$D^\pm$

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

$D^\pm$ MASS

The fit includes $D^\pm$, D^0, $D_s^\pm$, $D^{*\pm}$, D^{*0}, $D_s^{*\pm}$, $D_1(2420)^0$, $D_2^*(2460)^0$, and $D_{s1}(2536)^\pm$ mass and mass difference measurements.

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1869.60± 0.16 OUR FIT Error includes scale factor of 1.1.					
1869.5 ± 0.4 OUR AVERAGE					
1869.53± 0.49±0.20	110 ± 15	ANASHIN	10A	KEDR	e^+e^- at $\psi(3770)$
1870.0 ± 0.5 ±1.0	317	BARLAG	90C	ACCM	π^- Cu 230 GeV
1869.4 ± 0.6		[1] TRILLING	81	RVUE	e^+e^- 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1875 ±10	9	ADAMOVICH	87	EMUL	Photoproduction
1860 ±16	6	ADAMOVICH	84	EMUL	Photoproduction
1863 ± 4		DERRICK	84	HRS	e^+e^- 29 GeV
1868.4 ± 0.5		[1] SCHINDLER	81	MRK2	e^+e^- 3.77 GeV
1874 ± 5		GOLDHABER	77	MRK1	D^0, D^+ recoil spectra
1868.3 ± 0.9		[1] PERUZZI	77	LGW	e^+e^- 3.77 GeV
1874 ±11		PICCOLO	77	MRK1	e^+e^- 4.03, 4.41 GeV
1876 ±15	50	PERUZZI	76	MRK1	$K^\mp\pi^\pm\pi^\pm$

[1] PERUZZI 77 and SCHINDLER 81 errors do not include the 0.13% uncertainty in the absolute SPEAR energy calibration. TRILLING 81 uses the high precision $J/\psi(1S)$ and $\psi(2S)$ measurements of ZHOLENTZ 80 to determine this uncertainty and combines the PERUZZI 77 and SCHINDLER 81 results to obtain the value quoted.

$D^\pm$ MEAN LIFE

Measurements with an error $> 100\times10^{-15}$ s have been omitted from the Listings.

VALUE (10^{-15} s)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1040 ± 7 OUR AVERAGE					
1039.4± 4.3± 7.0	110k	LINK	02F	FOCS	γ nucleus, $\approx$ 180 GeV
$1033.6\pm22.1^{+\ 9.9}_{-12.7}$	3777	BONVICINI	99	CLEO	$e^+e^- \approx \Upsilon(4S)$
1048 ±15 ±11	9k	FRABETTI	94D	E687	$D^+ \to K^-\pi^+\pi^+$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1075 ±40 ±18	2455	FRABETTI	91	E687	γ Be, $D^+ \to K^-\pi^+\pi^+$
1030 ±80 ±60	200	ALVAREZ	90	NA14	γ, $D^+ \to K^-\pi^+\pi^+$
$1050\ ^{+77}_{-72}$	317	[2] BARLAG	90C	ACCM	π^- Cu 230 GeV
1050 ±80 ±70	363	ALBRECHT	88I	ARG	e^+e^- 10 GeV
1090 ±30 ±25	2992	RAAB	88	E691	Photoproduction

[2] BARLAG 90C estimates the systematic error to be negligible.

D^+ DECAY MODES

Most decay modes (other than the semileptonic modes) that involve a neutral K meson are now given as K^0_S modes, not as $\overline{K}^0$ modes. Nearly always it is a K^0_S that is measured, and interference between Cabibbo-allowed and doubly Cabibbo-suppressed modes can invalidate the assumption that $2\,\Gamma(K^0_S) = \Gamma(\overline{K}^0)$.

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
	Inclusive modes		
Γ_1	e^+ semileptonic	(16.07 ± 0.30) %	
Γ_2	μ^+ anything	(17.6 ± 3.2) %	
Γ_3	K^- anything	(25.7 ± 1.4) %	
Γ_4	$\overline{K}^0$ anything + K^0 anything	(61 ± 5) %	
Γ_5	K^+ anything	(5.9 ± 0.8) %	
Γ_6	$K^*(892)^-$ anything	(6 ± 5) %	
Γ_7	$\overline{K}^*(892)^0$ anything	(23 ± 5) %	
Γ_8	$K^*(892)^+$ anything		
Γ_9	$K^*(892)^0$ anything	< 6.6 %	CL=90%
Γ_{10}	η anything	(6.3 ± 0.7) %	
Γ_{11}	η' anything	(1.04 ± 0.18) %	
Γ_{12}	ϕ anything	(1.03 ± 0.12) %	
	Leptonic and semileptonic modes		
Γ_{13}	$e^+\nu_e$	< 8.8 $\times 10^{-6}$	CL=90%
Γ_{14}	$\mu^+\nu_\mu$	(3.82 ± 0.33) $\times 10^{-4}$	
Γ_{15}	$\tau^+\nu_\tau$	< 1.2 $\times 10^{-3}$	CL=90%
Γ_{16}	$\overline{K}^0 e^+\nu_e$	(8.83 ± 0.22) %	
Γ_{17}	$\overline{K}^0\mu^+\nu_\mu$	(9.4 ± 0.8) %	S=1.2
Γ_{18}	$K^-\pi^+ e^+\nu_e$	(4.1 ± 0.6) %	S=1.1
Γ_{19}	$\overline{K}^*(892)^0 e^+\nu_e$, $\overline{K}^*(892)^0 \to K^-\pi^+$	(3.68 ± 0.21) %	
Γ_{20}	$K^-\pi^+ e^+\nu_e$ nonresonant	< 7 $\times 10^{-3}$	CL=90%
Γ_{21}	$K^-\pi^+\mu^+\nu_\mu$	(3.9 ± 0.5) %	
Γ_{22}	$\overline{K}^*(892)^0\mu^+\nu_\mu$, $\overline{K}^*(892)^0 \to K^-\pi^+$	(3.7 ± 0.3) %	
Γ_{23}	$K^-\pi^+\mu^+\nu_\mu$ nonresonant	(2.1 ± 0.6) $\times 10^{-3}$	
Γ_{24}	$K^-\pi^+\pi^0\mu^+\nu_\mu$	< 1.7 $\times 10^{-3}$	CL=90%
Γ_{25}	$\pi^0 e^+\nu_e$	(4.05 ± 0.18) $\times 10^{-3}$	
Γ_{26}	$\eta e^+\nu_e$	(1.33 ± 0.21) $\times 10^{-3}$	
Γ_{27}	$\rho^0 e^+\nu_e$	(2.2 ± 0.4) $\times 10^{-3}$	
Γ_{28}	$\rho^0\mu^+\nu_\mu$	(2.5 ± 0.5) $\times 10^{-3}$	

Γ_{29}	$\omega e^+ \nu_e$		$(1.6 \ ^{+0.7}_{-0.6}) \times 10^{-3}$		
Γ_{30}	$\eta'(958) e^+ \nu_e$		< 3.5	$\times 10^{-4}$	CL=90%
Γ_{31}	$\phi e^+ \nu_e$		< 1.6	$\times 10^{-4}$	CL=90%

Fractions of some of the following modes with resonances have already appeared above as submodes of particular charged-particle modes.

Γ_{32}	$\overline{K}^*(892)^0 e^+ \nu_e$		(5.53±0.32) %		S=1.2
Γ_{33}	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$		(5.5 ±0.5) %		S=1.2
Γ_{34}	$\overline{K}_0^*(1430)^0 \mu^+ \nu_\mu$		< 2.5	$\times 10^{-4}$	
Γ_{35}	$\overline{K}^*(1680)^0 \mu^+ \nu_\mu$		< 1.6	$\times 10^{-3}$	

Hadronic modes with a $\overline{K}$ or $\overline{K}K\overline{K}$

Γ_{36}	$K_S^0 \pi^+$		(1.49±0.04) %		S=1.4
Γ_{37}	$K_L^0 \pi^+$		(1.46±0.05) %		
Γ_{38}	$K^- 2\pi^+$	[a]	(9.4 ±0.4) %		S=2.2
Γ_{39}	$(K^-\pi^+)_{S-\text{wave}} \pi^+$		(7.52±0.33) %		
Γ_{40}	$\overline{K}_0^*(800)^0 \pi^+$, $\overline{K}_0^*(800) \to K^-\pi^+$				
Γ_{41}	$\overline{K}_0^*(1430)^0 \pi^+$, $\overline{K}_0^*(1430)^0 \to K^-\pi^+$	[b]	(1.25±0.08) %		
Γ_{42}	$\overline{K}^*(892)^0 \pi^+$, $\overline{K}^*(892)^0 \to K^-\pi^+$		(1.04±0.12) %		
Γ_{43}	$\overline{K}^*(1410)^0 \pi^+$, $\overline{K}^{*0} \to K^-\pi^+$		not seen		
Γ_{44}	$\overline{K}_2^*(1430)^0 \pi^+$, $\overline{K}_2^*(1430)^0 \to K^-\pi^+$	[b]	(2.3 ±0.7) $\times 10^{-4}$		
Γ_{45}	$\overline{K}^*(1680)^0 \pi^+$, $\overline{K}^*(1680)^0 \to K^-\pi^+$	[b]	(2.2 ±1.1) $\times 10^{-4}$		
Γ_{46}	$K^-(2\pi^+)_{I=2}$		(1.45±0.27) %		
Γ_{47}	$K^- 2\pi^+$ nonresonant				
Γ_{48}	$K_S^0 \pi^+ \pi^0$	[a]	(6.90±0.32) %		S=1.3
Γ_{49}	$K_S^0 \rho^+$		(4.7 ±1.0) %		
Γ_{50}	$\overline{K}^*(892)^0 \pi^+$, $\overline{K}^*(892)^0 \to K_S^0 \pi^0$		(1.3 ±0.6) %		
Γ_{51}	$K_S^0 \pi^+ \pi^0$ nonresonant		(9 ±7) $\times 10^{-3}$		
Γ_{52}	$K^- 2\pi^+ \pi^0$	[c]	(6.08±0.29) %		S=1.6
Γ_{53}	$K_S^0 2\pi^+ \pi^-$	[c]	(3.10±0.11) %		S=1.1
Γ_{54}	$K^- 3\pi^+ \pi^-$	[a]	(5.7 ±0.6) $\times 10^{-3}$		S=1.2
Γ_{55}	$\overline{K}^*(892)^0 2\pi^+ \pi^-$, $\overline{K}^*(892)^0 \to K^-\pi^+$		(1.2 ±0.4) $\times 10^{-3}$		
Γ_{56}	$\overline{K}^*(892)^0 \rho^0 \pi^+$, $\overline{K}^*(892)^0 \to K^-\pi^+$		(2.3 ±0.4) $\times 10^{-3}$		

Γ_{57}	$\overline{K}^*(892)^0 a_1(1260)^+$	[d]	$(\ 9.3\ \pm 1.9\ ) \times 10^{-3}$	
Γ_{58}	$\overline{K}^*(892)^0 2\pi^+\pi^-$ no-ρ, $\overline{K}^*(892)^0 \to\ K^-\pi^+$			
Γ_{59}	$K^-\rho^0 2\pi^+$		$(\ 1.72\pm 0.29) \times 10^{-3}$	
Γ_{60}	$K^- 3\pi^+\pi^-$ nonresonant		$(\ 4.0\ \pm 3.0\ ) \times 10^{-4}$	
Γ_{61}	$K^+ 2K^0_S$		$(\ 4.6\ \pm 2.1\ ) \times 10^{-3}$	
Γ_{62}	$K^+ K^- K^0_S \pi^+$		$(\ 2.4\ \pm 0.5\ ) \times 10^{-4}$	

Pionic modes

Γ_{63}	$\pi^+\pi^0$		$(\ 1.26\pm 0.09) \times 10^{-3}$	
Γ_{64}	$2\pi^+\pi^-$		$(\ 3.27\pm 0.22) \times 10^{-3}$	
Γ_{65}	$\rho^0\pi^+$		$(\ 8.3\ \pm 1.5\ ) \times 10^{-4}$	
Γ_{66}	$\pi^+(\pi^+\pi^-)_{S-\text{wave}}$		$(\ 1.83\pm 0.18) \times 10^{-3}$	
Γ_{67}	$\sigma\pi^+$, $\sigma \to\ \pi^+\pi^-$		$(\ 1.38\pm 0.13) \times 10^{-3}$	
Γ_{68}	$f_0(980)\pi^+$, $f_0(980) \to\ \pi^+\pi^-$		$(\ 1.57\pm 0.34) \times 10^{-4}$	
Γ_{69}	$f_0(1370)\pi^+$, $f_0(1370) \to\ \pi^+\pi^-$		$(\ 8\ \ \pm 4\ \ ) \times 10^{-5}$	
Γ_{70}	$f_2(1270)\pi^+$, $f_2(1270) \to\ \pi^+\pi^-$		$(\ 5.0\ \pm 0.9\ ) \times 10^{-4}$	
Γ_{71}	$\rho(1450)^0\pi^+$, $\rho(1450)^0 \to\ \pi^+\pi^-$		$<\ 8\ \times 10^{-5}$	CL=95%
Γ_{72}	$f_0(1500)\pi^+$, $f_0(1500) \to\ \pi^+\pi^-$		$(\ 1.1\ \pm 0.4\ ) \times 10^{-4}$	
Γ_{73}	$f_0(1710)\pi^+$, $f_0(1710) \to\ \pi^+\pi^-$		$<\ 5\ \times 10^{-5}$	CL=95%
Γ_{74}	$f_0(1790)\pi^+$, $f_0(1790) \to\ \pi^+\pi^-$		$<\ 7\ \times 10^{-5}$	CL=95%
Γ_{75}	$(\pi^+\pi^+)_{S-\text{wave}}\pi^-$		$<\ 1.2\ \times 10^{-4}$	CL=95%
Γ_{76}	$2\pi^+\pi^-$ nonresonant		$<\ 1.1\ \times 10^{-4}$	CL=95%
Γ_{77}	$\pi^+ 2\pi^0$		$(\ 4.7\ \pm 0.4\ ) \times 10^{-3}$	
Γ_{78}	$2\pi^+\pi^-\pi^0$		$(\ 1.16\pm 0.09)\ \%$	
Γ_{79}	$\eta\pi^+$, $\eta \to\ \pi^+\pi^-\pi^0$		$(\ 7.8\ \pm 0.5\ ) \times 10^{-4}$	
Γ_{80}	$\omega\pi^+$, $\omega \to\ \pi^+\pi^-\pi^0$		$<\ 3\ \times 10^{-4}$	CL=90%
Γ_{81}	$3\pi^+ 2\pi^-$		$(\ 1.66\pm 0.17) \times 10^{-3}$	S=1.1

Fractions of some of the following modes with resonances have already appeared above as submodes of particular charged-particle modes.

