, or D_s modes		
Γ_8 $D^- \pi^+$	(3.0 \pm 0.4) $\times 10^{-3}$	
Γ_9 $D^- \rho^+$	(7.9 \pm 1.4) $\times 10^{-3}$	
Γ_{10} $\bar{D}^0 \pi^+ \pi^-$	< 1.6 $\times 10^{-3}$	CL=90%
Γ_{11} $D^*(2010)^- \pi^+$	(2.76 \pm 0.21) $\times 10^{-3}$	
Γ_{12} $D^- \pi^+ \pi^+ \pi^-$	(8.0 \pm 2.5) $\times 10^{-3}$	
Γ_{13} ($D^- \pi^+ \pi^+ \pi^-$) nonresonant	(3.9 \pm 1.9) $\times 10^{-3}$	
Γ_{14} $D^- \pi^+ \rho^0$	(1.1 \pm 1.0) $\times 10^{-3}$	
Γ_{15} $D^- a_1(1260)^+$	(6.0 \pm 3.3) $\times 10^{-3}$	
Γ_{16} $D^*(2010)^- \pi^+ \pi^0$	(1.5 \pm 0.5) %	
Γ_{17} $D^*(2010)^- \rho^+$	(6.7 \pm 3.3) $\times 10^{-3}$	
Γ_{18} $D^*(2010)^- \pi^+ \pi^+ \pi^-$	(7.6 \pm 1.7) $\times 10^{-3}$	S=1.3
Γ_{19} ($D^*(2010)^- \pi^+ \pi^+ \pi^-$) non-resonant	(0.0 \pm 2.5) $\times 10^{-3}$	
Γ_{20} $D^*(2010)^- \pi^+ \rho^0$	(5.7 \pm 3.1) $\times 10^{-3}$	

Γ_{21}	$D^*(2010)^- a_1(1260)^+$	$(1.30 \pm 0.27) \%$	
Γ_{22}	$D^*(2010)^- \pi^+ \pi^+ \pi^- \pi^0$	$(3.4 \pm 1.8) \%$	
Γ_{23}	$\bar{D}_2^*(2460)^- \pi^+$	$< 2.2 \times 10^{-3}$	CL=90%
Γ_{24}	$\bar{D}_2^*(2460)^- \rho^+$	$< 4.9 \times 10^{-3}$	CL=90%
Γ_{25}	$D^- D_s^+$	$(8.0 \pm 3.0) \times 10^{-3}$	
Γ_{26}	$D^*(2010)^- D_s^+$	$(9.6 \pm 3.4) \times 10^{-3}$	
Γ_{27}	$D^- D_s^{*+}$	$(1.0 \pm 0.5) \%$	
Γ_{28}	$D^*(2010)^- D_s^{*+}$	$(2.0 \pm 0.7) \%$	
Γ_{29}	$D_s^+ \pi^-$	$< 2.8 \times 10^{-4}$	CL=90%
Γ_{30}	$D_s^{*+} \pi^-$	$< 5 \times 10^{-4}$	CL=90%
Γ_{31}	$D_s^+ \rho^-$	$< 7 \times 10^{-4}$	CL=90%
Γ_{32}	$D_s^{*+} \rho^-$	$< 8 \times 10^{-4}$	CL=90%
Γ_{33}	$D_s^+ a_1(1260)^-$	$< 2.6 \times 10^{-3}$	CL=90%
Γ_{34}	$D_s^{*+} a_1(1260)^-$	$< 2.2 \times 10^{-3}$	CL=90%
Γ_{35}	$D_s^- K^+$	$< 2.4 \times 10^{-4}$	CL=90%
Γ_{36}	$D_s^{*-} K^+$	$< 1.7 \times 10^{-4}$	CL=90%
Γ_{37}	$D_s^- K^*(892)^+$	$< 9.9 \times 10^{-4}$	CL=90%
Γ_{38}	$D_s^{*-} K^*(892)^+$	$< 1.1 \times 10^{-3}$	CL=90%
Γ_{39}	$D_s^- \pi^+ K^0$	$< 5 \times 10^{-3}$	CL=90%
Γ_{40}	$D_s^{*-} \pi^+ K^0$	$< 3.1 \times 10^{-3}$	CL=90%
Γ_{41}	$D_s^- \pi^+ K^*(892)^0$	$< 4 \times 10^{-3}$	CL=90%
Γ_{42}	$D_s^{*-} \pi^+ K^*(892)^0$	$< 2.0 \times 10^{-3}$	CL=90%
Γ_{43}	$\bar{D}^0 \pi^0$	$< 1.2 \times 10^{-4}$	CL=90%
Γ_{44}	$\bar{D}^0 \rho^0$	$< 3.9 \times 10^{-4}$	CL=90%
Γ_{45}	$\bar{D}^0 \eta$	$< 1.3 \times 10^{-4}$	CL=90%
Γ_{46}	$\bar{D}^0 \eta'$	$< 9.4 \times 10^{-4}$	CL=90%
Γ_{47}	$\bar{D}^0 \omega$	$< 5.1 \times 10^{-4}$	CL=90%
Γ_{48}	$\bar{D}^*(2007)^0 \pi^0$	$< 4.4 \times 10^{-4}$	CL=90%
Γ_{49}	$\bar{D}^*(2007)^0 \rho^0$	$< 5.6 \times 10^{-4}$	CL=90%
Γ_{50}	$\bar{D}^*(2007)^0 \eta$	$< 2.6 \times 10^{-4}$	CL=90%
Γ_{51}	$\bar{D}^*(2007)^0 \eta'$	$< 1.4 \times 10^{-3}$	CL=90%
Γ_{52}	$\bar{D}^*(2007)^0 \omega$	$< 7.4 \times 10^{-4}$	CL=90%
Γ_{53}	$D^*(2010)^+ D^*(2010)^-$	$< 2.2 \times 10^{-3}$	CL=90%
Γ_{54}	$D^*(2010)^+ D^-$	$< 1.8 \times 10^{-3}$	CL=90%
Γ_{55}	$D^+ D^*(2010)^-$	$< 1.2 \times 10^{-3}$	CL=90%

Charmonium modes

Γ_{56}	$J/\psi(1S) K^0$	$(8.9 \pm 1.2) \times 10^{-4}$	
Γ_{57}	$J/\psi(1S) K^+ \pi^-$	$(1.1 \pm 0.6) \times 10^{-3}$	
Γ_{58}	$J/\psi(1S) K^*(892)^0$	$(1.35 \pm 0.18) \times 10^{-3}$	
Γ_{59}	$J/\psi(1S) \pi^0$	$< 5.8 \times 10^{-5}$	CL=90%
Γ_{60}	$J/\psi(1S) \eta$	$< 1.2 \times 10^{-3}$	CL=90%

Γ_{61}	$J/\psi(1S)\rho^0$	< 2.5	$\times 10^{-4}$	CL=90%
Γ_{62}	$J/\psi(1S)\omega$	< 2.7	$\times 10^{-4}$	CL=90%
Γ_{63}	$\psi(2S)K^0$	< 8	$\times 10^{-4}$	CL=90%
Γ_{64}	$\psi(2S)K^+\pi^-$	< 1	$\times 10^{-3}$	CL=90%
Γ_{65}	$\psi(2S)K^*(892)^0$	(1.4 ± 0.9)	$\times 10^{-3}$	
Γ_{66}	$\chi_{c1}(1P)K^0$	< 2.7	$\times 10^{-3}$	CL=90%
Γ_{67}	$\chi_{c1}(1P)K^*(892)^0$	< 2.1	$\times 10^{-3}$	CL=90%

K or K* modes

Γ_{68}	$K^+\pi^-$	$(1.5 \pm_{-0.4}^{+0.5})$	$\times 10^{-5}$	
Γ_{69}	$K^0\pi^0$	< 4.1	$\times 10^{-5}$	CL=90%
Γ_{70}	$\eta'K^0$	$(4.7 \pm_{-2.2}^{+2.8})$	$\times 10^{-5}$	
Γ_{71}	$\eta'K^*(892)^0$	< 3.9	$\times 10^{-5}$	CL=90%
Γ_{72}	$\eta K^*(892)^0$	< 3.0	$\times 10^{-5}$	CL=90%
Γ_{73}	ηK^0	< 3.3	$\times 10^{-5}$	CL=90%
Γ_{74}	K^+K^-	< 4.3	$\times 10^{-6}$	CL=90%
Γ_{75}	$K^0\bar{K}^0$	< 1.7	$\times 10^{-5}$	CL=90%
Γ_{76}	$K^+\rho^-$	< 3.5	$\times 10^{-5}$	CL=90%
Γ_{77}	$K^0\pi^+\pi^-$			
Γ_{78}	$K^0\rho^0$	< 3.9	$\times 10^{-5}$	CL=90%
Γ_{79}	$K^0f_0(980)$	< 3.6	$\times 10^{-4}$	CL=90%
Γ_{80}	$K^*(892)^+\pi^-$	< 7.2	$\times 10^{-5}$	CL=90%
Γ_{81}	$K^*(892)^0\pi^0$	< 2.8	$\times 10^{-5}$	CL=90%
Γ_{82}	$K_2^*(1430)^+\pi^-$	< 2.6	$\times 10^{-3}$	CL=90%
Γ_{83}	$K^0K^+K^-$	< 1.3	$\times 10^{-3}$	CL=90%
Γ_{84}	$K^0\phi$	< 8.8	$\times 10^{-5}$	CL=90%
Γ_{85}	$K^-\pi^+\pi^+\pi^-$	[b] < 2.3	$\times 10^{-4}$	CL=90%
Γ_{86}	$K^*(892)^0\pi^+\pi^-$	< 1.4	$\times 10^{-3}$	CL=90%
Γ_{87}	$K^*(892)^0\rho^0$	< 4.6	$\times 10^{-4}$	CL=90%
Γ_{88}	$K^*(892)^0f_0(980)$	< 1.7	$\times 10^{-4}$	CL=90%
Γ_{89}	$K_1(1400)^+\pi^-$	< 1.1	$\times 10^{-3}$	CL=90%
Γ_{90}	$K^-a_1(1260)^+$	[b] < 2.3	$\times 10^{-4}$	CL=90%
Γ_{91}	$K^*(892)^0K^+K^-$	< 6.1	$\times 10^{-4}$	CL=90%
Γ_{92}	$K^*(892)^0\phi$	< 4.3	$\times 10^{-5}$	CL=90%
Γ_{93}	$K_1(1400)^0\rho^0$	< 3.0	$\times 10^{-3}$	CL=90%
Γ_{94}	$K_1(1400)^0\phi$	< 5.0	$\times 10^{-3}$	CL=90%
Γ_{95}	$K_2^*(1430)^0\rho^0$	< 1.1	$\times 10^{-3}$	CL=90%
Γ_{96}	$K_2^*(1430)^0\phi$	< 1.4	$\times 10^{-3}$	CL=90%
Γ_{97}	$K^*(892)^0\gamma$	(4.0 ± 1.9)	$\times 10^{-5}$	
Γ_{98}	$K_1(1270)^0\gamma$	< 7.0	$\times 10^{-3}$	CL=90%

