Γ_{28}	$D_s^{*+}\pi^-$	<5	$\times 10^{-4}$	90%
Γ_{29}	$D_s^{+}\rho^-$	<7	$\times 10^{-4}$	90%
Γ_{30}	$D_s^{*+}\rho^-$	<8	$\times 10^{-4}$	90%
Γ_{31}	$D_s^{+}a_1(1260)^-$	<2.7	$\times 10^{-3}$	90%
Γ_{32}	$D_s^{*+}a_1(1260)^-$	<2.2	$\times 10^{-3}$	90%
Γ_{33}	$D_s^{-}K^+$	<2.4	$\times 10^{-4}$	90%
Γ_{34}	$D_s^{*-}K^+$	<1.8	$\times 10^{-4}$	90%
Γ_{35}	$D_s^{-}K^*(892)^+$	<1.0	$\times 10^{-3}$	90%
Γ_{36}	$D_s^{*-}K^*(892)^+$	<1.2	$\times 10^{-3}$	90%
Γ_{37}	$D_s^{-}\pi^+K^0$	<6	$\times 10^{-3}$	90%
Γ_{38}	$D_s^{*-}\pi^+K^0$	<3.2	$\times 10^{-3}$	90%
Γ_{39}	$D_s^{-}\pi^+K^*(892)^0$	<4	$\times 10^{-3}$	90%
Γ_{40}	$D_s^{*-}\pi^+K^*(892)^0$	<2.1	$\times 10^{-3}$	90%
Γ_{41}	$\overline{D}^0\pi^0$	<4.8	$\times 10^{-4}$	90%
Γ_{42}	$\overline{D}^0\rho^0$	<5.5	$\times 10^{-4}$	90%
Γ_{43}	$\overline{D}^0\eta$	<6.8	$\times 10^{-4}$	90%
Γ_{44}	$\overline{D}^0\eta'$	<8.6	$\times 10^{-4}$	90%
Γ_{45}	$\overline{D}^0\omega$	<6.3	$\times 10^{-4}$	90%
Γ_{46}	$\overline{D}^*(2007)^0\pi^0$	<9.7	$\times 10^{-4}$	90%
Γ_{47}	$\overline{D}^*(2007)^0\rho^0$	<1.17	$\times 10^{-3}$	90%
Γ_{48}	$\overline{D}^*(2007)^0\eta$	<6.9	$\times 10^{-4}$	90%
Γ_{49}	$\overline{D}^*(2007)^0\eta'$	<2.7	$\times 10^{-3}$	90%
Γ_{50}	$\overline{D}^*(2007)^0\omega$	<2.1	$\times 10^{-3}$	90%
	Charmonium modes			
Γ_{51}	$J/\psi(1S)K^0$	(7.5 ± 2.1)	$\times 10^{-4}$	
Γ_{52}	$J/\psi(1S)K^+\pi^-$	(1.2 ± 0.6)	$\times 10^{-3}$	
Γ_{53}	$J/\psi(1S)K^*(892)^0$	(1.58 ± 0.28)	$\times 10^{-3}$	
Γ_{54}	$\psi(2S)K^0$	<8	$\times 10^{-4}$	90%
Γ_{55}	$\psi(2S)K^+\pi^-$	<1	$\times 10^{-3}$	90%
Γ_{56}	$\psi(2S)K^*(892)^0$	(1.4 ± 0.9)	$\times 10^{-3}$	
Γ_{57}	$\chi_{c1}(1P)K^0$	<2.7	$\times 10^{-3}$	90%
Γ_{58}	$\chi_{c1}(1P)K^*(892)^0$	<2.1	$\times 10^{-3}$	90%
	***K* or *K** modes**			
Γ_{59}	$K^+\pi^-$	<2.6	$\times 10^{-5}$	90%
Γ_{60}	K^+K^-	<7	$\times 10^{-6}$	90%
Γ_{61}	$K^0\pi^+\pi^-$	<4.4	$\times 10^{-4}$	90%
Γ_{62}	$K^0\rho^0$	<3.2	$\times 10^{-4}$	90%
Γ_{63}	$K^0 f_0(980)$	<3.6	$\times 10^{-4}$	90%
Γ_{64}	$K^*(892)^+\pi^-$	<3.8	$\times 10^{-4}$	90%
Γ_{65}	$K_2^*(1430)^+\pi^-$	<2.6	$\times 10^{-3}$	90%
Γ_{66}	$K^0K^+K^-$	<1.3	$\times 10^{-3}$	90%
Γ_{67}	$K^0\phi$	<4.2	$\times 10^{-4}$	90%
Γ_{68}	$K^*(892)^0\pi^+\pi^-$	<1.4	$\times 10^{-3}$	90%
Γ_{69}	$K^*(892)^0\rho^0$	<4.6	$\times 10^{-4}$	90%