Γ_{82}	$\eta\pi^+$		$(\ 3.43\pm 0.22) \times 10^{-3}$	
Γ_{83}	$\eta\pi^+\pi^0$		$(\ 1.38\pm 0.35) \times 10^{-3}$	
Γ_{84}	$\omega\pi^+$		$<\ 3.4\ \times 10^{-4}$	CL=90%
Γ_{85}	$\eta'(958)\pi^+$		$(\ 4.4\ \pm 0.4\ ) \times 10^{-3}$	
Γ_{86}	$\eta'(958)\pi^+\pi^0$		$(\ 1.6\ \pm 0.5\ ) \times 10^{-3}$	

Hadronic modes with a $K\overline{K}$ pair

Γ_{87}	$K^+ K^0_S$		$(\ 2.86\pm0.12)\times10^{-3}$	S=1.9
Γ_{88}	$K^+ K^- \pi^+$	[a]	$(\ 9.8\ \pm0.4\ )\times10^{-3}$	S=1.9
Γ_{89}	$\phi\pi^+$, $\phi\to\ K^+K^-$		$(\ 2.72\pm0.13)\times10^{-3}$	
Γ_{90}	$K^+\overline{K}^*(892)^0$, $\overline{K}^*(892)^0\to\ K^-\pi^+$		$(\ 2.51^{+0.13}_{-0.17})\times10^{-3}$	
Γ_{91}	$K^+\overline{K}^*_0(1430)^0$, $\overline{K}^*_0(1430)^0\to$ $K^-\pi^+$		$(\ 1.8\ \pm0.4\ )\times10^{-3}$	
Γ_{92}	$K^+\overline{K}^*_2(1430)^0$, $\overline{K}^*_2\to$ $K^-\pi^+$		$(\ 1.7\ ^{+1.2}_{-0.8}\ )\times10^{-4}$	
Γ_{93}	$K^+\overline{K}^*_0(800)$, $\overline{K}^*_0\to\ K^-\pi^+$		$(\ 6.8\ ^{+3.5}_{-2.1}\ )\times10^{-4}$	
Γ_{94}	$a_0(1450)^0\pi^+$, $a^0_0\to\ K^+K^-$		$(\ 4.5\ ^{+7.0}_{-1.9}\ )\times10^{-4}$	
Γ_{95}	$\phi(1680)\pi^+$, $\phi\to\ K^+K^-$		$(\ 5.0\ ^{+4.0}_{-1.9}\ )\times10^{-5}$	
Γ_{96}	$K^+K^-\pi^+$ nonresonant		not seen	
Γ_{97}	$K^+K^0_S\pi^+\pi^-$		$(\ 1.74\pm0.18)\times10^{-3}$	
Γ_{98}	$K^0_S K^-2\pi^+$		$(\ 2.38\pm0.18)\times10^{-3}$	
Γ_{99}	$K^+K^-2\pi^+\pi^-$		$(\ 2.3\ \pm1.2\ )\times10^{-4}$	

A few poorly measured branching fractions:

Γ_{100}	$\phi\pi^+\pi^0$		$(\ 2.3\ \pm1.0\ )$ %	
Γ_{101}	$\phi\rho^+$		$<\ 1.5$ %	CL=90%
Γ_{102}	$K^+K^-\pi^+\pi^0$ non-ϕ		$(\ 1.5\ ^{+0.7}_{-0.6}\ )$ %	
Γ_{103}	$K^*(892)^+K^0_S$		$(\ 1.6\ \pm0.7\ )$ %	

Doubly Cabibbo-suppressed modes

Γ_{104}	$K^+\pi^0$	$(\ 2.37\pm0.32)\times10^{-4}$	
Γ_{105}	$K^+\pi^+\pi^-$	$(\ 5.42\pm0.30)\times10^{-4}$	
Γ_{106}	$K^+\rho^0$	$(\ 2.1\ \pm0.5\ )\times10^{-4}$	
Γ_{107}	$K^*(892)^0\pi^+$, $K^*(892)^0\to$ $K^+\pi^-$	$(\ 2.5\ \pm0.5\ )\times10^{-4}$	
Γ_{108}	$K^+f_0(980)$, $f_0(980)\to$ $\pi^+\pi^-$	$(\ 4.8\ \pm2.9\ )\times10^{-5}$	
Γ_{109}	$K^*_2(1430)^0\pi^+$, $K^*_2(1430)^0\to$ $K^+\pi^-$	$(\ 4.4\ \pm2.9\ )\times10^{-5}$	
Γ_{110}	$K^+\pi^+\pi^-$ nonresonant	not seen	
Γ_{111}	$2K^+K^-$	$(\ 8.9\ \pm2.1\ )\times10^{-5}$	

$\Delta C = 1$ weak neutral current (*C1*) modes, or Lepton Family number (*LF*) or Lepton number (*L*) violating modes

Γ_{112}	$\pi^+ e^+ e^-$	*C1*		< 7.4	$\times 10^{-6}$	CL=90%
Γ_{113}	$\pi^+ \phi$, $\phi \to e^+ e^-$		[e]	$(2.7\ ^{+4.0}_{-1.8}) \times 10^{-6}$		
Γ_{114}	$\pi^+ \mu^+ \mu^-$	*C1*		< 3.9	$\times 10^{-6}$	CL=90%
Γ_{115}	$\pi^+ \phi$, $\phi \to \mu^+ \mu^-$		[e]	$(1.8 \pm 0.8) \times 10^{-6}$		
Γ_{116}	$\rho^+ \mu^+ \mu^-$	*C1*		< 5.6	$\times 10^{-4}$	CL=90%
Γ_{117}	$K^+ e^+ e^-$		[f]	< 6.2	$\times 10^{-6}$	CL=90%
Γ_{118}	$K^+ \mu^+ \mu^-$		[f]	< 9.2	$\times 10^{-6}$	CL=90%
Γ_{119}	$\pi^+ e^\pm \mu^\mp$	*LF*	[g]	< 3.4	$\times 10^{-5}$	CL=90%
Γ_{120}	$\pi^+ e^+ \mu^-$					
Γ_{121}	$\pi^+ e^- \mu^+$					
Γ_{122}	$K^+ e^\pm \mu^\mp$	*LF*	[g]	< 6.8	$\times 10^{-5}$	CL=90%
Γ_{123}	$K^+ e^+ \mu^-$					
Γ_{124}	$K^+ e^- \mu^+$					
Γ_{125}	$\pi^- 2e^+$	*L*		< 3.6	$\times 10^{-6}$	CL=90%
Γ_{126}	$\pi^- 2\mu^+$	*L*		< 4.8	$\times 10^{-6}$	CL=90%
Γ_{127}	$\pi^- e^+ \mu^+$	*L*		< 5.0	$\times 10^{-5}$	CL=90%
Γ_{128}	$\rho^- 2\mu^+$	*L*		< 5.6	$\times 10^{-4}$	CL=90%
Γ_{129}	$K^- 2e^+$	*L*		< 4.5	$\times 10^{-6}$	CL=90%
Γ_{130}	$K^- 2\mu^+$	*L*		< 1.3	$\times 10^{-5}$	CL=90%
Γ_{131}	$K^- e^+ \mu^+$	*L*		< 1.3	$\times 10^{-4}$	CL=90%
Γ_{132}	$K^*(892)^- 2\mu^+$	*L*		< 8.5	$\times 10^{-4}$	CL=90%

Γ_{133}	A dummy mode used by the fit.	(46.3 ± 1.8) %	S=1.3

[a] The branching fraction for this mode may differ from the sum of the submodes that contribute to it, due to interference effects. See the relevant papers.

[b] These subfractions of the $K^- 2\pi^+$ mode are uncertain: see the Particle Listings.

[c] Submodes of the $D^+ \to K^- 2\pi^+ \pi^0$ and $K^0_S 2\pi^+ \pi^-$ modes were studied by ANJOS 92C and COFFMAN 92B, but with at most 142 events for the first mode and 229 for the second – not enough for precise results. With nothing new for 18 years, we refer to our 2008 edition, Physics Letters **B667** 1 (2008), for those results.

[d] The unseen decay modes of the resonances are included.

[e] This is *not* a test for the ΔC=1 weak neutral current, but leads to the $\pi^+ \ell^+ \ell^-$ final state.

[f] This mode is not a useful test for a ΔC=1 weak neutral current because both quarks must change flavor in this decay.

[*g*] The value is for the sum of the charge states or particle/antiparticle states indicated.

CONSTRAINED FIT INFORMATION

An overall fit to 23 branching ratios uses 36 measurements and one constraint to determine 15 parameters. The overall fit has a $\chi^2 = 35.8$ for 22 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\left\langle \delta x_i \delta x_j \right\rangle / (\delta x_i \cdot \delta x_j)$, in percent, from the fit to the branching fractions, $x_i \equiv \Gamma_i/\Gamma_{\rm total}$. The fit constrains the x_i whose labels appear in this array to sum to one.

x_{18}	0									
x_{27}	0	0								
x_{32}	6	8	6							
x_{33}	63	0	0	6						
x_{36}	6	0	0	2	6					
x_{38}	45	1	1	13	46	13				
x_{48}	−17	0	0	−5	−17	52	−37			
x_{52}	37	1	1	11	37	4	81	−17		
x_{53}	4	0	0	1	4	71	8	50	−17	
x_{54}	19	0	0	6	19	5	42	−16	34	3
x_{81}	18	0	0	5	18	5	39	−15	32	3
x_{87}	3	0	0	1	3	60	8	31	2	43
x_{88}	40	1	1	12	41	10	89	−35	75	5
x_{133}	−79	−33	−4	−29	−72	−24	−68	3	−61	−19
	x_{17}	x_{18}	x_{27}	x_{32}	x_{33}	x_{36}	x_{38}	x_{48}	x_{52}	x_{53}

x_{81}	79			
x_{87}	3	3		
x_{88}	38	35	6	
x_{133}	−32	−29	−15	−61
	x_{54}	x_{81}	x_{87}	x_{88}

D^+ BRANCHING RATIOS

Some now-obsolete measurements have been omitted from these Listings.

c-quark decays

$\Gamma(c \to e^+ \text{anything})/\Gamma(c \to \text{anything})$

For the Summary Table, we only use the average of e^+ and μ^+ measurements from $Z^0 \to c\overline{c}$ decays; see the second data block below.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.103 \pm 0.009 ^{+0.009}_{-0.008}$	378	[3] ABBIENDI	99K	OPAL	$Z^0 \to c\overline{c}$

[3] ABBIENDI 99K uses the excess of right-sign over wrong-sign leptons opposite reconstructed $D^*(2010)^+ \to D^0\pi^+$ decays in $Z^0 \to c\overline{c}$.

$\Gamma(c \to \mu^+ \text{anything})/\Gamma(c \to \text{anything})$

For the Summary Table, we only use the average of e^+ and μ^+ measurements from $Z^0 \to c\overline{c}$ decays; see the next data block.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.082 ± 0.005 OUR AVERAGE					
$0.073 \pm 0.008 \pm 0.002$	73	KAYIS-TOPAK.	05	CHRS	ν_μ emulsion
$0.095 \pm 0.007 ^{+0.014}_{-0.013}$	2829	ASTIER	00D	NOMD	$\nu_\mu \text{Fe} \to \mu^-\mu^+\text{X}$
$0.090 \pm 0.007 ^{+0.007}_{-0.006}$	476	[4] ABBIENDI	99K	OPAL	$Z^0 \to c\overline{c}$
$0.086 \pm 0.017 ^{+0.008}_{-0.007}$	69	[5] ALBRECHT	92F	ARG	$e^+e^- \approx 10$ GeV
$0.078 \pm 0.009 \pm 0.012$		ONG	88	MRK2	e^+e^- 29 GeV
$0.078 \pm 0.015 \pm 0.02$		BARTEL	87	JADE	e^+e^- 34.6 GeV
$0.082 \pm 0.012 ^{+0.02}_{-0.01}$		ALTHOFF	84G	TASS	e^+e^- 34.5 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.093 \pm 0.009 \pm 0.009$	88	KAYIS-TOPAK.	02	CHRS	See KAYIS-TOPAKSU 05
$0.089 \pm 0.018 \pm 0.025$		BARTEL	85J	JADE	See BARTEL 87

[4] ABBIENDI 99K uses the excess of right-sign over wrong-sign leptons opposite reconstructed $D^*(2010)^+ \to D^0\pi^+$ decays in $Z^0 \to c\overline{c}$.

[5] ALBRECHT 92F uses the excess of right-sign over wrong-sign leptons in a sample of events tagged by fully reconstructed $D^*(2010)^+ \to D^0\pi^+$ decays.

$\Gamma(c \to \ell^+ \text{anything})/\Gamma(c \to \text{anything})$

This is an average (not a sum) of e^+ and μ^+ measurements.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.096 ± 0.004 OUR AVERAGE					
$0.0958 \pm 0.0042 \pm 0.0028$	1828	[6] ABREU	00O	DLPH	$Z^0 \to c\overline{c}$
$0.095 \pm 0.006 ^{+0.007}_{-0.006}$	854	[7] ABBIENDI	99K	OPAL	$Z^0 \to c\overline{c}$

[6] ABREU 00O uses leptons opposite fully reconstructed $D^*(2010)^+$, D^+, or D^0 mesons.

[7] ABBIENDI 99K uses the excess of right-sign over wrong-sign leptons opposite reconstructed $D^*(2010)^+ \to D^0\pi^+$ decays in $Z^0 \to c\overline{c}$.

$\Gamma(c \to D^*(2010)^+ \text{anything})/\Gamma(c \to \text{anything})$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.255 \pm 0.015 \pm 0.008$	2371	[8] ABREU	00O	DLPH	$Z^0 \to c\overline{c}$

[8] ABREU 00O uses slow pions opposite fully reconstructed $D^*(2010)^+$, D^+, or D^0 mesons as a signal of $D^*(2010)^-$ production.