Γ_{99}	$K_1(1400)^0 \gamma$	< 4.3	$\times 10^{-3}$	CL=90%
Γ_{100}	$K_2^*(1430)^0 \gamma$	< 4.0	$\times 10^{-4}$	CL=90%
Γ_{101}	$K^*(1680)^0 \gamma$	< 2.0	$\times 10^{-3}$	CL=90%
Γ_{102}	$K_3^*(1780)^0 \gamma$	< 1.0	%	CL=90%
Γ_{103}	$K_4^*(2045)^0 \gamma$	< 4.3	$\times 10^{-3}$	CL=90%
Γ_{104}	$\phi \phi$	< 3.9	$\times 10^{-5}$	CL=90%

Light unflavored meson modes

Γ_{105}	$\pi^+ \pi^-$	< 1.5	$\times 10^{-5}$	CL=90%
Γ_{106}	$\pi^0 \pi^0$	< 9.3	$\times 10^{-6}$	CL=90%
Γ_{107}	$\eta \pi^0$	< 8	$\times 10^{-6}$	CL=90%
Γ_{108}	$\eta \eta$	< 1.8	$\times 10^{-5}$	CL=90%
Γ_{109}	$\eta' \pi^0$	< 1.1	$\times 10^{-5}$	CL=90%
Γ_{110}	$\eta' \eta'$	< 4.7	$\times 10^{-5}$	CL=90%
Γ_{111}	$\eta' \eta$	< 2.7	$\times 10^{-5}$	CL=90%
Γ_{112}	$\eta' \rho^0$	< 2.3	$\times 10^{-5}$	CL=90%
Γ_{113}	$\eta \rho^0$	< 1.3	$\times 10^{-5}$	CL=90%
Γ_{114}	$\pi^+ \pi^- \pi^0$	< 7.2	$\times 10^{-4}$	CL=90%
Γ_{115}	$\rho^0 \pi^0$	< 2.4	$\times 10^{-5}$	CL=90%
Γ_{116}	$\rho^\mp \pi^\pm$	[c] < 8.8	$\times 10^{-5}$	CL=90%
Γ_{117}	$\pi^+ \pi^- \pi^+ \pi^-$	< 2.3	$\times 10^{-4}$	CL=90%
Γ_{118}	$\rho^0 \rho^0$	< 2.8	$\times 10^{-4}$	CL=90%
Γ_{119}	$a_1(1260)^\mp \pi^\pm$	[c] < 4.9	$\times 10^{-4}$	CL=90%
Γ_{120}	$a_2(1320)^\mp \pi^\pm$	[c] < 3.0	$\times 10^{-4}$	CL=90%
Γ_{121}	$\pi^+ \pi^- \pi^0 \pi^0$	< 3.1	$\times 10^{-3}$	CL=90%
Γ_{122}	$\rho^+ \rho^-$	< 2.2	$\times 10^{-3}$	CL=90%
Γ_{123}	$a_1(1260)^0 \pi^0$	< 1.1	$\times 10^{-3}$	CL=90%
Γ_{124}	$\omega \pi^0$	< 4.6	$\times 10^{-4}$	CL=90%
Γ_{125}	$\pi^+ \pi^+ \pi^- \pi^- \pi^0$	< 9.0	$\times 10^{-3}$	CL=90%
Γ_{126}	$a_1(1260)^+ \rho^-$	< 3.4	$\times 10^{-3}$	CL=90%
Γ_{127}	$a_1(1260)^0 \rho^0$	< 2.4	$\times 10^{-3}$	CL=90%
Γ_{128}	$\pi^+ \pi^+ \pi^+ \pi^- \pi^- \pi^-$	< 3.0	$\times 10^{-3}$	CL=90%
Γ_{129}	$a_1(1260)^+ a_1(1260)^-$	< 2.8	$\times 10^{-3}$	CL=90%
Γ_{130}	$\pi^+ \pi^+ \pi^+ \pi^- \pi^- \pi^- \pi^0$	< 1.1	%	CL=90%

Baryon modes

Γ_{131}	$\rho \bar{p}$	< 1.8	$\times 10^{-5}$	CL=90%
Γ_{132}	$\rho \bar{p} \pi^+ \pi^-$	< 2.5	$\times 10^{-4}$	CL=90%
Γ_{133}	$\rho \bar{\Lambda} \pi^-$	< 1.8	$\times 10^{-4}$	CL=90%
Γ_{134}	$\Delta^0 \bar{\Delta}^0$	< 1.5	$\times 10^{-3}$	CL=90%
Γ_{135}	$\Delta^{++} \Delta^{--}$	< 1.1	$\times 10^{-4}$	CL=90%

Γ_{136}	$\bar{\Sigma}_c^{--} \Delta^{++}$		< 1.0	$\times 10^{-3}$	CL=90%
Γ_{137}	$\Lambda_c^- p \pi^+ \pi^-$		(1.3 ± 0.6)	$\times 10^{-3}$	
Γ_{138}	$\Lambda_c^- p$		< 2.1	$\times 10^{-4}$	CL=90%
Γ_{139}	$\Lambda_c^- p \pi^0$		< 5.9	$\times 10^{-4}$	CL=90%
Γ_{140}	$\Lambda_c^- p \pi^+ \pi^- \pi^0$		< 5.07	$\times 10^{-3}$	CL=90%
Γ_{141}	$\Lambda_c^- p \pi^+ \pi^- \pi^+ \pi^-$		< 2.74	$\times 10^{-3}$	CL=90%

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

Γ_{142}	$\gamma\gamma$	BI	< 3.9	$\times 10^{-5}$	CL=90%
Γ_{143}	$e^+ e^-$	BI	< 5.9	$\times 10^{-6}$	CL=90%
Γ_{144}	$\mu^+ \mu^-$	BI	< 6.8	$\times 10^{-7}$	CL=90%
Γ_{145}	$K^0 e^+ e^-$	BI	< 3.0	$\times 10^{-4}$	CL=90%
Γ_{146}	$K^0 \mu^+ \mu^-$	BI	< 3.6	$\times 10^{-4}$	CL=90%
Γ_{147}	$K^*(892)^0 e^+ e^-$	BI	< 2.9	$\times 10^{-4}$	CL=90%
Γ_{148}	$K^*(892)^0 \mu^+ \mu^-$	BI	< 2.3	$\times 10^{-5}$	CL=90%
Γ_{149}	$K^*(892)^0 \nu \bar{\nu}$	BI	< 1.0	$\times 10^{-3}$	CL=90%
Γ_{150}	$e^\pm \mu^\mp$	LF [c]	< 5.9	$\times 10^{-6}$	CL=90%
Γ_{151}	$e^\pm \tau^\mp$	LF [c]	< 5.3	$\times 10^{-4}$	CL=90%
Γ_{152}	$\mu^\pm \tau^\mp$	LF [c]	< 8.3	$\times 10^{-4}$	CL=90%

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

[b] B^0 and B_s^0 contributions not separated. Limit is on weighted average of the two decay rates.

[c] The value is for the sum of the charge states of particle/antiparticle 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
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
0.105 ± 0.008 OUR AVERAGE					
0.1078 ± 0.0060 ± 0.0069	³¹ ARTUSO	97 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$		
0.093 ± 0.011 ± 0.015	ALBRECHT	94 ARG	$e^+ e^- \rightarrow \Upsilon(4S)$		
0.099 ± 0.030 ± 0.009	HENDERSON	92 CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$		
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
0.109 ± 0.007 ± 0.011	ATHANAS	94 CLE2	Sup. by ARTUSO 97		
³¹ ARTUSO 97 uses partial reconstruction of $B \rightarrow D^* \ell \nu_\ell$ and inclusive semileptonic branching ratio from BARISH 96B (0.1049 ± 0.0017 ± 0.0043).					