Γ_{70}	$K^*(892)^0 f_0(980)$	<1.7	$\times 10^{-4}$	90%
Γ_{71}	$K_1(1400)^+\pi^-$	<1.1	$\times 10^{-3}$	90%
Γ_{72}	$K^*(892)^0K^+K^-$	<6.1	$\times 10^{-4}$	90%
Γ_{73}	$K^*(892)^0\phi$	<3.2	$\times 10^{-4}$	90%
Γ_{74}	$K_1(1400)^0\rho^0$	<3.0	$\times 10^{-3}$	90%
Γ_{75}	$K_1(1400)^0\phi$	<5.0	$\times 10^{-3}$	90%
Γ_{76}	$K_2^*(1430)^0\rho^0$	<1.1	$\times 10^{-3}$	90%
Γ_{77}	$K_2^*(1430)^0\phi$	<1.4	$\times 10^{-3}$	90%
Γ_{78}	$K^*(892)^0\gamma$	(4.0 ± 1.9)	$\times 10^{-5}$	
Γ_{79}	$K_1(1270)^0\gamma$	<7.0	$\times 10^{-3}$	90%
Γ_{80}	$K_1(1400)^0\gamma$	<4.3	$\times 10^{-3}$	90%
Γ_{81}	$K_2^*(1430)^0\gamma$	<4.0	$\times 10^{-4}$	90%
Γ_{82}	$K^*(1680)^0\gamma$	<2.0	$\times 10^{-3}$	90%
Γ_{83}	$K_3^*(1780)^0\gamma$	<1.0	%	90%
Γ_{84}	$K_4^*(2045)^0\gamma$	<4.3	$\times 10^{-3}$	90%
	Light unflavored meson modes			
Γ_{85}	$\pi^+\pi^-$	<2.9	$\times 10^{-5}$	90%
Γ_{86}	$\pi^+\pi^-\pi^0$	<7.2	$\times 10^{-4}$	90%
Γ_{87}	$\rho^0\pi^0$	<4.0	$\times 10^{-4}$	90%
Γ_{88}	$\rho^{\mp}\pi^{\pm}$	[b] <5.2	$\times 10^{-4}$	90%
Γ_{89}	$\pi^+\pi^-\pi^+\pi^-$	<6.7	$\times 10^{-4}$	90%
Γ_{90}	$\rho^0\rho^0$	<2.8	$\times 10^{-4}$	90%
Γ_{91}	$a_1(1260)^{\mp}\pi^{\pm}$	[b] <4.9	$\times 10^{-4}$	90%
Γ_{92}	$a_2(1320)^{\mp}\pi^{\pm}$	[b] <3.0	$\times 10^{-4}$	90%
Γ_{93}	$\pi^+\pi^-\pi^0\pi^0$	<3.1	$\times 10^{-3}$	90%
Γ_{94}	$\rho^+\rho^-$	<2.2	$\times 10^{-3}$	90%
Γ_{95}	$a_1(1260)^0\pi^0$	<1.1	$\times 10^{-3}$	90%
Γ_{96}	$\omega\pi^0$	<4.6	$\times 10^{-4}$	90%
Γ_{97}	$\eta\pi^0$	<1.8	$\times 10^{-3}$	90%
Γ_{98}	$\pi^+\pi^+\pi^-\pi^-\pi^0$	<9.0	$\times 10^{-3}$	90%
Γ_{99}	$a_1(1260)^+\rho^-$	<3.4	$\times 10^{-3}$	90%
Γ_{100}	$a_1(1260)^0\rho^0$	<2.4	$\times 10^{-3}$	90%
Γ_{101}	$\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-$	<3.0	$\times 10^{-3}$	90%
Γ_{102}	$a_1(1260)^+a_1(1260)^-$	<2.8	$\times 10^{-3}$	90%
Γ_{103}	$\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\pi^0$	<1.1	%	90%
	Baryon modes			
Γ_{104}	$p\overline{p}$	<3.4	$\times 10^{-5}$	90%
Γ_{105}	$p\overline{p}\pi^+\pi^-$	<2.5	$\times 10^{-4}$	90%
Γ_{106}	$p\overline{\Lambda}\pi^-$	<1.8	$\times 10^{-4}$	90%
Γ_{107}	$\Delta^0\overline{\Delta}^0$	<1.5	$\times 10^{-3}$	90%
Γ_{108}	$\Delta^{++}\Delta^{--}$	<1.1	$\times 10^{-4}$	90%
Γ_{109}	$\overline{\Sigma}_c^{--}\Delta^{++}$	<1.2	$\times 10^{-3}$	90%