Inclusive modes

$\Gamma(e^+ \text{semileptonic})/\Gamma_{total}$ Γ_1/Γ

The sum of our $\overline{K}^0 e^+ \nu_e$, $\overline{K}^*(892)^0 e^+ \nu_e$, $\pi^0 e^+ \nu_e$, $\eta e^+ \nu_e$, $\rho^0 e^+ \nu_e$, and $\omega e^+ \nu_e$ branching fractions is 15.3 ± 0.4%.

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
16.07±0.30 OUR AVERAGE					
16.13±0.10±0.29	26.2±0.2k	[9] ASNER	10	CLEO	e^+e^- at 3774 MeV
15.2 ±0.9 ±0.8	521 ± 32	ABLIKIM	07G	BES2	$e^+e^- \approx \psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
16.13±0.20±0.33	8798±105	[10] ADAM	06A	CLEO	See ASNER 10
17.0 ±1.9 ±0.7	158	BALTRUSAIT...85B		MRK3	e^+e^- 3.77 GeV

[9] Using the D^+ and D^0 lifetimes, ASNER 10 finds that the ratio of the D^+ and D^0 semileptonic widths is 0.985 ± 0.015 ± 0.024.

[10] Using the D^+ and D^0 lifetimes, ADAM 06A finds that the ratio of the D^+ and D^0 inclusive e^+ widths is 0.985 ± 0.028 ± 0.015, consistent with the isospin-invariance prediction of 1.

$\Gamma(\mu^+ \text{anything})/\Gamma_{total}$ Γ_2/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
17.6±2.7±1.8	100 ± 12	[11] ABLIKIM	08L	BES2	$e^+e^- \approx \psi(3772)$

[11] ABLIKIM 08L finds the ratio of $D^+ \to \mu^+ X$ and $D^0 \to \mu^+ X$ branching fractions to be 2.59 ± 0.70 ± 0.25, in accord with the ratio of D^+ and D^0 lifetimes, 2.54 ± 0.02.

$\Gamma(K^- \text{anything})/\Gamma_{total}$ Γ_3/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
25.7±1.4 OUR AVERAGE					
24.7±1.3±1.2	631 ± 33	ABLIKIM	07G	BES2	$e^+e^- \approx \psi(3770)$
$27.8^{+3.6}_{-3.1}$		BARLAG	92C	ACCM	π^- Cu 230 GeV
27.1±2.3±2.4		COFFMAN	91	MRK3	e^+e^- 3.77 GeV

$[\Gamma(\overline{K}^0 \text{anything}) + \Gamma(K^0 \text{anything})]/\Gamma_{total}$ Γ_4/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
61 ±5 OUR AVERAGE					
60.5±5.5±3.3	244 ± 22	ABLIKIM	06U	BES2	e^+e^- at 3773 MeV
61.2±6.5±4.3		COFFMAN	91	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^+ \text{anything})/\Gamma_{total}$ Γ_5/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
5.9±0.8 OUR AVERAGE					
6.1±0.9±0.4	189 ± 27	ABLIKIM	07G	BES2	$e^+e^- \approx \psi(3770)$
5.5±1.3±0.9		COFFMAN	91	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^*(892)^- \text{anything})/\Gamma_{total}$ Γ_6/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
5.7±5.2±0.7	7.2 ± 6.5	ABLIKIM	06U	BES2	e^+e^- at 3773 MeV

$\Gamma(\overline{K}^*(892)^0 \text{anything})/\Gamma_{\text{total}}$ Γ_7/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
23.2±4.5±3.0	189 ± 36	ABLIKIM	05P	BES	$e^+e^- \approx$ 3773 MeV

$\Gamma(K^*(892)^+ \text{anything})/\Gamma_{\text{total}}$ Γ_8/Γ

VALUE (%)	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<20.3	90	[12] ABLIKIM	06U	BES2	e^+e^- at 3773 MeV

[12] One-third of the $K^*(892)^+$ would decay to $K^+\pi^0$, and one-third of this ABLIKIM 06U limit is < 0.068, which is larger than the measured K^+X branching fraction.

$\Gamma(K^*(892)^0 \text{anything})/\Gamma_{\text{total}}$ Γ_9/Γ

VALUE (%)	CL%	DOCUMENT ID		TECN	COMMENT
<6.6	90	ABLIKIM	05P	BES	$e^+e^- \approx$ 3773 MeV

$\Gamma(\eta \text{ anything})/\Gamma_{\text{total}}$ Γ_{10}/Γ

This ratio includes η particles from η' decays.

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
6.3±0.5±0.5	1972 ± 142	HUANG	06B	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(\eta' \text{ anything})/\Gamma_{\text{total}}$ Γ_{11}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.04±0.16±0.09	82 ± 13	HUANG	06B	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(\phi \text{ anything})/\Gamma_{\text{total}}$ Γ_{12}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.03±0.10±0.07	248 ± 21	HUANG	06B	CLEO	e^+e^- at $\psi(3770)$

Leptonic and semileptonic modes

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<8.8 × 10^{-6}	90	EISENSTEIN	08	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<2.4 × 10^{-5}	90	ARTUSO	05A	CLEO	See EISENSTEIN 08

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

See the note on "Decay Constants of Charged Pseudoscalar Mesons" in the D_s^+ Listings.

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
3.82± 0.32±0.09	150 ± 12	[13] EISENSTEIN	08	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
12.2 $^{+11.1}_{-5.3}$ ±1.0	3	[14] ABLIKIM	05D	BES	$e^+e^- \approx$ 3.773 GeV
4.40± 0.66$^{+0.09}_{-0.12}$	47 ± 7	[15] ARTUSO	05A	CLEO	See EISENSTEIN 08
3.5 ± 1.4 ±0.6	7	[16] BONVICINI	04A	CLEO	Incl. in ARTUSO 05A
8 $^{+16}_{-5}$ $^{+5}_{-2}$	1	[17] BAI	98B	BES	$e^+e^- \to D^{*+}D^-$

[13] EISENSTEIN 08, using the D^+ lifetime and assuming $|V_{cd}| = |V_{us}|$, gets $f_{D^+} =$ (205.8 ± 8.5 ± 2.5) MeV from this measurement.

[14] ABLIKIM 05D finds a background-subtracted 2.67 ± 1.74 $D^+ \to \mu^+\nu_\mu$ events, and from this obtains $f_{D^+} = 371^{+129}_{-119} \pm 25$ MeV.

[15] ARTUSO 05A obtains $f_{D^+} = 222.6 \pm 16.7^{+2.8}_{-3.4}$ MeV from this measurement.

[16] BONVICINI 04A finds eight events with an estimated background of one, and from the branching fraction obtains $f_{D^+} = 202 \pm 41 \pm 17$ MeV.

[17] BAI 98B obtains $f_{D^+} = (300^{+180}_{-150}{}^{+80}_{-40})$ MeV from this measurement.

$\Gamma(\tau^+\nu_\tau)/\Gamma_{\text{total}}$ Γ_{15}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.2 \times 10^{-3}$	90	EISENSTEIN	08	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.1 \times 10^{-3}$	90	RUBIN	06A	CLEO	See EISENSTEIN 08

$\Gamma(\overline{K}^0 e^+\nu_e)/\Gamma_{\text{total}}$ Γ_{16}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
8.83±0.22 OUR AVERAGE					
8.83±0.10±0.20	8467	[18] BESSON	09	CLEO	e^+e^- at $\psi(3770)$
8.95±1.59±0.67	34 ± 6	[19] ABLIKIM	05A	BES	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
8.53±0.13±0.23		[20] DOBBS	08	CLEO	See BESSON 09
8.71±0.38±0.37	545 ± 24	HUANG	05B	CLEO	See DOBBS 08

[18] See the form-factor parameters near the end of this D^+ Listing.

[19] The ABLIKIM 05A result together with the $D^0 \to K^- e^+\nu_e$ branching fraction of ABLIKIM 04C and Particle Data Group lifetimes gives $\Gamma(D^0 \to K^- e^+\nu_e) / \Gamma(D^+ \to \overline{K}^0 e^+\nu_e) = 1.08 \pm 0.22 \pm 0.07$; isospin invariance predicts the ratio is 1.0.

[20] DOBBS 08 establishes $|\frac{V_{cd}}{V_{cs}} \cdot \frac{f_+^\pi(0)}{f_+^K(0)}| = 0.188 \pm 0.008 \pm 0.002$ from the D^+ and D^0 decays to $\overline{K}e^+\nu_e$ and $\pi e^+\nu_e$. It also finds $\Gamma(D^0 \to K^- e^+\nu_e) / \Gamma(D^+ \to \overline{K}^0 e^+\nu_e) = 1.06 \pm 0.02 \pm 0.03$; isospin invariance predicts the ratio is 1.0.

$\Gamma(\overline{K}^0\mu^+\nu_\mu)/\Gamma_{\text{total}}$ Γ_{17}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.094±0.008 OUR FIT	Error includes scale factor of 1.2.				
0.103±0.023±0.008	29 ± 6	ABLIKIM	07	BES2	e^+e^- at 3773 MeV

$\Gamma(\overline{K}^0\mu^+\nu_\mu)/\Gamma(K^-2\pi^+)$ Γ_{17}/Γ_{38}

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
1.01 ±0.08 OUR FIT	Error includes scale factor of 1.1.			
1.019±0.076±0.065	555 ± 39	LINK	04E FOCS	γ nucleus, $\overline{E}_\gamma \approx 180$ GeV

$\Gamma(K^-\pi^+e^+\nu_e)/\Gamma_{\text{total}}$ Γ_{18}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
4.1 ±0.6 OUR FIT	Error includes scale factor of 1.1.			
3.5 $^{+0.7}_{-0.6}$ OUR AVERAGE				
3.50±0.75±0.27	29 ± 6	ABLIKIM	06O BES2	e^+e^- at 3773 MeV
3.5 $^{+1.2}_{-0.7}$ ±0.4	14	BAI	91 MRK3	$e^+e^- \approx 3.77$ GeV

$\Gamma(\overline{K}^*(892)^0 e^+ \nu_e)/\Gamma_{\text{total}}$ Γ_{32}/Γ

Unseen decay modes of $\overline{K}^*(892)^0$ are included. See the end of the D^+ Listings for measurements of $D^+ \to \overline{K}^*(892)^0 \ell^+ \nu_\ell$ form-factor ratios.

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
5.53±0.32 OUR FIT Error includes scale factor of 1.2.				
5.52±0.34 OUR AVERAGE				
5.06±1.21±0.40	28 ± 7	ABLIKIM	06O BES2	e^+e^- at 3773 MeV
5.56±0.27±0.23	422 ± 21	[21] HUANG	05B CLEO	e^+e^- at $\psi(3770)$

[21] HUANG 05B finds $\Gamma(D^0 \to K^{*-} e^+ \nu_e)$ / $\Gamma(D^+ \to \overline{K}^{*0} e^+ \nu_e) = 0.98 \pm 0.08 \pm 0.04$; isospin invariance predicts the ratio is 1.0.

$\Gamma(\overline{K}^*(892)^0 e^+ \nu_e)/\Gamma(K^- \pi^+ e^+ \nu_e)$ Γ_{32}/Γ_{18}

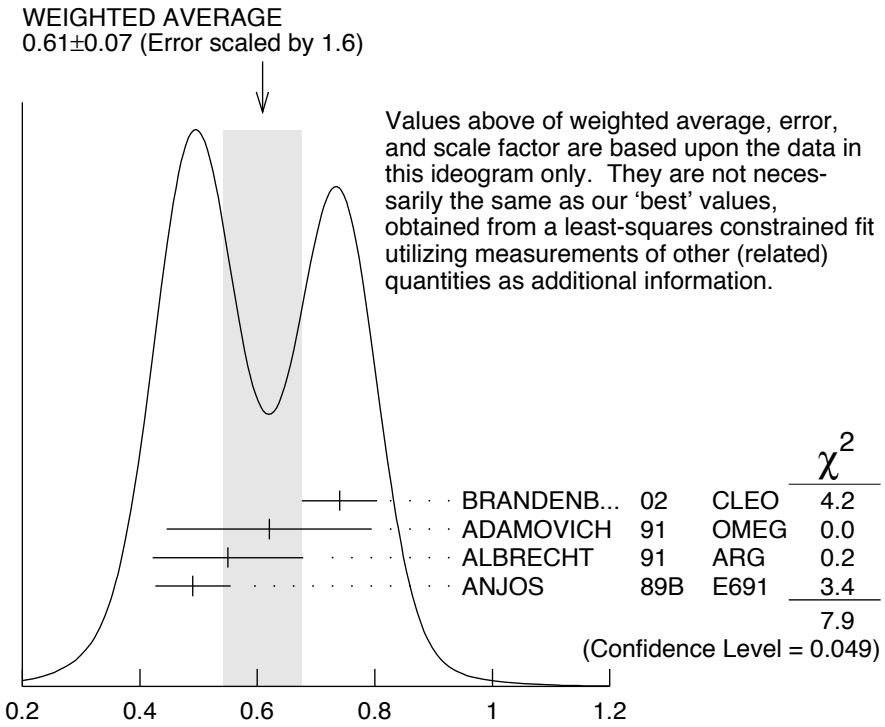
Unseen decay modes of the $\overline{K}^*(892)^0$ are included. See the end of the D^+ Listings for measurements of $D^+ \to \overline{K}^*(892)^0 \ell^+ \nu_\ell$ form-factor ratios.

VALUE	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
1.36±0.22 OUR FIT Error includes scale factor of 1.2.				
1.0 ±0.3	35	ADAMOVICH 91	OMEG	π^- 340 GeV

$\Gamma(\overline{K}^*(892)^0 e^+ \nu_e)/\Gamma(K^- 2\pi^+)$ Γ_{32}/Γ_{38}

Unseen decay modes of the $\overline{K}^*(892)^0$ are included. See the end of the D^+ Listings for measurements of $D^+ \to \overline{K}^*(892)^0 \ell^+ \nu_\ell$ form-factor ratios.