$\Gamma(D^- \ell^+ \nu_\ell) / \Gamma_{\text{total}}$
 ℓ denotes e or μ , not the sum.

 Γ_2/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.0200 ± 0.0025 OUR AVERAGE			
0.0187 ± 0.0015 ± 0.0032	32 ATHANAS	97 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
0.0235 ± 0.0020 ± 0.0044	33 BUSKULIC	97 ALEP	$e^+ e^- \rightarrow Z$
0.018 ± 0.006 ± 0.003	34 FULTON	91 CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$
0.020 ± 0.007 ± 0.006	35 ALBRECHT	89J ARG	$e^+ e^- \rightarrow \Upsilon(4S)$

³² ATHANAS 97 uses missing energy and missing momentum to reconstruct neutrino.

³³ BUSKULIC 97 assumes fraction (B^+) = fraction (B^0) = (37.8 ± 2.2)% and PDG 96 values for B lifetime and branching ratio of D^* and D decays.

³⁴ FULTON 91 assumes assuming equal production of B^0 and B^+ at the $\Upsilon(4S)$ and uses Mark III D and D^* branching ratios.

³⁵ ALBRECHT 89J reports 0.018 ± 0.006 ± 0.005. We rescale using the method described in STONE 94 but with the updated PDG 94 $B(D^0 \rightarrow K^- \pi^+)$.

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.0460 ± 0.0027 OUR AVERAGE				
0.0508 ± 0.0021 ± 0.0066		36 ACKERSTAFF	97G OPAL	$e^+ e^- \rightarrow Z$
0.0553 ± 0.0026 ± 0.0052		37 BUSKULIC	97 ALEP	$e^+ e^- \rightarrow Z$
0.0552 ± 0.0017 ± 0.0068		38 ABREU	96P DLPH	$e^+ e^- \rightarrow Z$
0.0449 ± 0.0032 ± 0.0039	376	39 BARISH	95 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
0.045 ± 0.003 ± 0.004		40 ALBRECHT	94 ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
0.047 ± 0.005 ± 0.005	235	41 ALBRECHT	93 ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
0.040 ± 0.004 ± 0.006		42 BORTOLETTO	89B CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$

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

0.0518 ± 0.0030 ± 0.0062	410	43 BUSKULIC	95N ALEP	Sup. by BUSKULIC 97
seen	398	44 SANGHERA	93 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
0.070 ± 0.018 ± 0.014		45 ANTREASYAN	90B CBAL	$e^+ e^- \rightarrow \Upsilon(4S)$
		46 ALBRECHT	89C ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
0.060 ± 0.010 ± 0.014		47 ALBRECHT	89J ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
0.070 ± 0.012 ± 0.019	47	48 ALBRECHT	87J ARG	$e^+ e^- \rightarrow \Upsilon(4S)$

³⁶ ACKERSTAFF 97G assumes fraction (B^+) = fraction (B^0) = (37.8 ± 2.2)% and PDG 96 values for B lifetime and branching ratio of D^* and D decays.

³⁷ BUSKULIC 97 assumes fraction (B^+) = fraction (B^0) = (37.8 ± 2.2)% and PDG 96 values for B lifetime and D^* and D branching fractions.

³⁸ ABREU 96P result is the average of two methods using exclusive and partial D^* reconstruction.

³⁹ BARISH 95 use $B(D^0 \rightarrow K^- \pi^+) = (3.91 \pm 0.08 \pm 0.17)\%$ and $B(D^{*+} \rightarrow D^0 \pi^+) = (68.1 \pm 1.0 \pm 1.3)\%$.

⁴⁰ 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.

⁴¹ ALBRECHT 93 reports 0.052 ± 0.005 ± 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.

- ⁴²We 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 $\alpha = 0.65 \pm 0.66 \pm 0.25$.
- ⁴³BUSKULIC 95N assumes fraction (B^+) = fraction (B^0) = $38.2 \pm 1.3 \pm 2.2\%$ and $\tau_{B^0} = 1.58 \pm 0.06$ ps. $\Gamma(D^{*-} \ell^+ \nu_\ell)/\text{total} = [5.18 - 0.13(\text{fraction}(B^0) - 38.2) - 1.5(\tau_{B^0} - 1.58)]\%$.
- ⁴⁴Combining $\overline{D}^{*0} \ell^+ \nu_\ell$ 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.
- ⁴⁵ANTREASYAN 90B is average over B and \overline{D}^* (2010) charge states.
- ⁴⁶The measurement of ALBRECHT 89C suggests a D^* polarization γ_L/γ_T of 0.85 ± 0.45 , or $\alpha = 0.7 \pm 0.9$.
- ⁴⁷ALBRECHT 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.
- ⁴⁸ALBRECHT 87J assume $\mu-e$ 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 $B(D^*(2010)^- \rightarrow D^0 \pi^-) = 0.49 \pm 0.08$. Superseded by ALBRECHT 89J.

$\Gamma(\rho^- \ell^+ \nu_\ell)/\Gamma_{\text{total}}$ Γ_4/Γ
 $\ell = e$ or μ , not sum over e and μ modes.

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
$2.5 \pm 0.4^{+0.7}_{-0.9}$		49 ALEXANDER 96T	CLE2	$e + e^- \rightarrow \Upsilon(4S)$

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

<4.1 90 ⁵⁰BEAN 93B CLE2 $e^+ e^- \rightarrow \Upsilon(4S)$

- ⁴⁹ALEXANDER 96T gives systematic errors $^{+0.5}_{-0.7} \pm 0.5$ where the second error reflects the estimated model dependence. We combine these in quadrature. Assumes isospin symmetry: $\Gamma(B^0 \rightarrow \rho^- \ell^+ \nu_\ell) = 2 \times \Gamma(B^+ \rightarrow \rho^0 \ell^+ \nu_\ell) \sim 2 \times \Gamma(B^+ \rightarrow \omega \ell^+ \nu_\ell)$.
- ⁵⁰BEAN 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 $B^+ \rightarrow (\omega \text{ or } \rho^0) \ell^+ \nu_\ell$. The range corresponds to the ISGW, WSB, and KS models. An upper limit on $|V_{ub}/V_{cb}| < 0.08-0.13$ at 90% CL is derived as well.

$\Gamma(\pi^- \ell^+ \nu_\ell)/\Gamma_{\text{total}}$ Γ_5/Γ

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
$1.8 \pm 0.4 \pm 0.4$	⁵¹ ALEXANDER 96T	CLE2	$e + e^- \rightarrow \Upsilon(4S)$

- ⁵¹ALEXANDER 96T gives systematic errors $\pm 0.3 \pm 0.2$ where the second error reflects the estimated model dependence. We combine these in quadrature. Assumes isospin symmetry: $\Gamma(B^0 \rightarrow \pi^- \ell^+ \nu_\ell) = 2 \times \Gamma(B^+ \rightarrow \pi^0 \ell^+ \nu_\ell)$.

$\Gamma(\pi^- \mu^+ \nu_\mu)/\Gamma_{\text{total}}$ Γ_6/Γ

VALUE	DOCUMENT ID	TECN
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• • • We do not use the following data for averages, fits, limits, etc. • • •

seen ⁵²ALBRECHT 91C ARG

- ⁵²In ALBRECHT 91C, one event is fully reconstructed providing evidence for the $b \rightarrow u$ transition.

$\Gamma(K^+ \text{ anything})/\Gamma_{\text{total}}$ Γ_7/Γ

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.78 ± 0.8	53 ALBRECHT	96D ARG	$e^+e^- \rightarrow \Upsilon(4S)$

⁵³ Average multiplicity.

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

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.0030 ± 0.0004 OUR AVERAGE				
0.0029 ± 0.0004 ± 0.0002	81	54 ALAM	94 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
0.0027 ± 0.0006 ± 0.0005		55 BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
0.0048 ± 0.0011 ± 0.0011	22	56 ALBRECHT	90J ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.0051 +0.0028 +0.0013 -0.0025 -0.0012	4	57 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	56 ALBRECHT	88K ARG	$e^+e^- \rightarrow \Upsilon(4S)$
⁵⁴ ALAM 94 reports $[B(B^0 \rightarrow D^- \pi^+) \times B(D^+ \rightarrow K^- \pi^+ \pi^+)] = 0.000265 \pm 0.000032 \pm 0.000023$. We divide by our best value $B(D^+ \rightarrow K^- \pi^+ \pi^+) = (9.0 \pm 0.6) \times 10^{-2}$. 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 $\Upsilon(4S)$.				
⁵⁵ BORTOLETTO 92 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D .				
⁵⁶ ALBRECHT 88K assumes $B^0 \bar{B}^0 : B^+ B^-$ production ratio is 45:55. Superseded by ALBRECHT 90J which assumes 50:50.				
⁵⁷ 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_9/Γ

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.0079 ± 0.0014 OUR AVERAGE				
0.0078 ± 0.0013 ± 0.0005	79	58 ALAM	94 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
0.009 ± 0.005 ± 0.003	9	59 ALBRECHT	90J ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

0.022 ± 0.012 ± 0.009	6	59 ALBRECHT	88K ARG	$e^+e^- \rightarrow \Upsilon(4S)$
⁵⁸ ALAM 94 reports $[B(B^0 \rightarrow D^- \rho^+) \times B(D^+ \rightarrow K^- \pi^+ \pi^+)] = 0.000704 \pm 0.000096 \pm 0.000070$. We divide by our best value $B(D^+ \rightarrow K^- \pi^+ \pi^+) = (9.0 \pm 0.6) \times 10^{-2}$. 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 $\Upsilon(4S)$.				
⁵⁹ ALBRECHT 88K assumes $B^0 \bar{B}^0 : B^+ B^-$ production ratio is 45:55. Superseded by ALBRECHT 90J which assumes 50:50.				