Lepton Family number (*LF*) violating modes,
$\Delta B = 2$ forbidden decay via mixing (*B2M*) modes, or
$\Delta B = 1$ weak neutral current (*B1*) modes

Γ_{110}	e^+e^-	*B1*	<5.9	$\times 10^{-6}$	90%
Γ_{111}	$\mu^+\mu^-$	*B1*	<5.9	$\times 10^{-6}$	90%
Γ_{112}	$K^0e^+e^-$	*B1*	<3.0	$\times 10^{-4}$	90%
Γ_{113}	$K^0\mu^+\mu^-$	*B1*	<3.6	$\times 10^{-4}$	90%
Γ_{114}	$K^*(892)^0e^+e^-$	*B1*	<2.9	$\times 10^{-4}$	90%
Γ_{115}	$K^*(892)^0\mu^+\mu^-$	*B1*	<2.3	$\times 10^{-5}$	90%
Γ_{116}	$e^{\pm}\mu^{\mp}$	*LF*	[b] <5.9	$\times 10^{-6}$	90%
Γ_{117}	$e^{\pm}\tau^{\mp}$	*LF*	[b] <5.3	$\times 10^{-4}$	90%
Γ_{118}	$\mu^{\pm}\tau^{\mp}$	*LF*	[b] <8.3	$\times 10^{-4}$	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*
0.095±0.016 OUR AVERAGE				
0.093±0.011±0.015	ALBRECHT	94	ARG	$e^+e^- \to \Upsilon(4S)$
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	[16] FULTON	91	CLEO	$e^+e^- \to \Upsilon(4S)$
0.020±0.007±0.006	[17] ALBRECHT	89J	ARG	$e^+e^- \to \Upsilon(4S)$

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

[17] 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($D^0 \to K^-\pi^+$).

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

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.044±0.004 OUR AVERAGE					
0.045±0.003±0.004		[18] ALBRECHT	94	ARG	$e^+e^- \to \Upsilon(4S)$
0.047±0.005±0.005	235	[19] ALBRECHT	93	ARG	$e^+e^- \to \Upsilon(4S)$
0.040±0.004±0.006		[20] BORTOLETTO	89B	CLEO	$e^+e^- \to \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen	398	[21] SANGHERA	93	CLE2	$e^+e^- \to \Upsilon(4S)$
		[22] ALBRECHT	89C	ARG	$e^+e^- \to \Upsilon(4S)$
0.060±0.010±0.014		[23] ALBRECHT	89J	ARG	$e^+e^- \to \Upsilon(4S)$
0.070±0.012±0.019	47	[24] ALBRECHT	87J	ARG	$e^+e^- \to \Upsilon(4S)$

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

[19] 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($D^0 \to K^-\pi^+$). 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.

[20] 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($D^0 \to K^-\pi^+$). The measurement suggests a D^* polarization parameter value $\alpha = 0.65 \pm 0.66 \pm 0.25$.