VALUE	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
0.59±0.04 OUR FIT Error includes scale factor of 1.4.				
0.61±0.07 OUR AVERAGE Error includes scale factor of 1.6. See the ideogram below.				
0.74±0.04±0.05		BRANDENB... 02	CLEO	$e^+e^- \approx \Upsilon(4S)$
0.62±0.15±0.09	35	ADAMOVICH 91	OMEG	π^- 340 GeV
0.55±0.08±0.10	880	ALBRECHT 91	ARG	$e^+e^- \approx$ 10.4 GeV
0.49±0.04±0.05		ANJOS 89B	E691	Photoproduction



$\Gamma\left(\overline{K}^*(892)^0 e^+ \nu_e\right)/\Gamma\left(K^- 2\pi^+\right)$

$\Gamma\left(K^-\pi^+ e^+ \nu_e \text{ nonresonant}\right)/\Gamma_{\text{total}}$ Γ_{20}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.007	90	ANJOS	89B	E691	Photoproduction

$\Gamma\left(K^-\pi^+\mu^+\nu_\mu\right)/\Gamma\left(\overline{K}^0\mu^+\nu_\mu\right)$ Γ_{21}/Γ_{17}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.417±0.030±0.023	555 ± 39	LINK	04E	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma\left(\overline{K}^*(892)^0\mu^+\nu_\mu\right)/\Gamma\left(\overline{K}^0\mu^+\nu_\mu\right)$ Γ_{33}/Γ_{17}

Unseen decay modes of the $\overline{K}^*(892)^0$ are included. See the end of the D^+ Listings for measurements of $D^+ \to \overline{K}^*(892)^0\ell^+\nu_\ell$ form-factor ratios.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.58 ±0.05 OUR FIT					
0.594±0.043±0.033	555 ± 39	LINK	04E	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma\left(\overline{K}^*(892)^0\mu^+\nu_\mu\right)/\Gamma\left(K^-2\pi^+\right)$ Γ_{33}/Γ_{38}

Unseen decay modes of the $\overline{K}^*(892)^0$ are included. See the end of the D^+ Listings for measurements of $D^+ \to \overline{K}^*(892)^0\ell^+\nu_\ell$ form-factor ratios.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.58 ±0.05 OUR FIT Error includes scale factor of 1.1.					
0.57 ±0.06 OUR AVERAGE Error includes scale factor of 1.2.					
0.72 ±0.10 ±0.05		BRANDENB...	02	CLEO	$e^+e^- \approx \Upsilon(4S)$
0.56 ±0.04 ±0.06	875	FRABETTI	93E	E687	γBe $\overline{E}_\gamma \approx$ 200 GeV
0.46 ±0.07 ±0.08	224	KODAMA	92C	E653	π^- emulsion 600 GeV

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

$0.602 \pm 0.010 \pm 0.021$	12k	[22] LINK	02J	FOCS	γ nucleus, $\approx$ 180 GeV

[22] This LINK 02J result includes the effects of an interference of a small S-wave $K^-\pi^+$ amplitude with the dominant $\overline{K}^{*0}$ amplitude. (The interference effect is reported in LINK 02E.) This result is redundant with results of LINK 04E elsewhere in these Listings.

$\Gamma(K^-\pi^+\mu^+\nu_\mu \text{ nonresonant})/\Gamma(K^-\pi^+\mu^+\nu_\mu)$ Γ_{23}/Γ_{21}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.0530 \pm 0.0074^{+0.0099}_{-0.0096}}$	14k	LINK	05I	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^-\pi^+\pi^0\mu^+\nu_\mu)/\Gamma(K^-\pi^+\mu^+\nu_\mu)$ Γ_{24}/Γ_{21}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.042	90	FRABETTI	93E	E687	γBe $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma(\overline{K}_0^*(1430)^0\mu^+\nu_\mu)/\Gamma(K^-\pi^+\mu^+\nu_\mu)$ Γ_{34}/Γ_{21}

Unseen decay modes of the $\overline{K}_0^*(1430)^0$ are included.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
<0.0064	90	LINK	05I	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(\overline{K}^*(1680)^0\mu^+\nu_\mu)/\Gamma(K^-\pi^+\mu^+\nu_\mu)$ Γ_{35}/Γ_{21}

Unseen decay modes of the $\overline{K}^*(1680)^0$ are included.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
<0.04	90	LINK	05I	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(\pi^0 e^+\nu_e)/\Gamma_{\text{total}}$ Γ_{25}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
$0.405 \pm 0.016 \pm 0.009$	838	[23] BESSON	09	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.373 \pm 0.022 \pm 0.013$		[24] DOBBS	08	CLEO	See BESSON 09
$0.44 \pm 0.06 \pm 0.03$	63 ± 9	HUANG	05B	CLEO	See DOBBS 08

[23] See the form-factor parameters near the end of this D^+ Listing.

[24] DOBBS 08 establishes $\left|\frac{V_{cd}}{V_{cs}} \cdot \frac{f_+^\pi(0)}{f_+^K(0)}\right| = 0.188 \pm 0.008 \pm 0.002$ from the D^+ and D^0 decays to $\overline{K}e^+\nu_e$ and $\pi e^+\nu_e$. It finds $\Gamma(D^0 \to \pi^- e^+\nu_e)$ / $\Gamma(D^+ \to \pi^0 e^+\nu_e) = 2.03 \pm 0.14 \pm 0.08$; isospin invariance predicts the ratio is 2.0.

$\Gamma(\eta e^+\nu_e)/\Gamma_{\text{total}}$ Γ_{26}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
$13.3 \pm 2.0 \pm 0.6$	46 ± 8	MITCHELL	09B	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(\rho^0 e^+\nu_e)/\Gamma_{\text{total}}$ Γ_{27}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0022 ± 0.0004 OUR FIT					
$0.0021 \pm 0.0004 \pm 0.0001$	27 ± 6	[25] HUANG	05B	CLEO	e^+e^- at $\psi(3770)$

[25] HUANG 05B finds $\Gamma(D^0 \to \rho^- e^+\nu_e)$ / 2 $\Gamma(D^+ \to \rho^0 e^+\nu_e) = 1.2^{+0.4}_{-0.3} \pm 0.1$; isospin invariance predicts the ratio is 1.0.

$\Gamma(\rho^0 e^+ \nu_e)/\Gamma(\overline{K}^*(892)^0 e^+ \nu_e)$ Γ_{27}/Γ_{32}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.039±0.007 OUR FIT					
0.045±0.014±0.009	49	[26] AITALA	97	E791	π^- nucleus, 500 GeV

[26] AITALA 97 explicitly subtracts $D^+ \to \eta' e^+ \nu_e$ and other backgrounds to get this result.

$\Gamma(\rho^0 \mu^+ \nu_\mu)/\Gamma(\overline{K}^*(892)^0 \mu^+ \nu_\mu)$ Γ_{28}/Γ_{33}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.045±0.007 OUR AVERAGE Error includes scale factor of 1.1.					
0.041±0.006±0.004	320 ± 44	LINK	06B	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV
0.051±0.015±0.009	54	[27] AITALA	97	E791	π^- nucleus, 500 GeV
0.079±0.019±0.013	39	[28] FRABETTI	97	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV

[27] AITALA 97 explicitly subtracts $D^+ \to \eta' \mu^+ \nu_\mu$ and other backgrounds to get this result.

[28] Because the reconstruction efficiency for photons is low, this FRABETTI 97 result also includes any $D^+ \to \eta' \mu^+ \nu_\mu \to \gamma \rho^0 \mu^+ \nu_\mu$ events in the numerator.

$\Gamma(\omega e^+ \nu_e)/\Gamma_{\text{total}}$ Γ_{29}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.0016^{+0.0007}_{-0.0006}\pm0.0001}$	$7.6^{+3.3}_{-2.7}$	HUANG	05B	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(\eta'(958) e^+ \nu_e)/\Gamma_{\text{total}}$ Γ_{30}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.5 \times 10^{-4}$	90	MITCHELL	09B	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(\phi e^+ \nu_e)/\Gamma_{\text{total}}$ Γ_{31}/Γ

Unseen decay modes of the ϕ are included.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.6 \times 10^{-4}$	90	MITCHELL	09B	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0201	90	ABLIKIM	06P	BES2	e^+e^- at 3773 MeV
<0.0209	90	BAI	91	MRK3	$e^+e^- \approx$ 3.77 GeV

Hadronic modes with a $\overline{K}$ or $\overline{K}K\overline{K}$

$\Gamma(K^0_S \pi^+)/\Gamma_{\text{total}}$ Γ_{36}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.49 ±0.04 OUR FIT Error includes scale factor of 1.4.					
1.526±0.022±0.038		[29] DOBBS	07	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.55 ±0.05 ±0.06	2230 ± 60	[29] HE	05	CLEO	See DOBBS 07
1.6 ±0.3 ±0.1	161	ADLER	88C	MRK3	e^+e^- 3.77 GeV

[29] DOBBS 07 and HE 05 use single- and double-tagged events in an overall fit. DOBBS 07 supersedes HE 05.

$\Gamma(K^0_S\pi^+)/\Gamma(K^-2\pi^+)$ Γ_{36}/Γ_{38}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.159 ±0.007 OUR FIT Error includes scale factor of 3.3.					
0.1530±0.0023±0.0016	10.6k	LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx 180$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.174 ±0.012 ±0.011	473	[30] BISHAI	97	CLEO	$e^+e^- \approx \Upsilon(4S)$
0.137 ±0.015 ±0.016	264	ANJOS	90C	E691	Photoproduction

[30] See BISHAI 97 for an isospin analysis of $D^+ \to \overline{K}\pi$ amplitudes.

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

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.460±0.040±0.035	2023 ± 54	[31] HE	08	CLEO	e^+e^- at $\psi(3770)$

[31] The difference of CLEO $D^+ \to K^0_S\pi^+$ and $K^0_L\pi^+$ branching fractions over the sum (DOBBS 07 and HE 08) is $+0.022 \pm 0.016 \pm 0.018$.

$\Gamma(K^-2\pi^+)/\Gamma_{\text{total}}$ Γ_{38}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
9.4 ±0.4 OUR FIT Error includes scale factor of 2.2.					
9.14±0.10±0.17		[32] DOBBS	07	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
9.5 ±0.2 ±0.3	15.1k±130	[32] HE	05	CLEO	See DOBBS 07
9.3 ±0.6 ±0.8	1502	[33] BALEST	94	CLEO	$e^+e^- \approx \Upsilon(4S)$
$6.4\ ^{+1.5}_{-1.4}$		[34] BARLAG	92C	ACCM	π^- Cu 230 GeV
9.1 ±1.3 ±0.4	1164	ADLER	88C	MRK3	e^+e^- 3.77 GeV
9.1 ±1.9	239	[35] SCHINDLER	81	MRK2	e^+e^- 3.771 GeV

[32] DOBBS 07 and HE 05 use single- and double-tagged events in an overall fit. DOBBS 07 supersedes HE 05.

[33] BALEST 94 measures the ratio of $D^+ \to K^-\pi^+\pi^+$ and $D^0 \to K^-\pi^+$ branching fractions to be 2.35 ± 0.16 ± 0.16 and uses their absolute measurement of the $D^0 \to K^-\pi^+$ fraction (AKERIB 93).

[34] BARLAG 92C computes the branching fraction by topological normalization.

[35] SCHINDLER 81 (MARK-2) measures $\sigma(e^+e^- \to \psi(3770)) \times$ branching fraction to be 0.38 ± 0.05 nb. We use the MARK-3 (ADLER 88C) value of $\sigma = 4.2 \pm 0.6 \pm 0.3$ nb.

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$\Gamma((K^-\pi^+)_{S\text{-wave}}\pi^+)/\Gamma(K^-2\pi^+)$ Γ_{39}/Γ_{38}

This is the "fit fraction" from the Dalitz-plot analysis. The $K^-\pi^+$ S-wave includes a broad scalar κ ($\overline{K}^*_0(800)$), the $\overline{K}^*_0(1430)^0$, and non-resonant background.

VALUE	DOCUMENT ID		TECN	COMMENT
0.801 ±0.012 OUR AVERAGE				
0.8024±0.0138±0.0043	[36] LINK	09	FOCS	MIPWA fit, 53k evts
0.838 ±0.038	[37] BONVICINI	08A	CLEO	QMIPWA fit, 141k evts
0.786 ±0.014 ±0.018	AITALA	06	E791	Dalitz fit, 15.1k events
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.8323±0.0150±0.0008	[38] LINK	07B	FOCS	See LINK 09

[36] This LINK 09 model-independent partial-wave analysis of the $K^-\pi^+$ S-wave slices the $K^-\pi^+$ mass range into 39 bins.

[37] The BONVICINI 08A QMIPWA (quasi-model-independent partial-wave analysis) of the $K^-\pi^+$ S-wave amplitude slices the $K^-\pi^+$ mass range into 26 bins but keeps the Breit-Wigner $\overline{K}_0^*(1430)^0$.

[38] This LINK 07B fit uses a K matrix. The $K^-\pi^+$ S-wave fit fraction given above breaks down into (207.3 ± 25.5 ± 12.4)% isospin-1/2 and (40.5 ± 9.6 ± 3.2)% isospin-3/2 — with large interference between the two. The isospin-1/2 component includes the κ (or $\overline{K}_0^*(800)^0$) and $\overline{K}_0^*(1430)^0$.