 $\Gamma(\bar{D}^0 \pi^+ \pi^-)/\Gamma_{\text{total}}$ Γ_{10}/Γ

<u>VALUE</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<0.0016	90	60	ALAM	94 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

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

<0.007	90	61	BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
<0.034	90	62	BEBEK	87	CLEO $e^+e^- \rightarrow \Upsilon(4S)$
0.07 ± 0.05		5	63	BEHREND	83 CLEO $e^+e^- \rightarrow \Upsilon(4S)$

⁶⁰ Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

⁶¹ 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 $D_0^*(2340) \rightarrow D^0\pi$ is < 0.0001 at 90% CL and into $D_2^*(2460)$ followed by $D_2^*(2460) \rightarrow D^0\pi$ is < 0.0004 at 90% CL.

⁶² BEBEK 87 assume the $\Upsilon(4S)$ decays 43% to $B^0\bar{B}^0$. We rescale to 50%. $B(D^0 \rightarrow K^-\pi^+) = (4.2 \pm 0.4 \pm 0.4)\%$ and $B(D^0 \rightarrow K^-\pi^+\pi^+\pi^-) = (9.1 \pm 0.8 \pm 0.8)\%$ were used.

⁶³ Corrected by us using assumptions: $B(D^0 \rightarrow K^-\pi^+) = (0.042 \pm 0.006)$ and $B(\Upsilon(4S) \rightarrow B^0\bar{B}^0) = 50\%$. The product branching ratio is $B(B^0 \rightarrow \bar{D}^0\pi^+\pi^-)B(\bar{D}^0 \rightarrow K^+\pi^-) = (0.39 \pm 0.26) \times 10^{-2}$.

$\Gamma(D^*(2010)^-\pi^+)/\Gamma_{\text{total}} \qquad \qquad \qquad \Gamma_{11}/\Gamma$

VALUE	EVT	DOCUMENT ID	TECN	COMMENT
0.00276 ± 0.00021 OUR AVERAGE				
0.00281 ± 0.00024 ± 0.00005		64 BRANDENB...	98 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
0.0026 ± 0.0003 ± 0.0004	82	65 ALAM	94 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
0.0033 ± 0.0010 ± 0.0001		66 BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
0.00234 ± 0.00087 ± 0.00005	12	67 ALBRECHT	90J ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.00234 ^{+0.00148} / _{-0.00109} ± 0.00005	5	68 BEBEK	87 CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

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

0.010 ± 0.004 ± 0.001	8	69	AKERS	94J	OPAL $e^+e^- \rightarrow Z$
0.0027 ± 0.0014 ± 0.0010	5	70	ALBRECHT	87C	ARG $e^+e^- \rightarrow \Upsilon(4S)$
0.0035 ± 0.002 ± 0.002		71	ALBRECHT	86F	ARG $e^+e^- \rightarrow \Upsilon(4S)$
0.017 ± 0.005 ± 0.005	41	72	GILES	84	CLEO $e^+e^- \rightarrow \Upsilon(4S)$

⁶⁴ BRANDENBURG 98 assume equal production of B^+ and B^0 at $\Upsilon(4S)$ and use the D^* reconstruction technique. The first error is their experiment's error and the second error is the systematic error from the PDG 96 value of $B(D^* \rightarrow D\pi)$.

⁶⁵ 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 $B(D^0 \rightarrow K^-\pi^+\pi^+\pi^-)/B(D^0 \rightarrow K^-\pi^+)$.

⁶⁶ BORTOLETTO 92 reports $0.0040 \pm 0.0010 \pm 0.0007$ for $B(D^*(2010)^+ \rightarrow D^0\pi^+) = 0.57 \pm 0.06$. We rescale to our best value $B(D^*(2010)^+ \rightarrow D^0\pi^+) = (68.3 \pm 1.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D .

⁶⁷ 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 $B(D^*(2010)^+ \rightarrow D^0\pi^+) = (68.3 \pm 1.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D .

⁶⁸ 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 $B(D^*(2010)^+ \rightarrow D^0\pi^+) = (68.3 \pm 1.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error

from using our best value. Updated in BERKELMAN 91 to use same assumptions as noted for BORTOLETTO 92 and ALBRECHT 90J.

⁶⁹ Assumes $B(Z \rightarrow b\bar{b}) = 0.217$ and 38% B_d production fraction.

⁷⁰ ALBRECHT 87C use PDG 86 branching ratios for D and D^* (2010) and assume $B(\Upsilon(4S) \rightarrow B^+ B^-) = 55\%$ and $B(\Upsilon(4S) \rightarrow B^0 \bar{B}^0) = 45\%$. Superseded by ALBRECHT 90J.

⁷¹ ALBRECHT 86F uses pseudomass that is independent of D^0 and D^+ branching ratios.

⁷² Assumes $B(D^*(2010)^+ \rightarrow D^0 \pi^+) = 0.60^{+0.08}_{-0.15}$. Assumes $B(\Upsilon(4S) \rightarrow B^0 \bar{B}^0) = 0.40 \pm 0.02$ Does not depend on D branching ratios.

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

VALUE	DOCUMENT ID	TECN	COMMENT
0.0080 ± 0.0021 ± 0.0014	⁷³ BORTOLETTO92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$

⁷³ BORTOLETTO 92 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D .

$\Gamma((D^- \pi^+ \pi^+ \pi^-) \text{ nonresonant}) / \Gamma_{\text{total}}$ Γ_{13} / Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.0039 ± 0.0014 ± 0.0013	⁷⁴ BORTOLETTO92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$

⁷⁴ BORTOLETTO 92 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D .

$\Gamma(D^- \pi^+ \rho^0) / \Gamma_{\text{total}}$ Γ_{14} / Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.0011 ± 0.0009 ± 0.0004	⁷⁵ BORTOLETTO92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$

⁷⁵ BORTOLETTO 92 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D .

$\Gamma(D^- a_1(1260)^+) / \Gamma_{\text{total}}$ Γ_{15} / Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.0060 ± 0.0022 ± 0.0024	⁷⁶ BORTOLETTO92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$

⁷⁶ BORTOLETTO 92 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D .

$\Gamma(D^*(2010)^- \pi^+ \pi^0) / \Gamma_{\text{total}}$ Γ_{16} / Γ

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.0150 ± 0.0051 ± 0.0003	51	⁷⁷ 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	⁷⁸ ALBRECHT 87C	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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⁷⁷ 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 $B(D^*(2010)^+ \rightarrow D^0 \pi^+) = (68.3 \pm 1.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D .

⁷⁸ ALBRECHT 87C use PDG 86 branching ratios for D and D^* (2010) and assume $B(\Upsilon(4S) \rightarrow B^+ B^-) = 55\%$ and $B(\Upsilon(4S) \rightarrow B^0 \bar{B}^0) = 45\%$. Superseded by ALBRECHT 90J.

$$\Gamma(D^*(2010)^-\rho^+)/\Gamma_{\text{total}} \qquad \Gamma_{17}/\Gamma$$

<u>VALUE</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.0067 ± 0.0033 OUR AVERAGE					
0.0159 ± 0.0112 ± 0.0003			⁷⁹ BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
0.0058 ± 0.0035 ± 0.0001	19		⁸⁰ ALBRECHT	90J ARG	$e^+e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
0.0074 ± 0.0010 ± 0.0014	76		^{81,82} ALAM	94 CLE2	Sup. by JESSOP 97
0.081 ± 0.029 ^{+0.059} _{-0.024}	19		⁸³ CHEN	85 CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

⁷⁹ BORTOLETTO 92 reports $0.019 \pm 0.008 \pm 0.011$ for $B(D^*(2010)^+ \rightarrow D^0\pi^+) = 0.57 \pm 0.06$. We rescale to our best value $B(D^*(2010)^+ \rightarrow D^0\pi^+) = (68.3 \pm 1.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D .

⁸⁰ ALBRECHT 90J reports $0.007 \pm 0.003 \pm 0.003$ for $B(D^*(2010)^+ \rightarrow D^0\pi^+) = 0.57 \pm 0.06$. We rescale to our best value $B(D^*(2010)^+ \rightarrow D^0\pi^+) = (68.3 \pm 1.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D .

⁸¹ 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 $B(D^0 \rightarrow K^-\pi^+\pi^+\pi^-)/B(D^0 \rightarrow K^-\pi^+)$.

⁸² 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.

⁸³ Uses $B(D^* \rightarrow D^0\pi^+) = 0.6 \pm 0.15$ and $B(\Upsilon(4S) \rightarrow B^0\bar{B}^0) = 0.4$. Does not depend on D branching ratios.

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

<u>VALUE</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.0076 ± 0.0017 OUR AVERAGE					
Error includes scale factor of 1.3. See the ideogram below.					
0.0063 ± 0.0010 ± 0.0011	49		^{84,85} ALAM	94 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
0.0133 ± 0.0036 ± 0.0003			⁸⁶ BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
0.0100 ± 0.0040 ± 0.0002	26		⁸⁷ 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		⁸⁸ ALBRECHT	87C ARG	$e^+e^- \rightarrow \Upsilon(4S)$
<0.042	90		⁸⁹ BEBEK	87 CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

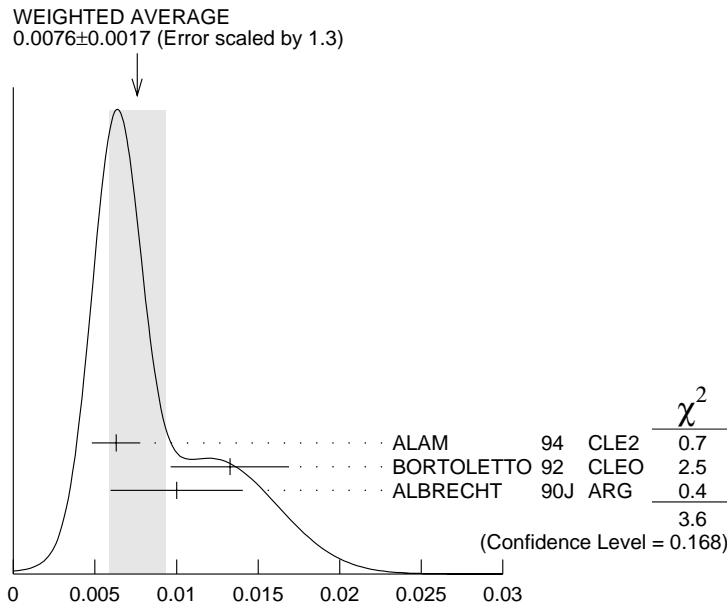
⁸⁴ ALAM 94 assume equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the CLEO II $B(D^*(2010)^+ \rightarrow D^0\pi^+)$ and absolute $B(D^0 \rightarrow K^-\pi^+)$ and the PDG 1992 $B(D^0 \rightarrow K^-\pi^+\pi^0)/B(D^0 \rightarrow K^-\pi^+)$ and $B(D^0 \rightarrow K^-\pi^+\pi^+\pi^-)/B(D^0 \rightarrow K^-\pi^+)$.

⁸⁵ 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 $\bar{D}^{*-}a_1^+$ is twice that for $\bar{D}^{*-}\pi^+\pi^+\pi^-$.)

⁸⁶ BORTOLETTO 92 reports $0.0159 \pm 0.0028 \pm 0.0037$ for $B(D^*(2010)^+ \rightarrow D^0\pi^+) = 0.57 \pm 0.06$. We rescale to our best value $B(D^*(2010)^+ \rightarrow D^0\pi^+) = (68.3 \pm 1.4) \times$

10^{-2} . Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D .

- 87 ALBRECHT 90J reports $0.012 \pm 0.003 \pm 0.004$ for $B(D^*(2010)^+ \rightarrow D^0 \pi^+) = 0.57 \pm 0.06$. We rescale to our best value $B(D^*(2010)^+ \rightarrow D^0 \pi^+) = (68.3 \pm 1.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D .
- 88 ALBRECHT 87C use PDG 86 branching ratios for D and $D^*(2010)$ and assume $B(\Upsilon(4S) \rightarrow B^+ B^-) = 55\%$ and $B(\Upsilon(4S) \rightarrow B^0 \bar{B}^0) = 45\%$. Superseded by ALBRECHT 90J.
- 89 BEBEK 87 value has been updated in BERKELMAN 91 to use same assumptions as noted for BORTOLETTO 92.



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

VALUE	DOCUMENT ID	TECN	COMMENT	Γ_{19}/Γ
$0.0000 \pm 0.0019 \pm 0.0016$	⁹⁰ BORTOLETTO92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$	

⁹⁰BORTOLETTO 92 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D and $D^*(2010)$.

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

VALUE	DOCUMENT ID	TECN	COMMENT
0.0057 ± 0.0031 ± 0.0001	⁹¹ BORTOLETTO92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$

⁹¹ BORTOLETTO 92 reports $0.0068 \pm 0.0032 \pm 0.0021$ for $B(D^*(2010)^+ \rightarrow D^0 \pi^+) = 0.57 \pm 0.06$. We rescale to our best value $B(D^*(2010)^+ \rightarrow D^0 \pi^+) = (68.3 \pm 1.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D .

$$\Gamma(D^*(2010)^- a_1(1260)^+) / \Gamma_{\text{total}} \qquad \Gamma_{21} / \Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
0.0130 ± 0.0027 OUR AVERAGE			
0.0126 ± 0.0020 ± 0.0022	^{92,93} ALAM	94 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
0.0150 ± 0.0069 ± 0.0003	⁹⁴ BORTOLETTO92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$

⁹² 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.

⁹³ 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 $B(D^0 \rightarrow K^- \pi^+ \pi^+ \pi^-) / B(D^0 \rightarrow K^- \pi^+)$.

⁹⁴ BORTOLETTO 92 reports $0.018 \pm 0.006 \pm 0.006$ for $B(D^*(2010)^+ \rightarrow D^0 \pi^+) = 0.57 \pm 0.06$. We rescale to our best value $B(D^*(2010)^+ \rightarrow D^0 \pi^+) = (68.3 \pm 1.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D .

$$\Gamma(D^*(2010)^- \pi^+ \pi^+ \pi^- \pi^0) / \Gamma_{\text{total}} \qquad \Gamma_{22} / \Gamma$$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.034 ± 0.018 ± 0.001	28	⁹⁵ ALBRECHT	90J ARG	$e^+ e^- \rightarrow \Upsilon(4S)$

⁹⁵ ALBRECHT 90J reports $0.041 \pm 0.015 \pm 0.016$ for $B(D^*(2010)^+ \rightarrow D^0 \pi^+) = 0.57 \pm 0.06$. We rescale to our best value $B(D^*(2010)^+ \rightarrow D^0 \pi^+) = (68.3 \pm 1.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D .

$$\Gamma(\bar{D}_2^*(2460)^- \pi^+) / \Gamma_{\text{total}} \qquad \Gamma_{23} / \Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 0.0022	90	⁹⁶ ALAM	94 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

⁹⁶ 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 $B(D_2^*(2460)^+ \rightarrow D^0 \pi^+) = 30\%$.

$$\Gamma(\bar{D}_2^*(2460)^- \rho^+) / \Gamma_{\text{total}} \qquad \Gamma_{24} / \Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 0.0049	90	⁹⁷ ALAM	94 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

⁹⁷ 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 $B(D_2^*(2460)^+ \rightarrow D^0 \pi^+) = 30\%$.

$\Gamma(D^- D_s^+)/\Gamma_{\text{total}}$					Γ_{25}/Γ
<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
0.0080 ± 0.0030 OUR AVERAGE					
0.0084 ± 0.0030 ^{+0.0020} _{-0.0021}		98 GIBAUT	96 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$	
0.013 ± 0.011 ± 0.003		99 ALBRECHT	92G ARG	$e^+ e^- \rightarrow \Upsilon(4S)$	
0.007 ± 0.004 ± 0.002		100 BORTOLETTO92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.012 ± 0.007	3	101 BORTOLETTO90	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$	
<p>⁹⁸ GIBAUT 96 reports $0.0087 \pm 0.0024 \pm 0.0020$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.035$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.</p> <p>⁹⁹ ALBRECHT 92G reports $0.017 \pm 0.013 \pm 0.006$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes PDG 1990 D^+ branching ratios, e.g., $B(D^+ \rightarrow K^- \pi^+ \pi^+) = 7.7 \pm 1.0\%$.</p> <p>¹⁰⁰ BORTOLETTO 92 reports $0.0080 \pm 0.0045 \pm 0.0030$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.030 \pm 0.011$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D.</p> <p>¹⁰¹ BORTOLETTO 90 assume $B(D_s \rightarrow \phi\pi^+) = 2\%$. Superseded by BORTOLETTO 92.</p>					

$\Gamma(D^*(2010)^- D_s^+)/\Gamma_{\text{total}}$					Γ_{26}/Γ
<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
0.0096 ± 0.0034 OUR AVERAGE					
0.0090 ± 0.0027 ± 0.0022		102 GIBAUT	96 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$	
0.010 ± 0.008 ± 0.003		103 ALBRECHT	92G ARG	$e^+ e^- \rightarrow \Upsilon(4S)$	
0.013 ± 0.008 ± 0.003		104 BORTOLETTO92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.024 ± 0.014	3	105 BORTOLETTO90	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$	
<p>¹⁰² GIBAUT 96 reports $0.0093 \pm 0.0023 \pm 0.0016$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.035$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.</p> <p>¹⁰³ ALBRECHT 92G reports $0.014 \pm 0.010 \pm 0.003$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes PDG 1990 D^+ 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 $B(D^*(2010)^+ \rightarrow D^0 \pi^+) = 55 \pm 4\%$.</p> <p>¹⁰⁴ BORTOLETTO 92 reports $0.016 \pm 0.009 \pm 0.006$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.030 \pm 0.011$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D and $D^*(2010)$.</p> <p>¹⁰⁵ BORTOLETTO 90 assume $B(D_s \rightarrow \phi\pi^+) = 2\%$. Superseded by BORTOLETTO 92.</p>					

$$\Gamma(D^- D_s^{*+})/\Gamma_{\text{total}} \qquad \Gamma_{27}/\Gamma$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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0.010±0.005 OUR AVERAGE

0.010±0.004±0.002	106 GIBAUT	96 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
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0.020±0.014±0.005	107 ALBRECHT	92G ARG	$e^+e^- \rightarrow \Upsilon(4S)$
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106 GIBAUT 96 reports $0.0100 \pm 0.0035 \pm 0.0022$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.035$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