$\Gamma(\overline{K}_0^*(800)^0\pi^+, \overline{K}_0^*(800) \to K^-\pi^+)/\Gamma(K^-2\pi^+)$ Γ_{40}/Γ_{38}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.478±0.121±0.053	AITALA	02	E791	See AITALA 06, above

$\Gamma(\overline{K}_0^*(1430)^0\pi^+, \overline{K}_0^*(1430)^0 \to K^-\pi^+)/\Gamma(K^-2\pi^+)$ Γ_{41}/Γ_{38}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.1330±0.0062	BONVICINI	08A	CLEO	QMIPWA fit, 141k evts
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.125 ±0.014 ±0.005	AITALA	02	E791	See AITALA 06, above
0.284 ±0.022 ±0.059	FRABETTI	94G	E687	Dalitz fit, 8800 evts
0.248 ±0.019 ±0.017	ANJOS	93	E691	γBe 90–260 GeV

$\Gamma(\overline{K}^*(892)^0\pi^+, \overline{K}^*(892)^0 \to K^-\pi^+)/\Gamma(K^-2\pi^+)$ Γ_{42}/Γ_{38}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.111 ±0.012 OUR AVERAGE Error includes scale factor of 3.7.				
0.1236±0.0034±0.0034	LINK	09	FOCS	MIPWA fit, 53k evts
0.0988±0.0046	BONVICINI	08A	CLEO	QMIPWA fit, 141k evts
0.119 ±0.002 ±0.020	AITALA	06	E791	Dalitz fit, 15.1k events
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.1361±0.0041±0.0030	[39] LINK	07B	FOCS	See LINK 09
0.123 ±0.010 ±0.009	AITALA	02	E791	See AITALA 06
0.137 ±0.006 ±0.009	FRABETTI	94G	E687	Dalitz fit, 8800 evts
0.170 ±0.009 ±0.034	ANJOS	93	E691	γBe 90–260 GeV
0.14 ±0.04 ±0.04	ALVAREZ	91B	NA14	Photoproduction
0.13 ±0.01 ±0.07	ADLER	87	MRK3	e^+e^- 3.77 GeV

[39] The statistical error on this LINK 07B value is corrected in LINK 09.

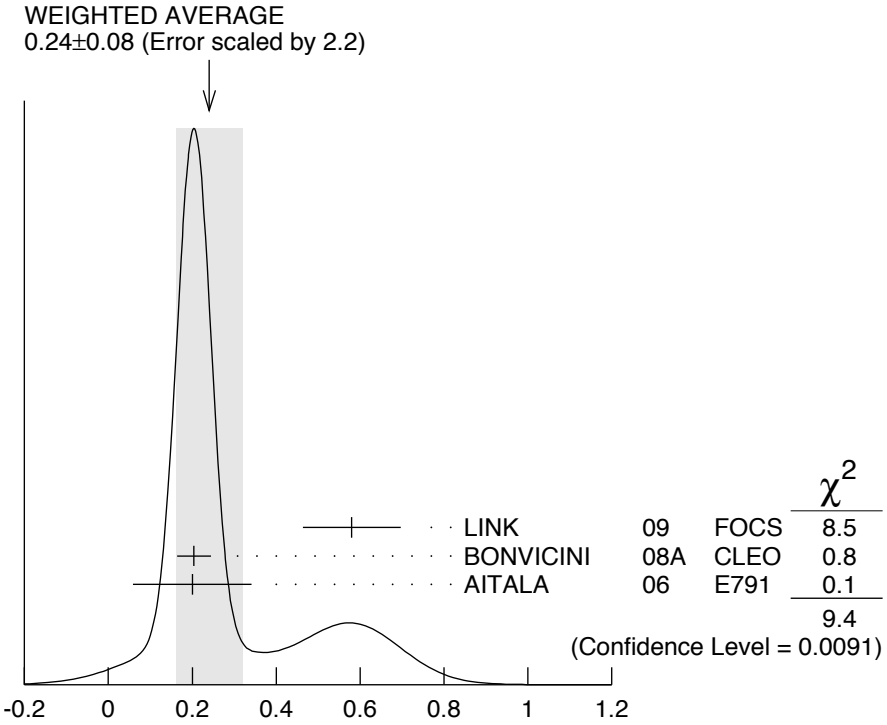
$\Gamma(\overline{K}^*(1410)^0\pi^+, \overline{K}^{*0} \to K^-\pi^+)/\Gamma(K^-2\pi^+)$ Γ_{43}/Γ_{38}

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
not seen	LINK	09	FOCS	MIPWA fit, 53k evts
not seen	BONVICINI	08A	CLEO	QMIPWA fit, 141k evts
• • • We do not use the following data for averages, fits, limits, etc. • • •				
4.8±2.1±1.7	LINK	07B	FOCS	See LINK 09

$\Gamma(\overline{K}_2^*(1430)^0\pi^+, \overline{K}_2^*(1430)^0 \to K^-\pi^+)/\Gamma(K^-2\pi^+)$ Γ_{44}/Γ_{38}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE (units 10^{-2})	*DOCUMENT ID*		*TECN*	*COMMENT*
0.24 ±0.08 OUR AVERAGE	Error includes scale factor of 2.2. See the ideogram below.			
0.58 ±0.10 ±0.06	LINK	09	FOCS	MIPWA fit, 53k evts
0.204±0.040	BONVICINI	08A	CLEO	QMIPWA fit, 141k evts
0.2 ±0.1 ±0.1	AITALA	06	E791	Dalitz fit, 15.1k events
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.39 ±0.09 ±0.05	LINK	07B	FOCS	See LINK 09
0.5 ±0.1 ±0.2	AITALA	02	E791	See AITALA 06



$\Gamma(\overline{K}_2^*(1430)^0\pi^+, \overline{K}_2^*(1430)^0 \to K^-\pi^+)/\Gamma(K^-2\pi^+)$ Γ_{44}/Γ_{38}
(units 10^{-2})

$\Gamma(\overline{K}^*(1680)^0\pi^+, \overline{K}^*(1680)^0 \to K^-\pi^+)/\Gamma(K^-2\pi^+)$ Γ_{45}/Γ_{38}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE (units 10^{-2})	*DOCUMENT ID*		*TECN*	*COMMENT*
0.23 ±0.12 OUR AVERAGE				
1.75 ±0.62 ±0.54	LINK	09	FOCS	MIPWA fit, 53k evts
0.196±0.118	BONVICINI	08A	CLEO	QMIPWA fit, 141k evts
1.2 ±0.6 ±1.2	AITALA	06	E791	Dalitz fit, 15.1k events
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.90 ±0.63 ±0.43	LINK	07B	FOCS	See LINK 09
2.5 ±0.7 ±0.3	AITALA	02	E791	See AITALA 06
4.7 ±0.6 ±0.7	FRABETTI	94G	E687	Dalitz fit, 8800 evts
3.0 ±0.4 ±1.3	ANJOS	93	E691	γBe 90–260 GeV

$\Gamma(K^-(2\pi^+)_{I=2})/\Gamma(K^-2\pi^+)$ Γ_{46}/Γ_{38}

VALUE	DOCUMENT ID		TECN	COMMENT
0.155±0.028	BONVICINI	08A	CLEO	QMIPWA fit, 141k evts

$\Gamma(K^-2\pi^+$ nonresonant$)/\Gamma(K^-2\pi^+)$ Γ_{47}/Γ_{38}

This is the "fit fraction" from the Dalitz-plot analysis. Later analyses find little need for this decay mode.

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.130±0.058±0.044	AITALA	02	E791	See AITALA 06
0.998±0.037±0.072	FRABETTI	94G	E687	Dalitz fit, 8800 evts
0.838±0.088±0.275	ANJOS	93	E691	γBe 90–260 GeV
0.79 ±0.07 ±0.15	ADLER	87	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^0_S\pi^+\pi^0)/\Gamma_{total}$ Γ_{48}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
6.90±0.32 OUR FIT Error includes scale factor of 1.3.					
6.99±0.09±0.25		[40] DOBBS	07	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
7.2 ±0.2 ±0.4	5090±100	[40] HE	05	CLEO	See DOBBS 07
5.1 ±1.3 ±0.8	159	ADLER	88C	MRK3	e^+e^- 3.77 GeV

[40] DOBBS 07 and HE 05 use single- and double-tagged events in an overall fit. DOBBS 07 supersedes HE 05.

$\Gamma(K^0_S\rho^+)/\Gamma(K^0_S\pi^+\pi^0)$ Γ_{49}/Γ_{48}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.68±0.08±0.12	ADLER	87	MRK3	e^+e^- 3.77 GeV

$\Gamma(\overline{K}^*(892)^0\pi^+, \overline{K}^*(892)^0 \to K^0_S\pi^0)/\Gamma(K^0_S\pi^+\pi^0)$ Γ_{50}/Γ_{48}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.19±0.06±0.06	ADLER	87	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^0_S\pi^+\pi^0$ nonresonant$)/\Gamma(K^0_S\pi^+\pi^0)$ Γ_{51}/Γ_{48}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.13±0.07±0.08	ADLER	87	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^-2\pi^+\pi^0)/\Gamma_{total}$ Γ_{52}/Γ

See our 2008 Review (Physics Letters **B667** 1 (2008)) for measurements of submodes of this mode. There is nothing new since 1992, and the two papers, ANJOS 92C, with 91 ± 12 events above background, and COFFMAN 92B, with 142 ± 20 such events, could not determine submode fractions with much accuracy.

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
6.08±0.29 OUR FIT Error includes scale factor of 1.6.					
5.98±0.08±0.16		[41] DOBBS	07	CLEO	e^+e^- at $\psi(3770)$

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

6.0 ±0.2 ±0.2	4840 ± 100	[41] HE	05	CLEO	See DOBBS 07	
5.8 ±1.2 ±1.2	142	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV	
6.3 $^{+1.4}_{-1.3}$ ±1.2	175	BALTRUSAIT..	86E	MRK3	See COFFMAN 92B	

[41] DOBBS 07 and HE 05 use single- and double-tagged events in an overall fit. DOBBS 07 supersedes HE 05.

$\Gamma(K^0_S 2\pi^+\pi^-)/\Gamma_{total}$ Γ_{53}/Γ

See our 2008 Review (Physics Letters **B667** 1 (2008)) for measurements of submodes of this mode. There is nothing new since 1992, and the two papers, ANJOS 92C, with 229 ± 17 events above background, and COFFMAN 92B, with 209 ± 20 such events, could not determine submode fractions with much accuracy.

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
3.10 ±0.11 OUR FIT Error includes scale factor of 1.1.				
3.122±0.046±0.096		[42] DOBBS	07	CLEO e^+e^- at $\psi(3770)$

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

3.2 ±0.1 ±0.2	3210 ± 85	[42] HE	05	CLEO	See DOBBS 07	
2.1 $^{+1.0}_{-0.9}$		[43] BARLAG	92C	ACCM	π^- Cu 230 GeV	
3.3 ±0.8 ±0.2	168	ADLER	88C	MRK3	e^+e^- 3.77 GeV	

[42] DOBBS 07 and HE 05 use single- and double-tagged events in an overall fit. DOBBS 07 supersedes HE 05.

[43] BARLAG 92C computes the branching fraction by topological normalization.

$\Gamma(K^-3\pi^+\pi^-)/\Gamma(K^-2\pi^+)$ Γ_{54}/Γ_{38}

VALUE	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
0.061±0.005 OUR FIT Error includes scale factor of 1.1.				
0.062±0.008 OUR AVERAGE Error includes scale factor of 1.3.				
0.058±0.002±0.006	2923	LINK	03D	FOCS γ A, $\overline{E}_\gamma \approx$ 180 GeV
0.077±0.008±0.010	239	FRABETTI	97C	E687 γBe, $\overline{E}_\gamma \approx$ 200 GeV

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

0.09 ±0.01 ±0.01	113	ANJOS	90D	E691	Photoproduction

$\Gamma(\overline{K}^*(892)^0 2\pi^+\pi^-, \overline{K}^*(892)^0 \to K^-\pi^+)/\Gamma(K^-3\pi^+\pi^-)$ Γ_{55}/Γ_{54}

VALUE	*DOCUMENT ID*	*TECN*	*COMMENT*
0.21±0.04±0.06	LINK	03D	FOCS γ A, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(\overline{K}^*(892)^0 \rho^0\pi^+, \overline{K}^*(892)^0 \to K^-\pi^+)/\Gamma(K^-3\pi^+\pi^-)$ Γ_{56}/Γ_{54}

VALUE	*DOCUMENT ID*	*TECN*	*COMMENT*
0.40±0.03±0.06	LINK	03D	FOCS γ A, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(\overline{K}^*(892)^0 \rho^0\pi^+, \overline{K}^*(892)^0 \to K^-\pi^+)/\Gamma(K^-2\pi^+)$ Γ_{56}/Γ_{38}

VALUE	*DOCUMENT ID*	*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.016±0.007±0.004	FRABETTI	97C	E687 γBe, $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma(\overline{K}^*(892)^0 2\pi^+\pi^-$ no-ρ, $\overline{K}^*(892)^0 \to K^-\pi^+)/\Gamma(K^-2\pi^+)$ Γ_{58}/Γ_{38}

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.032\pm0.010\pm0.008$	FRABETTI	97C	E687	γBe, $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma(K^-\rho^0 2\pi^+)/\Gamma(K^-3\pi^+\pi^-)$ Γ_{59}/Γ_{54}

VALUE	DOCUMENT ID		TECN	COMMENT
$0.30\pm0.04\pm0.01$	LINK	03D	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^-\rho^0 2\pi^+)/\Gamma(K^-2\pi^+)$ Γ_{59}/Γ_{38}

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.034\pm0.009\pm0.005$	FRABETTI	97C	E687	γBe, $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma(\overline{K}^*(892)^0 a_1(1260)^+)/\Gamma(K^-2\pi^+)$ Γ_{57}/Γ_{38}

Unseen decay modes of the $\overline{K}^*(892)^0$ and $a_1(1260)^+$ are included.