107 ALBRECHT 92G reports $0.027 \pm 0.017 \pm 0.009$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes PDG 1990 D^+ branching ratios, e.g., $B(D^+ \rightarrow K^- \pi^+ \pi^+) = 7.7 \pm 1.0\%$.

$$[\Gamma(D^*(2010)^- D_s^+) + \Gamma(D^*(2010)^- D_s^{*+})]/\Gamma_{\text{total}} \qquad (\Gamma_{26} + \Gamma_{28})/\Gamma$$

<u>VALUE (units 10^{-2})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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$4.15 \pm 1.11^{+0.99}_{-1.02}$	22	108 BORTOLETTO90	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
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108 BORTOLETTO 90 reports 7.5 ± 2.0 for $B(D_s^+ \rightarrow \phi\pi^+) = 0.02$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$$\Gamma(D^*(2010)^- D_s^{*+})/\Gamma_{\text{total}} \qquad \Gamma_{28}/\Gamma$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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0.020±0.007 OUR AVERAGE

0.020±0.006±0.005	109 GIBAUT	96 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
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0.019±0.011±0.005	110 ALBRECHT	92G ARG	$e^+e^- \rightarrow \Upsilon(4S)$
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109 GIBAUT 96 reports $0.0203 \pm 0.0050 \pm 0.0036$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.035$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

110 ALBRECHT 92G reports $0.026 \pm 0.014 \pm 0.006$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (3.6 \pm 0.9) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes PDG 1990 D^+ 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 $B(D^*(2010)^+ \rightarrow D^0 \pi^+) = 55 \pm 4\%$.

$$\Gamma(D_s^+ \pi^-)/\Gamma_{\text{total}} \qquad \Gamma_{29}/\Gamma$$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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<0.00028	90	111 ALEXANDER	93B CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.0013	90	112 BORTOLETTO90	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
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111 ALEXANDER 93B reports $< 2.7 \times 10^{-4}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.036$.

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

$$\Gamma(D_s^{*+} \pi^-) / \Gamma_{\text{total}} \qquad \Gamma_{30} / \Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.0005	90	113 ALEXANDER 93B	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
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113 ALEXANDER 93B reports $< 4.4 \times 10^{-4}$ for $B(D_s^+ \rightarrow \phi \pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \rightarrow \phi \pi^+) = 0.036$.

$$[\Gamma(D_s^+ \pi^-) + \Gamma(D_s^- K^+)] / \Gamma_{\text{total}} \qquad (\Gamma_{29} + \Gamma_{35}) / \Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.0013	90	114 ALBRECHT 93E	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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114 ALBRECHT 93E reports $< 1.7 \times 10^{-3}$ for $B(D_s^+ \rightarrow \phi \pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi \pi^+) = 0.036$.

$$[\Gamma(D_s^{*+} \pi^-) + \Gamma(D_s^{*-} K^+)] / \Gamma_{\text{total}} \qquad (\Gamma_{30} + \Gamma_{36}) / \Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.0009	90	115 ALBRECHT 93E	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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115 ALBRECHT 93E reports $< 1.2 \times 10^{-3}$ for $B(D_s^+ \rightarrow \phi \pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi \pi^+) = 0.036$.

$$\Gamma(D_s^+ \rho^-) / \Gamma_{\text{total}} \qquad \Gamma_{31} / \Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.0007	90	116 ALEXANDER 93B	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.0016	90	117 ALBRECHT 93E	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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116 ALEXANDER 93B reports $< 6.6 \times 10^{-4}$ for $B(D_s^+ \rightarrow \phi \pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \rightarrow \phi \pi^+) = 0.036$.

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

$$\Gamma(D_s^{*+} \rho^-) / \Gamma_{\text{total}} \qquad \Gamma_{32} / \Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.0008	90	118 ALEXANDER 93B	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.0019	90	119 ALBRECHT 93E	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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118 ALEXANDER 93B reports $< 7.4 \times 10^{-4}$ for $B(D_s^+ \rightarrow \phi \pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \rightarrow \phi \pi^+) = 0.036$.

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

$$\Gamma(D_s^+ a_1(1260)^-) / \Gamma_{\text{total}} \qquad \Gamma_{33} / \Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.0026	90	120 ALBRECHT 93E	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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120 ALBRECHT 93E reports $< 3.5 \times 10^{-3}$ for $B(D_s^+ \rightarrow \phi \pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi \pi^+) = 0.036$.

$\Gamma(D_s^{*+} a_1(1260)^-)/\Gamma_{\text{total}}$ Γ_{34}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.0022	90	121 ALBRECHT	93E ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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121 ALBRECHT 93E reports $< 2.9 \times 10^{-3}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.036$.

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

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.00024	90	122 ALEXANDER	93B CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.0013	90	123 BORTOLETTO90	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$
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122 ALEXANDER 93B reports $< 2.3 \times 10^{-4}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.036$.

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

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

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.00017	90	124 ALEXANDER	93B CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
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124 ALEXANDER 93B reports $< 1.7 \times 10^{-4}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.036$.

 $\Gamma(D_s^- K^*(892)^+)/\Gamma_{\text{total}}$ Γ_{37}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.0010	90	125 ALEXANDER	93B CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.0034	90	126 ALBRECHT	93E ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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125 ALEXANDER 93B reports $< 9.7 \times 10^{-4}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.036$.

126 ALBRECHT 93E reports $< 4.6 \times 10^{-3}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.036$.

 $\Gamma(D_s^{*-} K^*(892)^+)/\Gamma_{\text{total}}$ Γ_{38}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.0011	90	127 ALEXANDER	93B CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.004	90	128 ALBRECHT	93E ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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127 ALEXANDER 93B reports $< 11.0 \times 10^{-4}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.036$.

128 ALBRECHT 93E reports $< 5.8 \times 10^{-3}$ for $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 0.036$.

$$\Gamma(D_s^- \pi^+ K^0) / \Gamma_{\text{total}} \qquad \Gamma_{39} / \Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.005	90	129 ALBRECHT	93E ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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129 ALBRECHT 93E reports $< 7.3 \times 10^{-3}$ for $B(D_s^+ \rightarrow \phi \pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi \pi^+) = 0.036$.

$$\Gamma(D_s^{*-} \pi^+ K^0) / \Gamma_{\text{total}} \qquad \Gamma_{40} / \Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.0031	90	130 ALBRECHT	93E ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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130 ALBRECHT 93E reports $< 4.2 \times 10^{-3}$ for $B(D_s^+ \rightarrow \phi \pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi \pi^+) = 0.036$.

$$\Gamma(D_s^- \pi^+ K^*(892)^0) / \Gamma_{\text{total}} \qquad \Gamma_{41} / \Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.004	90	131 ALBRECHT	93E ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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131 ALBRECHT 93E reports $< 5.0 \times 10^{-3}$ for $B(D_s^+ \rightarrow \phi \pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi \pi^+) = 0.036$.

$$\Gamma(D_s^{*-} \pi^+ K^*(892)^0) / \Gamma_{\text{total}} \qquad \Gamma_{42} / \Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.0020	90	132 ALBRECHT	93E ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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132 ALBRECHT 93E reports $< 2.7 \times 10^{-3}$ for $B(D_s^+ \rightarrow \phi \pi^+) = 0.027$. We rescale to our best value $B(D_s^+ \rightarrow \phi \pi^+) = 0.036$.

$$\Gamma(\bar{D}^0 \pi^0) / \Gamma_{\text{total}} \qquad \Gamma_{43} / \Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.00012	90	133 NEMATI	98 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.00048	90	134 ALAM	94 CLE2	Repl. by NEMATI 98
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133 NEMATI 98 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the PDG 96 values for D^0 , D^{*0} , η , η' , and ω branching fractions.

134 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 $B(D^0 \rightarrow K^- \pi^+ \pi^+ \pi^-) / B(D^0 \rightarrow K^- \pi^+)$.

$$\Gamma(\bar{D}^0 \rho^0) / \Gamma_{\text{total}} \qquad \Gamma_{44} / \Gamma$$

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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<0.00039	90		135 NEMATI	98 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.00055	90		136 ALAM	94 CLE2	Repl. by NEMATI 98
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<0.0006	90		137 BORTOLETTO92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$
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<0.0027	90	4	138 ALBRECHT	88K ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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135 NEMATI 98 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the PDG 96 values for D^0 , D^{*0} , η , η' , and ω branching fractions.

- 136 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 $B(D^0 \rightarrow K^- \pi^+ \pi^+ \pi^-)/B(D^0 \rightarrow K^- \pi^+)$.
- 137 BORTOLETTO 92 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and uses Mark III branching fractions for the D .
- 138 ALBRECHT 88K reports < 0.003 assuming $B^0 \bar{B}^0 : B^+ B^-$ production ratio is 45:55. We rescale to 50%.

$\Gamma(\bar{D}^0 \eta)/\Gamma_{\text{total}}$ Γ_{45}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.00013	90	139 NEMAT1	98 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.00068	90	140 ALAM	94 CLE2	Repl. by NEMAT1 98
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139 NEMAT1 98 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the PDG 96 values for D^0 , D^{*0} , η , η' , and ω branching fractions.

140 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 $B(D^0 \rightarrow K^- \pi^+ \pi^+ \pi^-)/B(D^0 \rightarrow K^- \pi^+)$.

$\Gamma(\bar{D}^0 \eta')/\Gamma_{\text{total}}$ Γ_{46}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.00094	90	141 NEMAT1	98 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.00086	90	142 ALAM	94 CLE2	Repl. by NEMAT1 98
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141 NEMAT1 98 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the PDG 96 values for D^0 , D^{*0} , η , η' , and ω branching fractions.

142 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 $B(D^0 \rightarrow K^- \pi^+ \pi^+ \pi^-)/B(D^0 \rightarrow K^- \pi^+)$.

$\Gamma(\bar{D}^0 \omega)/\Gamma_{\text{total}}$ Γ_{47}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.00051	90	143 NEMAT1	98 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.00063	90	144 ALAM	94 CLE2	Repl. by NEMAT1 98
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143 NEMAT1 98 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the PDG 96 values for D^0 , D^{*0} , η , η' , and ω branching fractions.

144 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 $B(D^0 \rightarrow K^- \pi^+ \pi^+ \pi^-)/B(D^0 \rightarrow K^- \pi^+)$.

$\Gamma(\bar{D}^*(2007)^0 \pi^0)/\Gamma_{\text{total}}$ Γ_{48}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.00044	90	145 NEMAT1	98 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.00097	90	146 ALAM	94 CLE2	Repl. by NEMAT1 98
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145 NEMAT1 98 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the PDG 96 values for D^0 , D^{*0} , η , η' , and ω branching fractions.

146 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 $B(D^0 \rightarrow K^- \pi^+ \pi^+ \pi^-)/B(D^0 \rightarrow K^- \pi^+)$.

 $\Gamma(\bar{D}^*(2007)^0 \rho^0)/\Gamma_{\text{total}}$ Γ_{49}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.00056	90	147 NEMAT1	98 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.00117	90	148 ALAM	94 CLE2	Repl. by NEMAT1 98
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147 NEMAT1 98 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the PDG 96 values for D^0 , D^{*0} , η , η' , and ω branching fractions.

148 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 $B(D^0 \rightarrow K^- \pi^+ \pi^+ \pi^-)/B(D^0 \rightarrow K^- \pi^+)$.

 $\Gamma(\bar{D}^*(2007)^0 \eta)/\Gamma_{\text{total}}$ Γ_{50}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.00026	90	149 NEMAT1	98 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.00069	90	150 ALAM	94 CLE2	Repl. by NEMAT1 98
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149 NEMAT1 98 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the PDG 96 values for D^0 , D^{*0} , η , η' , and ω branching fractions.

150 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 $B(D^0 \rightarrow K^- \pi^+ \pi^+ \pi^-)/B(D^0 \rightarrow K^- \pi^+)$.

 $\Gamma(\bar{D}^*(2007)^0 \eta')/\Gamma_{\text{total}}$ Γ_{51}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.0014	90	BRANDENB...	98 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.0019	90	151 NEMAT1	98 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
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<0.0027	90	152 ALAM	94 CLE2	Repl. by NEMAT1 98
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151 NEMAT1 98 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the PDG 96 values for D^0 , D^{*0} , η , η' , and ω branching fractions.

152 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 $B(D^0 \rightarrow K^- \pi^+ \pi^+ \pi^-)/B(D^0 \rightarrow K^- \pi^+)$.

$\Gamma(\bar{D}^*(2007)^0\omega)/\Gamma_{\text{total}}$ Γ_{52}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.00074	90	153 NEMATI	98 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.0021	90	154 ALAM	94 CLE2	Repl. by NEMATI 98
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153 NEMATI 98 assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$ and use the PDG 96 values for D^0 , D^{*0} , η , η' , and ω branching fractions.

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

 $\Gamma(D^*(2010)^+ D^*(2010)^-)/\Gamma_{\text{total}}$ Γ_{53}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<2.2 × 10⁻³	90	155 ASNER	97 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
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155 ASNER 97 at CLEO observes 1 event with an expected background of 0.022 ± 0.011 .

This corresponds to a branching ratio of $(5.3^{+7.1}_{-3.7} \pm 1.0) \times 10^{-4}$.

 $\Gamma(D^*(2010)^+ D^-)/\Gamma_{\text{total}}$ Γ_{54}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<1.8 × 10⁻³	90	ASNER	97 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
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 $\Gamma(D^+ D^*(2010)^-)/\Gamma_{\text{total}}$ Γ_{55}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<1.2 × 10⁻³	90	ASNER	97 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
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 $\Gamma(J/\psi(1S)K^0)/\Gamma_{\text{total}}$ Γ_{56}/Γ

VALUE (units 10 ⁻⁴)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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8.9 ± 1.2 OUR AVERAGE

8.5 ^{+1.4} _{-1.2} ± 0.6			156 JESSOP	97 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
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11.5 ± 2.3 ± 1.7			157 ABE	96H CDF	$p\bar{p}$ at 1.8 TeV
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6.87 ± 4.03 ± 0.22			158 BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
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9.2 ± 7.1 ± 0.3		2	159 ALBRECHT	90J ARG	$e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

7.5 ± 2.4 ± 0.8		10	158 ALAM	94 CLE2	Sup. by JESSOP 97
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<50	90		ALAM	86 CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
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156 Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

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

158 BORTOLETTO 92 reports $6 \pm 3 \pm 2$ for $B(J/\psi(1S) \rightarrow e^+e^-) = 0.069 \pm 0.009$. We rescale to our best value $B(J/\psi(1S) \rightarrow e^+e^-) = (6.02 \pm 0.19) \times 10^{-2}$. 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 $\Upsilon(4S)$.

159 ALBRECHT 90J reports $8 \pm 6 \pm 2$ for $B(J/\psi(1S) \rightarrow e^+e^-) = 0.069 \pm 0.009$. We rescale to our best value $B(J/\psi(1S) \rightarrow e^+e^-) = (6.02 \pm 0.19) \times 10^{-2}$. 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_{57}/Γ
VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
0.00115 ± 0.00055 ± 0.00004			160 BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

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

<0.0013	90		161 ALBRECHT	87D ARG	$e^+e^- \rightarrow \Upsilon(4S)$
<0.0063	90	2	GILES	84 CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

160 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 $B(J/\psi(1S) \rightarrow e^+e^-) = (6.02 \pm 0.19) \times 10^{-2}$. 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 $\Upsilon(4S)$.

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

$\Gamma(J/\psi(1S)K^*(892)^0)/\Gamma_{\text{total}}$					Γ_{58}/Γ
VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
0.00135 ± 0.00018 OUR AVERAGE					

0.00132 ± 0.00017 ± 0.00017			162 JESSOP	97 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
0.00136 ± 0.00027 ± 0.00022			163 ABE	96H CDF	$p\bar{p}$ at 1.8 TeV
0.00126 ± 0.00065 ± 0.00004			164 BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
0.00126 ± 0.00059 ± 0.00004	6		165 ALBRECHT	90J ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.0040 ± 0.0018 ± 0.0001	5		166 BEBEK	87 CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

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

0.00169 ± 0.00031 ± 0.00018	29		167 ALAM	94 CLE2	Sup. by JESSOP 97
			168 ALBRECHT	94G ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.0040 ± 0.0030			169 ALBAJAR	91E UA1	$E_{\text{cm}}^{p\bar{p}} = 630$ GeV
0.0033 ± 0.0018	5		170 ALBRECHT	87D ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.0041 ± 0.0018	5		171 ALAM	86 CLEO	Repl. by BEBEK 87

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

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

164 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 $B(J/\psi(1S) \rightarrow e^+e^-) = (6.02 \pm 0.19) \times 10^{-2}$. 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 $\Upsilon(4S)$.

165 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 $B(J/\psi(1S) \rightarrow e^+e^-) = (6.02 \pm 0.19) \times 10^{-2}$. 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 $\Upsilon(4S)$.

166 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 $B(J/\psi(1S) \rightarrow e^+e^-) = (6.02 \pm 0.19) \times 10^{-2}$. 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.

167 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 $\Upsilon(4S)$.

168 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 $K_S^0 \pi^0$.

169 ALBAJAR 91E assumes B_d^0 production fraction of 36%.

170 ALBRECHT 87D assume $B^+ B^- / B^0 \bar{B}^0$ ratio is 55/45. Superseded by ALBRECHT 90J.

171 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.

$\Gamma(J/\psi(1S)K^*(892)^0)/\Gamma(J/\psi(1S)K^0)$ Γ_{58}/Γ_{56}

VALUE	DOCUMENT ID	TECN	COMMENT
$1.39 \pm 0.36 \pm 0.10$	ABE	96Q CDF	$p\bar{p}$

$\Gamma(J/\psi(1S)\pi^0)/\Gamma_{\text{total}}$ Γ_{59}/Γ

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$< 5.8 \times 10^{-5}$	90		BISHAI	96 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

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

$< 3.2 \times 10^{-4}$	90		172 ACCIARRI	97C L3	
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$< 6.9 \times 10^{-3}$	90	1	173 ALEXANDER	95 CLE2	Sup. by BISHAI 96
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172 ACCIARRI 97C assumes B^0 production fraction ($39.5 \pm 4.0\%$) and B_S ($12.0 \pm 3.0\%$).