VALUE	DOCUMENT ID		TECN	COMMENT
$0.099\pm0.008\pm0.018$	LINK	03D	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^-3\pi^+\pi^-$ nonresonant$)/\Gamma(K^-3\pi^+\pi^-)$ Γ_{60}/Γ_{54}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$0.07\ \pm0.05\pm0.01$		LINK	03D	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.026	90	FRABETTI	97C	E687	γBe, $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma(K^+2K_S^0)/\Gamma(K^-2\pi^+)$ Γ_{61}/Γ_{38}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.049 ± 0.022 OUR AVERAGE Error includes scale factor of 2.4.					
$0.035\pm0.010\pm0.005$	39 $\pm$ 9	ALBRECHT	94I	ARG	$e^+e^-\approx$ 10 GeV
0.085 ± 0.018	70 $\pm$ 12	AMMAR	91	CLEO	$e^+e^- \approx$ 10.5 GeV

$\Gamma(K^+K^-K_S^0\pi^+)/\Gamma(K_S^0 2\pi^+\pi^-)$ Γ_{62}/Γ_{53}

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
$7.7\pm1.5\pm0.9$	35 $\pm$ 7	LINK	01C	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

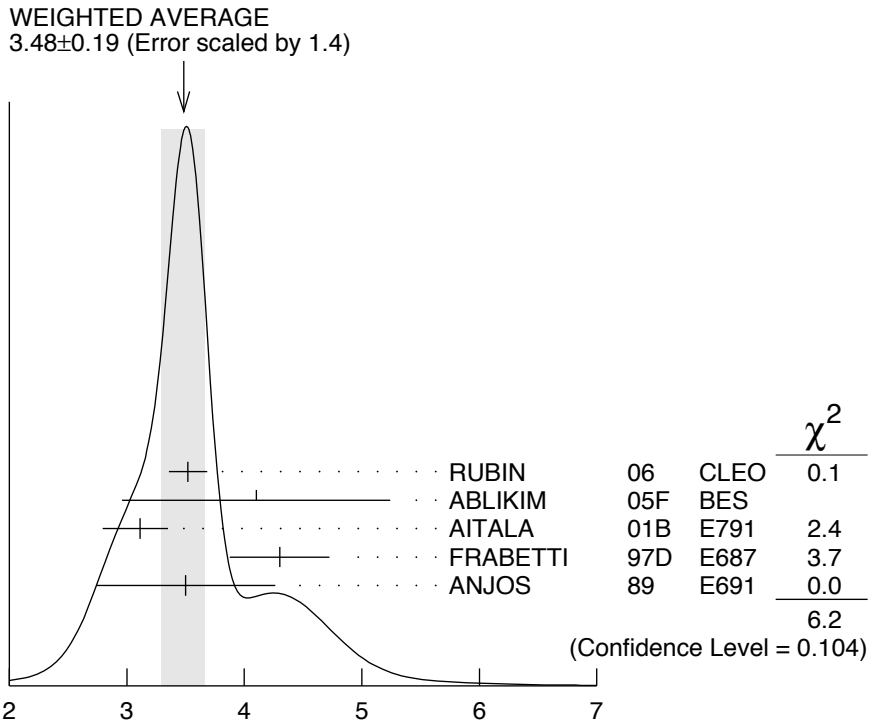
Pionic modes

$\Gamma(\pi^+\pi^0)/\Gamma(K^-2\pi^+)$ Γ_{63}/Γ_{38}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.34 ± 0.07 OUR AVERAGE					
$1.33\pm0.11\pm0.09$	1229 $\pm$ 99	AUBERT,B	06F	BABR	$e^+e^- \approx \Upsilon(4S)$
$1.33\pm0.07\pm0.06$	914 $\pm$ 46	RUBIN	06	CLEO	e^+e^- at $\psi(3770)$
$1.44\pm0.19\pm0.10$	171 $\pm$ 22	ARMS	04	CLEO	$e^+e^- \approx$ 10 GeV

$\Gamma(2\pi^+\pi^-)/\Gamma(K^-2\pi^+)$ Γ_{64}/Γ_{38}

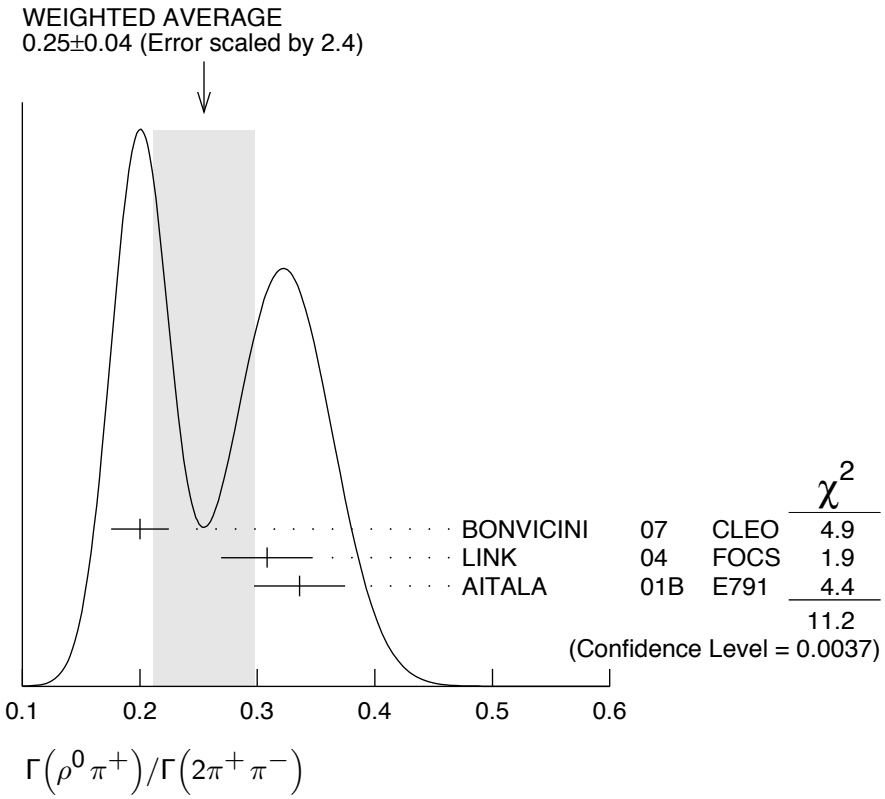
VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
3.48±0.19 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below.				
$3.52\pm0.11\pm0.12$	3303 ± 95	RUBIN	06 CLEO	e^+e^- at $\psi(3770)$
$4.1\ \pm1.1\ \pm0.3$	85 ± 22	ABLIKIM	05F BES	$e^+e^-\approx\ \psi(3770)$
$3.11\pm0.18^{+0.16}_{-0.26}$	1172	AITALA	01B E791	π^- nucleus, 500 GeV
$4.3\ \pm0.3\ \pm0.3$	236	FRABETTI	97D E687	γ Be $\approx$ 200 GeV
$3.5\ \pm0.7\ \pm0.3$	83	ANJOS	89 E691	Photoproduction



$\Gamma(\rho^0\pi^+)/\Gamma(2\pi^+\pi^-)$ Γ_{65}/Γ_{64}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	*DOCUMENT ID*	*TECN*	*COMMENT*
0.25 ±0.04 OUR AVERAGE Error includes scale factor of 2.4. See the ideogram below.			
$0.200\ \pm0.023\ \pm0.009$	BONVICINI	07 CLEO	Dalitz fit, $\approx$ 2240 evts
$0.3082\pm0.0314\pm0.0230$	LINK	04 FOCS	Dalitz fit, 1527 ± 51 evts
$0.336\ \pm0.032\ \pm0.022$	AITALA	01B E791	Dalitz fit, 1172 evts



$\Gamma(\pi^+(\pi^+\pi^-)_{S\text{=wave}})/\Gamma(2\pi^+\pi^-)$ Γ_{66}/Γ_{64}

This is the "fit fraction" from the Dalitz-plot analysis. See also the next three data blocks.

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
0.5600±0.0324±0.0214	[44] LINK	04	FOCS	Dalitz fit, 1527 ± 51 evts

[44] LINK 04 borrows a K-matrix parametrization from ANISOVICH 03 of the full π-π *S*-wave isoscalar scattering amplitude to describe the $\pi^+\pi^-$ *S*-wave component of the $\pi^+\pi^+\pi^-$ state. The fit fraction given above is a sum over five f_0 mesons, the $f_0(980)$, $f_0(1300)$, $f_0(1200–1600)$, $f_0(1500)$, and $f_0(1750)$. See LINK 04 for details and discussion.

$\Gamma(\sigma\pi^+, \sigma \to \pi^+\pi^-)/\Gamma(2\pi^+\pi^-)$ Γ_{67}/Γ_{64}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
0.422±0.027 OUR AVERAGE				
0.418±0.014±0.025	BONVICINI	07	CLEO	Dalitz fit, ≈ 2240 evts
0.463±0.090±0.021	AITALA	01B	E791	Dalitz fit, 1172 evts

$\Gamma(f_0(980)\pi^+, f_0(980) \to \pi^+\pi^-)/\Gamma(2\pi^+\pi^-)$ Γ_{68}/Γ_{64}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
0.048±0.010 OUR AVERAGE Error includes scale factor of 1.3.				
0.041±0.009±0.003	BONVICINI	07	CLEO	Dalitz fit, ≈ 2240 evts
0.062±0.013±0.004	AITALA	01B	E791	Dalitz fit, 1172 evts

$\Gamma(f_0(1370)\pi^+, f_0(1370) \to \pi^+\pi^-)/\Gamma(2\pi^+\pi^-)$ Γ_{69}/Γ_{64}

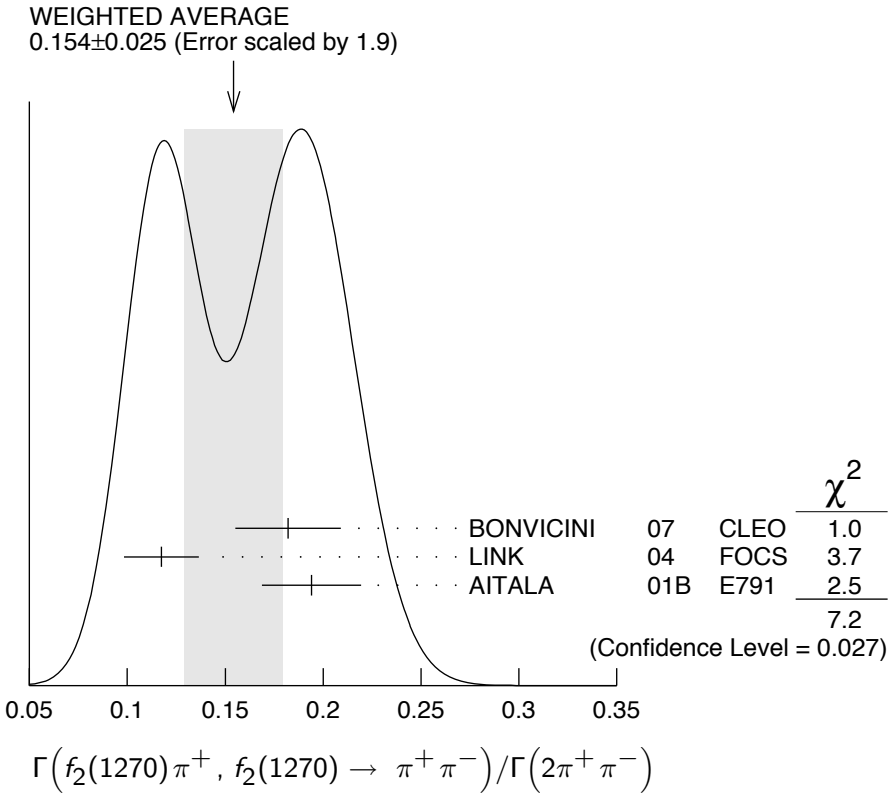
This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.024±0.013 OUR AVERAGE				
0.026±0.018±0.006	BONVICINI	07	CLEO	Dalitz fit, ≈ 2240 evts
0.023±0.015±0.008	AITALA	01B	E791	Dalitz fit, 1172 evts

$\Gamma(f_2(1270)\pi^+, f_2(1270) \to \pi^+\pi^-)/\Gamma(2\pi^+\pi^-)$ Γ_{70}/Γ_{64}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.154 ±0.025 OUR AVERAGE Error includes scale factor of 1.9. See the ideogram below.				
0.182 ±0.026 ±0.007	BONVICINI	07	CLEO	Dalitz fit, ≈ 2240 evts
0.1174±0.0190±0.0029	LINK	04	FOCS	Dalitz fit, 1527 ± 51 evts
0.194 ±0.025 ±0.004	AITALA	01B	E791	Dalitz fit, 1172 evts



$\Gamma(\rho(1450)^0\pi^+, \rho(1450)^0 \to \pi^+\pi^-)/\Gamma(2\pi^+\pi^-)$ Γ_{71}/Γ_{64}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.024	95	BONVICINI	07	CLEO	Dalitz fit, ≈ 2240 evts
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.007±0.007±0.003		AITALA	01B	E791	Dalitz fit, 1172 evts

$\Gamma(f_0(1500)\pi^+, f_0(1500) \to \pi^+\pi^-)/\Gamma(2\pi^+\pi^-)$ Γ_{72}/Γ_{64}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.034±0.010±0.008	BONVICINI	07	CLEO	Dalitz fit, ≈ 2240 evts

$\Gamma(f_0(1710)\pi^+, f_0(1710) \to \pi^+\pi^-)/\Gamma(2\pi^+\pi^-)$ Γ_{73}/Γ_{64}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.016	95	BONVICINI	07	CLEO	Dalitz fit, $\approx$ 2240 evts

$\Gamma(f_0(1790)\pi^+, f_0(1790) \to \pi^+\pi^-)/\Gamma(2\pi^+\pi^-)$ Γ_{74}/Γ_{64}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.02	95	BONVICINI	07	CLEO	Dalitz fit, $\approx$ 2240 evts

$\Gamma((\pi^+\pi^+)_{S-\text{wave}}\pi^-)/\Gamma(2\pi^+\pi^-)$ Γ_{75}/Γ_{64}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.037	95	BONVICINI	07	CLEO	Dalitz fit, $\approx$ 2240 evts

$\Gamma(2\pi^+\pi^-\ \text{nonresonant})/\Gamma(2\pi^+\pi^-)$ Γ_{76}/Γ_{64}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.035	95	BONVICINI	07	CLEO	Dalitz fit, $\approx$ 2240 evts
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.078 \pm 0.060 \pm 0.027$		AITALA	01B	E791	Dalitz fit, 1172 evts

$\Gamma(\pi^+ 2\pi^0)/\Gamma(K^-2\pi^+)$ Γ_{77}/Γ_{38}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
5.0±0.3±0.3	1535 ± 89	RUBIN	06	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(2\pi^+\pi^-\pi^0)/\Gamma(K^-2\pi^+)$ Γ_{78}/Γ_{38}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
12.4±0.5±0.6	5701 ± 205	RUBIN	06	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(\eta\pi^+)/\Gamma_{\text{total}}$ Γ_{82}/Γ

Unseen decay modes of the η are included.

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
34.3±1.4±1.7	1033 ± 42	ARTUSO	08	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(\eta\pi^+)/\Gamma(K^-2\pi^+)$ Γ_{82}/Γ_{38}

Unseen decay modes of the η are included.

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$3.81 \pm 0.26 \pm 0.21$	377 ± 26	RUBIN	06	CLEO	See ARTUSO 08

$\Gamma(\omega\pi^+)/\Gamma_{\text{total}}$ Γ_{84}/Γ

Unseen decay modes of the ω are included.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.4 \times 10^{-4}$	90	RUBIN	06	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(3\pi^+2\pi^-)/\Gamma(K^-2\pi^+)$ Γ_{81}/Γ_{38}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.77±0.17 OUR FIT					
1.73±0.20±0.17	732 ± 77	RUBIN	06	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2.3 ±0.4 ±0.2	58	FRABETTI	97C	E687	γBe, $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma(3\pi^+2\pi^-)/\Gamma(K^-3\pi^+\pi^-)$ Γ_{81}/Γ_{54}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.289±0.019 OUR FIT					
0.290±0.017±0.011	835	LINK	03D	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(\eta\pi^+\pi^0)/\Gamma_{\text{total}}$ Γ_{83}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
13.8±3.1±1.6	149 ± 34	ARTUSO	08	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(\eta'(958)\pi^+)/\Gamma_{\text{total}}$ Γ_{85}/Γ

Unseen decay modes of the $\eta'(958)$ are included.

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
44.2±2.5±2.9	352 ± 20	ARTUSO	08	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(\eta'(958)\pi^+\pi^0)/\Gamma_{\text{total}}$ Γ_{86}/Γ

Unseen decay modes of the $\eta'(958)$ are included.

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
15.7±4.3±2.5	33 ± 9	ARTUSO	08	CLEO	e^+e^- at $\psi(3770)$

Hadronic modes with a $K\overline{K}$ pair

$\Gamma(K^+K^0_S)/\Gamma_{\text{total}}$ Γ_{87}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
2.86±0.12 OUR FIT Error includes scale factor of 1.9.					
3.14±0.09±0.08	1971 ± 51	BONVICINI	08	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(K^+K^0_S)/\Gamma(K^0_S\pi^+)$ Γ_{87}/Γ_{36}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.192 ±0.006 OUR FIT Error includes scale factor of 2.8.					
0.1901±0.0024 OUR AVERAGE					
0.1899±0.0011±0.0022	101k±561	WON	09	BELL	e^+e^- at $\Upsilon(4S)$
0.1892±0.0155±0.0073	278 ± 21	ARMS	04	CLEO	$e^+e^- \approx$ 10 GeV
0.1996±0.0119±0.0096	949	LINK	02B	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.222 ±0.037 ±0.013	63 ± 10	ABLIKIM	05F	BES	$e^+e^- \approx \psi(3770)$
0.222 ±0.041 ±0.019	70	BISHAI	97	CLEO	See ARMS 04
0.25 ±0.04 ±0.02	129	FRABETTI	95	E687	γBe $\overline{E}_\gamma \approx$ 200 GeV
0.271 ±0.065 ±0.039	69	ANJOS	90C	E691	γBe
0.317 ±0.086 ±0.048	31	BALTRUSAIT..	85E	MRK3	e^+e^- 3.77 GeV
0.25 ±0.15	6	SCHINDLER	81	MRK2	e^+e^- 3.771 GeV

$\Gamma(K^+ K^0_S)/\Gamma(K^- 2\pi^+)$ Γ_{87}/Γ_{38}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$3.02 \pm 0.18 \pm 0.15$	949	[45] LINK 02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

[45] This LINK 02B result is redundant with a result in the previous datablock.

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

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
0.98 ±0.04 OUR FIT	Error includes scale factor of 1.9.			
0.935±0.017±0.024		[46] DOBBS 07	CLEO	$e^+ e^-$ at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.97 ±0.04 ±0.04	1250 ± 40	[46] HE 05	CLEO	See DOBBS 07

[46] DOBBS 07 and HE 05 use single- and double-tagged events in an overall fit. DOBBS 07 supersedes HE 05.

$\Gamma(K^+ K^- \pi^+)/\Gamma(K^- 2\pi^+)$ Γ_{88}/Γ_{38}

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.1042±0.0020 OUR FIT	Error includes scale factor of 1.3.			
0.1058±0.0029 OUR AVERAGE	Error includes scale factor of 1.4.			
0.117 ±0.013 ±0.007	181 ± 20	ABLIKIM 05F	BES	$e^+ e^- \approx \psi(3770)$
0.107 ±0.001 ±0.002	43k	AUBERT 05S	BABR	$e^+ e^- \approx \Upsilon(4S)$
$0.093 \pm 0.010 \, {}^{+0.008}_{-0.006}$		JUN 00	SELX	Σ^- nucleus, 600 GeV
$0.0976 \pm 0.0042 \pm 0.0046$		FRABETTI 95B	E687	γ Be, $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma(\phi\pi^+, \phi \to K^+ K^-)/\Gamma(K^+ K^- \pi^+)$ Γ_{89}/Γ_{88}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$\mathbf{27.8 \pm 0.4 \, {}^{+0.2}_{-0.5}}$	RUBIN 08	CLEO	Dalitz fit, 19,458±163 evts
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$29.2 \pm 3.1 \pm 3.0$	FRABETTI 95B	E687	Dalitz fit, 915 evts

$\Gamma(K^+ \overline{K}^*(892)^0, \overline{K}^*(892)^0 \to K^- \pi^+)/\Gamma(K^+ K^- \pi^+)$ Γ_{90}/Γ_{88}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$\mathbf{25.7 \pm 0.5 \, {}^{+0.4}_{-1.2}}$	RUBIN 08	CLEO	Dalitz fit, 19,458±163 evts
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$30.1 \pm 2.0 \pm 2.5$	FRABETTI 95B	E687	Dalitz fit, 915 evts

$\Gamma(K^+ \overline{K}^*_0(1430)^0, \overline{K}^*_0(1430)^0 \to K^- \pi^+)/\Gamma(K^+ K^- \pi^+)$ Γ_{91}/Γ_{88}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$\mathbf{18.8 \pm 1.2 \, {}^{+3.3}_{-3.4}}$	RUBIN 08	CLEO	Dalitz fit, 19,458±163 evts
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$37.0 \pm 3.5 \pm 1.8$	FRABETTI 95B	E687	Dalitz fit, 915 evts

$\Gamma(K^+\overline{K}_2^*(1430)^0,\ \overline{K}_2^*\to K^-\pi^+)/\Gamma(K^+K^-\pi^+)$ Γ_{92}/Γ_{88}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE (%)	DOCUMENT ID		TECN	COMMENT
$1.7\pm0.4^{+1.2}_{-0.7}$	RUBIN	08	CLEO	Dalitz fit, 19,458 ± 163 evts

$\Gamma(K^+\overline{K}_0^*(800),\ \overline{K}_0^*\to K^-\pi^+)/\Gamma(K^+K^-\pi^+)$ Γ_{93}/Γ_{88}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE (%)	DOCUMENT ID		TECN	COMMENT
$7.0\pm0.8^{+3.5}_{-2.0}$	RUBIN	08	CLEO	Dalitz fit, 19,458 ± 163 evts

$\Gamma(a_0(1450)^0\pi^+,\ a_0^0\to K^+K^-)/\Gamma(K^+K^-\pi^+)$ Γ_{94}/Γ_{88}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE (%)	DOCUMENT ID		TECN	COMMENT
$4.6\pm0.6^{+7.2}_{-1.8}$	RUBIN	08	CLEO	Dalitz fit, 19,458 ± 163 evts

$\Gamma(\phi(1680)\pi^+,\ \phi\to K^+K^-)/\Gamma(K^+K^-\pi^+)$ Γ_{95}/Γ_{88}

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE (%)	DOCUMENT ID		TECN	COMMENT
$0.51\pm0.11^{+0.37}_{-0.16}$	RUBIN	08	CLEO	Dalitz fit, 19,458 ± 163 evts

$\Gamma(K^*(892)^+K_S^0)/\Gamma(K_S^0\pi^+)$ Γ_{103}/Γ_{36}

Unseen decay modes of the $K^*(892)^+$ are included.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$1.1\pm0.3\pm0.4$	67	FRABETTI	95	E687	γ Be $\overline{E}_\gamma\approx 200$ GeV

$\Gamma(\phi\pi^+\pi^0)/\Gamma_{\text{total}}$ Γ_{100}/Γ

Unseen decay modes of the ϕ are included.

VALUE	DOCUMENT ID		TECN	COMMENT
0.023 ± 0.010	[47] BARLAG	92C	ACCM	π^- Cu 230 GeV

[47] BARLAG 92C computes the branching fraction using topological normalization.

$\Gamma(\phi\rho^+)/\Gamma(K^-2\pi^+)$ Γ_{101}/Γ_{38}

Unseen decay modes of the ϕ are included.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.16	90	DAOUDI	92	CLEO	$e^+e^-\approx$ 10.5 GeV

$\Gamma(K^+K^-\pi^+\pi^0\text{non-}\phi)/\Gamma_{\text{total}}$ Γ_{102}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$0.015^{+0.007}_{-0.006}$	[48] BARLAG	92C	ACCM	π^- Cu 230 GeV

[48] BARLAG 92C computes the branching fraction using topological normalization.

$\Gamma(K^+K^-\pi^+\pi^0\text{non-}\phi)/\Gamma(K^-2\pi^+)$ Γ_{102}/Γ_{38}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.25	90	ANJOS	89E	E691	Photoproduction

$\Gamma(K^+ K^0_S \pi^+ \pi^-)/\Gamma(K^0_S 2\pi^+ \pi^-)$ Γ_{97}/Γ_{53}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
5.62±0.39±0.40	469 ± 32	LINK	01C	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^0_S K^- 2\pi^+)/\Gamma(K^0_S 2\pi^+ \pi^-)$ Γ_{98}/Γ_{53}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
7.68±0.41±0.32	670 ± 35	LINK	01C	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^+ K^- 2\pi^+ \pi^-)/\Gamma(K^- 3\pi^+ \pi^-)$ Γ_{99}/Γ_{54}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.040±0.009±0.019	38	LINK	03D	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

Doubly Cabibbo-suppressed modes

$\Gamma(K^+ \pi^0)/\Gamma_{\text{total}}$ Γ_{104}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.37±0.32 OUR AVERAGE					
2.52±0.47±0.26	189 ± 37	AUBERT,B	06F	BABR	$e^+e^- \approx \Upsilon(4S)$
2.28±0.36±0.17	148 ± 23	DYTMAN	06	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(K^+ \pi^+ \pi^-)/\Gamma(K^- 2\pi^+)$ Γ_{105}/Γ_{38}

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
5.77±0.22 OUR AVERAGE					
5.69±0.18±0.14	2638 ± 84	KO	09	BELL	e^+e^- at $\Upsilon(4S)$
6.5 ±0.8 ±0.4	189 ± 24	LINK	04F	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV
7.7 ±1.7 ±0.8	59 ± 13	AITALA	97C	E791	π^- A, 500 GeV
7.2 ±2.3 ±1.7	21	FRABETTI	95E	E687	γBe, $\overline{E}_\gamma$= 220 GeV

$\Gamma(K^+ \rho^0)/\Gamma(K^+ \pi^+ \pi^-)$ $\Gamma_{106}/\Gamma_{105}$

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.39 ±0.09 OUR AVERAGE				
0.3943±0.0787±0.0815	LINK	04F	FOCS	Dalitz fit, 189 evts
0.37 ±0.14 ±0.07	AITALA	97C	E791	Dalitz fit, 59 evts

$\Gamma(K^+ f_0(980), f_0(980) \to \pi^+ \pi^-)/\Gamma(K^+ \pi^+ \pi^-)$ $\Gamma_{108}/\Gamma_{105}$

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.0892±0.0333±0.0412	LINK	04F	FOCS	Dalitz fit, 189 evts

$\Gamma(K^*(892)^0 \pi^+, K^*(892)^0 \to K^+ \pi^-)/\Gamma(K^+ \pi^+ \pi^-)$ $\Gamma_{107}/\Gamma_{105}$

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.47 ±0.08 OUR AVERAGE				
0.5220±0.0684±0.0638	LINK	04F	FOCS	Dalitz fit, 189 evts
0.35 ±0.14 ±0.01	AITALA	97C	E791	Dalitz fit, 59 evts

$\Gamma(K^*_2(1430)^0 \pi^+, K^*_2(1430)^0 \to K^+ \pi^-)/\Gamma(K^+ \pi^+ \pi^-)$ $\Gamma_{109}/\Gamma_{105}$

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.0803±0.0372±0.0391	LINK	04F	FOCS	Dalitz fit, 189 evts

$\Gamma(K^+\pi^+\pi^-\text{nonresonant})/\Gamma(K^+\pi^+\pi^-)$ $\Gamma_{110}/\Gamma_{105}$

This is the "fit fraction" from the Dalitz-plot analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.36\pm0.14\pm0.07$	[49] AITALA	97C	E791	Dalitz fit, 59 evts

[49] LINK 04F, with three times as many events, finds no need for a nonresonant amplitude.

$\Gamma(2K^+K^-)/\Gamma(K^-2\pi^+)$ Γ_{111}/Γ_{38}

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
$9.49\pm2.17\pm0.22$	65	[50] LINK	02I	FOCS	γ nucleus, $\approx$ 180 GeV

[50] LINK 02I finds little evidence for ϕK^+ or $f_0(980)K^+$ submodes.

Rare or forbidden modes

$\Gamma(\pi^+e^+e^-)/\Gamma_{\text{total}}$ Γ_{112}/Γ

A test for the $\Delta C = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<7.4\times10^{-6}$	90		[51] HE	05A	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<5.2\times10^{-5}$	90		AITALA	99G	E791	π^- N 500 GeV
$<1.1\times10^{-4}$	90		FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<6.6\times10^{-5}$	90		AITALA	96	E791	π^- N 500 GeV
$<2.5\times10^{-3}$	90		WEIR	90B	MRK2	e^+e^- 29 GeV
$<2.6\times10^{-3}$	90	39	HAAS	88	CLEO	e^+e^- 10 GeV

[51] This HE 05A limit is for the e^+e^- mass in the continuum away from the $\phi(1020)$. See the next data block.