173 Assumes equal production of $B^+ B^-$ and $B^0 \bar{B}^0$ on $\Upsilon(4S)$.

$\Gamma(J/\psi(1S)\eta)/\Gamma_{\text{total}}$ Γ_{60}/Γ

VALUE	CL%	DOCUMENT ID	TECN
$< 1.2 \times 10^{-3}$	90	174 ACCIARRI	97C L3

174 ACCIARRI 97C assumes B^0 production fraction ($39.5 \pm 4.0\%$) and B_S ($12.0 \pm 3.0\%$).

$\Gamma(J/\psi(1S)\rho^0)/\Gamma_{\text{total}}$ Γ_{61}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 2.5 \times 10^{-4}$	90	BISHAI	96 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

$\Gamma(J/\psi(1S)\omega)/\Gamma_{\text{total}}$ Γ_{62}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 2.7 \times 10^{-4}$	90	BISHAI	96 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

$\Gamma(\psi(2S)K^0)/\Gamma_{\text{total}}$ Γ_{63}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 0.0008	90	175 ALAM	94 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

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

< 0.0015	90	175 BORTOLETTO92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$
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< 0.0028	90	175 ALBRECHT	90J ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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175 Assumes equal production of B^+ and B^0 at the $\Upsilon(4S)$.

$\Gamma(\psi(2S)K^+ \pi^-)/\Gamma_{\text{total}}$ Γ_{64}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 0.001	90	176 ALBRECHT	90J ARG	$e^+ e^- \rightarrow \Upsilon(4S)$

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

$\Gamma(\psi(2S)K^*(892)^0)/\Gamma_{\text{total}}$ Γ_{65}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
0.0014 ± 0.0008 ± 0.0004		177 BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
<0.0019	90	177 ALAM	94 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
<0.0023	90	177 ALBRECHT	90J ARG	$e^+e^- \rightarrow \Upsilon(4S)$

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

 $\Gamma(\chi_{c1}(1P)K^0)/\Gamma_{\text{total}}$ Γ_{66}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0027	90	178 ALAM	94 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

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

 $\Gamma(\chi_{c1}(1P)K^*(892)^0)/\Gamma_{\text{total}}$ Γ_{67}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.0021	90	179 ALAM	94 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

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

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

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
$1.5^{+0.5}_{-0.4} \pm 0.14$		GODANG	98 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

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

$2.4^{+1.7}_{-1.1} \pm 0.2$		180 ADAM	96D DLPH	$e^+e^- \rightarrow Z$
< 1.7	90	ASNER	96 CLE2	Sup. by ADAM 96D
< 3.0	90	181 BUSKULIC	96V ALEP	$e^+e^- \rightarrow Z$
< 9	90	182 ABREU	95N DLPH	Sup. by ADAM 96D
< 8.1	90	183 AKERS	94L OPAL	$e^+e^- \rightarrow Z$
< 2.6	90	184 BATTLE	93 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
<18	90	ALBRECHT	91B ARG	$e^+e^- \rightarrow \Upsilon(4S)$
< 9	90	185 AVERY	89B CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
<32	90	AVERY	87 CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

180 ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$. Contributions from B^0 and B_s decays cannot be separated. Limits are given for the weighted average of the decay rates for the two neutral B mesons.

181 BUSKULIC 96V assumes PDG 96 production fractions for B^0 , B^+ , B_s , b baryons.

182 Assumes a B^0 , B^- production fraction of 0.39 and a B_s production fraction of 0.12. Contributions from B^0 and B_s decays cannot be separated. Limits are given for the weighted average of the decay rates for the two neutral B mesons.

183 Assumes $B(Z \rightarrow b\bar{b}) = 0.217$ and B_d^0 (B_s^0) fraction 39.5% (12%).

184 BATTLE 93 assumes equal production of $B^0\bar{B}^0$ and B^+B^- at $\Upsilon(4S)$.

185 Assumes the $\Upsilon(4S)$ decays 43% to $B^0\bar{B}^0$.

 $\Gamma(K^0\pi^0)/\Gamma_{\text{total}}$ Γ_{69}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<4.1 × 10⁻⁵	90	GODANG	98 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

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

<4.0 × 10 ⁻⁵	90	ASNER	96 CLE2	Rep. by GODANG 98
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$\Gamma(\eta' K^0)/\Gamma_{\text{total}}$					Γ_{70}/Γ
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$(4.7^{+2.7}_{-2.0} \pm 0.9) \times 10^{-5}$		BEHRENS	98 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$	

$\Gamma(\eta' K^*(892)^0)/\Gamma_{\text{total}}$					Γ_{71}/Γ
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 3.9 \times 10^{-5}$	90	BEHRENS	98 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$	

$\Gamma(\eta K^*(892)^0)/\Gamma_{\text{total}}$					Γ_{72}/Γ
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 3.0 \times 10^{-5}$	90	BEHRENS	98 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$	

$\Gamma(\eta K^0)/\Gamma_{\text{total}}$					Γ_{73}/Γ
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 3.3 \times 10^{-5}$	90	BEHRENS	98 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$	

$[\Gamma(K^+ \pi^-) + \Gamma(\pi^+ \pi^-)]/\Gamma_{\text{total}}$					$(\Gamma_{68} + \Gamma_{105})/\Gamma$
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
$(1.9 \pm 0.6) \times 10^{-5}$					OUR AVERAGE

$(2.8^{+1.5}_{-1.0} \pm 2.0) \times 10^{-5}$	186	ADAM	96D DLPH	$e^+ e^- \rightarrow Z$	
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$(1.8^{+0.6+0.3}_{-0.5-0.4}) \times 10^{-5}$	17.2	ASNER	96 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$	
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$(2.4^{+0.8}_{-0.7} \pm 0.2) \times 10^{-5}$	187	BATTLE	93 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$	
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¹⁸⁶ ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$. Contributions from B^0 and B_s decays cannot be separated. Limits are given for the weighted average of the decay rates for the two neutral B mesons.

¹⁸⁷ BATTLE 93 assumes equal production of $B^0 \bar{B}^0$ and $B^+ B^-$ at $\Upsilon(4S)$.

$\Gamma(K^+ K^-)/\Gamma_{\text{total}}$					Γ_{74}/Γ
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 4.3 \times 10^{-6}$	90	GODANG	98 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$	

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

$< 4.6 \times 10^{-5}$		¹⁸⁸ ADAM	96D DLPH	$e^+ e^- \rightarrow Z$	
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$< 0.4 \times 10^{-5}$	90	ASNER	96 CLE2	Repl. by GODANG 98	
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$< 1.8 \times 10^{-5}$	90	¹⁸⁹ BUSKULIC	96V ALEP	$e^+ e^- \rightarrow Z$	
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$< 1.2 \times 10^{-4}$	90	¹⁹⁰ ABREU	95N DLPH	Sup. by ADAM 96D	
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$< 0.7 \times 10^{-5}$	90	¹⁹¹ BATTLE	93 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$	
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¹⁸⁸ ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$. Contributions from B^0 and B_s decays cannot be separated. Limits are given for the weighted average of the decay rates for the two neutral B mesons.

¹⁸⁹ BUSKULIC 96V assumes PDG 96 production fractions for B^0 , B^+ , B_s , b baryons.

¹⁹⁰ Assumes a B^0 , B^- production fraction of 0.39 and a B_s production fraction of 0.12. Contributions from B^0 and B_s^0 decays cannot be separated. Limits are given for the weighted average of the decay rates for the two neutral B mesons.

¹⁹¹ BATTLE 93 assumes equal production of $B^0 \bar{B}^0$ and $B^+ B^-$ at $\Upsilon(4S)$.

$$\Gamma(K^0 \bar{K}^0)/\Gamma_{\text{total}} \qquad \Gamma_{75}/\Gamma$$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<1.7 \times 10^{-5}$	90	GODANG	98 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

$$\Gamma(K^+ \rho^-)/\Gamma_{\text{total}} \qquad \Gamma_{76}/\Gamma$$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<3.5 \times 10^{-5}$	90	ASNER	96 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

$$\Gamma(K^0 \pi^+ \pi^-)/\Gamma_{\text{total}} \qquad \Gamma_{77}/\Gamma$$

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

$$\Gamma(K^0 \rho^0)/\Gamma_{\text{total}} \qquad \Gamma_{78}/\Gamma$$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<3.9 \times 10^{-5}$	90	ASNER	96 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

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

$<3.2 \times 10^{-4}$	90	ALBRECHT	91B ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
$<5.0 \times 10^{-4}$	90	192 AVERY	89B CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$
<0.064	90	193 AVERY	87 CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$

192 AVERY 89B reports $< 5.8 \times 10^{-4}$ assuming the $\Upsilon(4S)$ decays 43% to $B^0 \bar{B}^0$. We rescale to 50%.

193 AVERY 87 reports < 0.08 assuming the $\Upsilon(4S)$ decays 40% to $B^0 \bar{B}^0$. We rescale to 50%.

$$\Gamma(K^0 f_0(980))/\Gamma_{\text{total}} \qquad \Gamma_{79}/\Gamma$$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<3.6 \times 10^{-4}$	90	194 AVERY	89B CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$

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

$$\Gamma(K^*(892)^+ \pi^-)/\Gamma_{\text{total}} \qquad \Gamma_{80}/\Gamma$$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<7.2 \times 10^{-5}$	90	ASNER	96 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
$<3.8 \times 10^{-4}$	90	195 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	196 AVERY	87 CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$

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

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

$$\Gamma(K^*(892)^0 \pi^0)/\Gamma_{\text{total}} \qquad \Gamma_{81}/\Gamma$$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<2.8 \times 10^{-5}$	90	ASNER	96 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

$$\Gamma(K_2^*(1430)^+ \pi^-)/\Gamma_{\text{total}} \qquad \Gamma_{82}/\Gamma$$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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