$\Gamma(\pi^+\phi, \phi\to e^+e^-)/\Gamma_{\text{total}}$ Γ_{113}/Γ

This is *not* a test for the $\Delta C = 1$ weak neutral current, but leads to the $\pi^+e^+e^-$ final state.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$(2.7^{+3.6}_{-1.8}\pm0.2)\times10^{-6}$	2	[52] HE	05A	CLEO	e^+e^- at $\psi(3770)$

[52] This HE 05A result is consistent with the known $D^+\to\phi\pi^+$ and $\phi\to e^+e^-$ fractions.

$\Gamma(\pi^+\mu^+\mu^-)/\Gamma_{\text{total}}$ Γ_{114}/Γ

A test for the $\Delta C = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<3.9\times10^{-6}$	90		[53] ABAZOV	08D	D0	$p\overline{p}$, $E_{\text{cm}} = 1.96$ TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<8.8\times10^{-6}$	90		LINK	03F	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV
$<1.5\times10^{-5}$	90		AITALA	99G	E791	π^- N 500 GeV
$<8.9\times10^{-5}$	90		FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<1.8\times10^{-5}$	90		AITALA	96	E791	π^- N 500 GeV
$<2.2\times10^{-4}$	90	0	KODAMA	95	E653	π^- emulsion 600 GeV
$<5.9\times10^{-3}$	90		WEIR	90B	MRK2	e^+e^- 29 GeV
$<2.9\times10^{-3}$	90	36	HAAS	88	CLEO	e^+e^- 10 GeV

[53] This ABAZOV 08D limit is for the $\mu^+\mu^-$ mass in the continuum away from the $\phi(1020)$. See the next data block.

$\Gamma(\pi^+\phi,\ \phi\to\mu^+\mu^-)/\Gamma_{\text{total}}$ Γ_{115}/Γ

This is *not* a test for the $\Delta C = 1$ weak neutral current, but leads to the $\pi^+\mu^+\mu^-$ final state.

VALUE		DOCUMENT ID		TECN	COMMENT
$(1.8\pm0.5\pm0.6)\times10^{-6}$	[54]	ABAZOV	08D	D0	$p\overline{p}$, $E_{\text{cm}} = 1.96$ TeV

[54] This ABAZOV 08D value is consistent with the known $D^+\to\ \phi\pi^+$ and $\phi\to\ \mu^+\mu^-$ fractions.

$\Gamma(\rho^+\mu^+\mu^-)/\Gamma_{\text{total}}$ Γ_{116}/Γ

A test for the $\Delta C = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<5.6\times10^{-4}$	90	0	KODAMA	95	E653	π^- emulsion 600 GeV

$\Gamma(K^+e^+e^-)/\Gamma_{\text{total}}$ Γ_{117}/Γ

Both quarks would have to change flavor for this decay to occur.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<6.2\times10^{-6}$	90	HE	05A	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.0\times10^{-4}$	90	AITALA	99G	E791	π^-N 500 GeV
$<2.0\times10^{-4}$	90	FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma\approx$ 220 GeV
$<4.8\times10^{-3}$	90	WEIR	90B	MRK2	e^+e^- 29 GeV

$\Gamma(K^+\mu^+\mu^-)/\Gamma_{\text{total}}$ Γ_{118}/Γ

Both quarks would have to change flavor for this decay to occur.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<9.2\times10^{-6}$	90	LINK	03F	FOCS	γ nucleus,$\overline{E}_\gamma\approx$ 180 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<4.4\times10^{-5}$	90	AITALA	99G	E791	π^-N 500 GeV
$<9.7\times10^{-5}$	90	FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma\approx$ 220 GeV
$<3.2\times10^{-4}$	90	KODAMA	95	E653	π^- emulsion 600 GeV
$<9.2\times10^{-3}$	90	WEIR	90B	MRK2	e^+e^- 29 GeV

$\Gamma(\pi^+e^\pm\mu^\mp)/\Gamma_{\text{total}}$ Γ_{119}/Γ

A test of lepton-family-number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.4\times10^{-5}$	90	AITALA	99G	E791	π^-N 500 GeV

$\Gamma(\pi^+e^+\mu^-)/\Gamma_{\text{total}}$ Γ_{120}/Γ

A test of lepton-family-number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.1\times10^{-4}$	90	FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma\approx$ 220 GeV
$<3.3\times10^{-3}$	90	WEIR	90B	MRK2	e^+e^- 29 GeV

$\Gamma(\pi^+ e^- \mu^+)/\Gamma_{total}$ Γ_{121}/Γ

A test of lepton-family-number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.3 \times 10^{-4}$	90	FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<3.3 \times 10^{-3}$	90	WEIR	90B	MRK2	$e^+ e^-$ 29 GeV

$\Gamma(K^+ e^\pm \mu^\mp)/\Gamma_{total}$ Γ_{122}/Γ

A test of lepton-family-number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<6.8 \times 10^{-5}$	90	AITALA	99G	E791	π^- N 500 GeV

$\Gamma(K^+ e^+ \mu^-)/\Gamma_{total}$ Γ_{123}/Γ

A test of lepton-family-number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.3 \times 10^{-4}$	90	FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<3.4 \times 10^{-3}$	90	WEIR	90B	MRK2	$e^+ e^-$ 29 GeV

$\Gamma(K^+ e^- \mu^+)/\Gamma_{total}$ Γ_{124}/Γ

A test of lepton-family-number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.2 \times 10^{-4}$	90	FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<3.4 \times 10^{-3}$	90	WEIR	90B	MRK2	$e^+ e^-$ 29 GeV

$\Gamma(\pi^- 2e^+)/\Gamma_{total}$ Γ_{125}/Γ

A test of lepton-number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.6 \times 10^{-6}$	90	HE	05A	CLEO	$e^+ e^-$ at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<9.6 \times 10^{-5}$	90	AITALA	99G	E791	π^- N 500 GeV
$<1.1 \times 10^{-4}$	90	FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<4.8 \times 10^{-3}$	90	WEIR	90B	MRK2	$e^+ e^-$ 29 GeV

$\Gamma(\pi^- 2\mu^+)/\Gamma_{total}$ Γ_{126}/Γ

A test of lepton-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<4.8 \times 10^{-6}$	90		LINK	03F	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<1.7 \times 10^{-5}$	90		AITALA	99G	E791	π^- N 500 GeV
$<8.7 \times 10^{-5}$	90		FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<2.2 \times 10^{-4}$	90	0	KODAMA	95	E653	π^- emulsion 600 GeV
$<6.8 \times 10^{-3}$	90		WEIR	90B	MRK2	$e^+ e^-$ 29 GeV

$\Gamma(\pi^- e^+ \mu^+)/\Gamma_{total}$ Γ_{127}/Γ

A test of lepton-number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.0 \times 10^{-5}$	90	AITALA	99G	E791	π^- N 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.1 \times 10^{-4}$	90	FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<3.7 \times 10^{-3}$	90	WEIR	90B	MRK2	$e^+ e^-$ 29 GeV

$\Gamma(\rho^- 2\mu^+)/\Gamma_{total}$ Γ_{128}/Γ

A test of lepton-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<5.6 \times 10^{-4}$	90	0	KODAMA	95	E653	π^- emulsion 600 GeV

$\Gamma(K^- 2e^+)/\Gamma_{total}$ Γ_{129}/Γ

A test of lepton-number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.5 \times 10^{-6}$	90	HE	05A	CLEO	$e^+ e^-$ at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.2 \times 10^{-4}$	90	FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<9.1 \times 10^{-3}$	90	WEIR	90B	MRK2	$e^+ e^-$ 29 GeV

$\Gamma(K^- 2\mu^+)/\Gamma_{total}$ Γ_{130}/Γ

A test of lepton-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<1.3 \times 10^{-5}$	90		LINK	03F	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<1.2 \times 10^{-4}$	90		FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<3.2 \times 10^{-4}$	90	0	KODAMA	95	E653	π^- emulsion 600 GeV
$<4.3 \times 10^{-3}$	90		WEIR	90B	MRK2	$e^+ e^-$ 29 GeV

$\Gamma(K^- e^+ \mu^+)/\Gamma_{total}$ Γ_{131}/Γ

A test of lepton-number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.3 \times 10^{-4}$	90	FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<4.0 \times 10^{-3}$	90	WEIR	90B	MRK2	$e^+ e^-$ 29 GeV

$\Gamma(K^*(892)^- 2\mu^+)/\Gamma_{total}$ Γ_{132}/Γ

A test of lepton-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<8.5 \times 10^{-4}$	90	0	KODAMA	95	E653	π^- emulsion 600 GeV

$D^\pm$ *CP*-VIOLATING DECAY-RATE ASYMMETRIES

This is the difference between D^+ and D^- partial widths for these modes divided by the sum of the widths.

$A_{CP}(\mu^\pm \nu)$ in $D^+ \to \mu^+ \nu_\mu$, $D^- \to \mu^- \overline{\nu}_\mu$

VALUE	DOCUMENT ID		TECN	COMMENT
$+0.08 \pm 0.08$	EISENSTEIN	08	CLEO	$e^+ e^-$ at $\psi(3770)$

$A_{CP}(K^0_S\pi^\pm)$ in $D^\pm \to K^0_S\pi^\pm$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
-0.009 ± 0.009 OUR AVERAGE					
$-0.006\pm0.010\pm0.003$		DOBBS	07	CLEO	e^+e^- at $\psi(3770)$
$-0.016\pm0.015\pm0.009$	10.6k	[55] LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx 180$ GeV

[55] LINK 02B measures $N(D^+ \to K^0_S\pi^+)/N(D^+ \to K^-\pi^+\pi^+)$, the ratio of numbers of events observed, and similarly for the D^-.

$A_{CP}(K^\mp 2\pi^\pm)$ in $D^+ \to K^-2\pi^+$, $D^- \to K^+2\pi^-$

VALUE	DOCUMENT ID		TECN	COMMENT
$-0.005\pm0.004\pm0.009$	DOBBS	07	CLEO	e^+e^- at $\psi(3770)$

$A_{CP}(K^\mp\pi^\pm\pi^\pm\pi^0)$ in $D^+ \to K^-\pi^+\pi^+\pi^0$, $D^- \to K^+\pi^-\pi^-\pi^0$

VALUE	DOCUMENT ID		TECN	COMMENT
$+0.010\pm0.009\pm0.009$	DOBBS	07	CLEO	e^+e^- at $\psi(3770)$

$A_{CP}(K^0_S\pi^\pm\pi^0)$ in $D^+ \to K^0_S\pi^+\pi^0$, $D^- \to K^0_S\pi^-\pi^0$

VALUE	DOCUMENT ID		TECN	COMMENT
$+0.003\pm0.009\pm0.003$	DOBBS	07	CLEO	e^+e^- at $\psi(3770)$

$A_{CP}(K^0_S\pi^\pm\pi^+\pi^-)$ in $D^+ \to K^0_S\pi^+\pi^+\pi^-$, $D^- \to K^0_S\pi^-\pi^-\pi^+$

VALUE	DOCUMENT ID		TECN	COMMENT
$+0.001\pm0.011\pm0.006$	DOBBS	07	CLEO	e^+e^- at $\psi(3770)$

$A_{CP}(K^0_S K^\pm)$ in $D^\pm \to K^0_S K^\pm$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$+0.071\pm0.061\pm0.012$	949	[56] LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx 180$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$+0.069\pm0.060\pm0.015$	949	[57] LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx 180$ GeV

[56] LINK 02B measures $N(D^+ \to K^0_S K^+)/N(D^+ \to K^0_S\pi^+)$, the ratio of numbers of events observed, and similarly for the D^-.

[57] LINK 02B measures $N(D^+ \to K^0_S K^+)/N(D^+ \to K^-\pi^+\pi^+)$, the ratio of numbers of events observed, and similarly for the D^-.

$A_{CP}(K^+K^-\pi^\pm)$ in $D^\pm \to K^+K^-\pi^\pm$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.3 ±0.6 OUR AVERAGE					
$-0.03\pm0.84\pm0.29$		RUBIN	08	CLEO	e^+e^-, 3774 MeV
$-0.1\ \pm1.5\ \pm0.8$		DOBBS	07	CLEO	e^+e^- at $\psi(3770)$
$+1.4\ \pm1.0\ \pm0.8$	$43k\pm321$	[58] AUBERT	05S	BABR	$e^+e^- \approx \Upsilon(4S)$
$+0.6\ \pm1.1\ \pm0.5$	14k	[59] LINK	00B	FOCS	
$-1.4\ \pm2.9$		[59] AITALA	97B	E791	$-0.062 < A_{CP} < +0.034$ (90% CL)
$-3.1\ \pm6.8$		[59] FRABETTI	94I	E687	$-0.14 < A_{CP} < +0.081$ (90% CL)

[58] AUBERT 05S measures $N(D^+ \to K^+K^-\pi^+)/N(D^+_s \to K^+K^-\pi^+)$, the ratio of the numbers of events observed, and similarly for the D^-.

[59] FRABETTI 94I, AITALA 98C, and LINK 00B measure $N(D^+ \to K^-K^+\pi^+)/N(D^+ \to K^-\pi^+\pi^+)$, the ratio of numbers of events observed, and similarly for the D^-.

$A_{CP}(K^{\pm}K^{*0})$ in $D^+ \to K^+\overline{K}^{*0}$, $D^- \to K^-K^{*0}$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.1± 1.3 OUR AVERAGE					
− 0.4± 2.0±0.6		RUBIN	08	CLEO	Fit-fraction asymmetry
+ 0.9± 1.7±0.7	11k±122	[60] AUBERT	05S	BABR	$e^+e^- \approx \Upsilon(4S)$
− 1.0± 5.0		[61] AITALA	97B	E791	$-0.092 < A_{CP} < +0.072$ (90% CL)
−12 ±13		[61] FRABETTI	94I	E687	$-0.33 < A_{CP} < +0.094$ (90% CL)

[60] AUBERT 05S measures $N(D^+ \to K^+\overline{K}^{*0})/N(D_s^+ \to K^+K^-\pi^+)$, the ratio of the numbers of events observed, and similarly for the D^-.

[61] FRABETTI 94I and AITALA 97B measure $N(D^+ \to K^+\overline{K}^*(892)^0)/N(D^+ \to K^-\pi^+\pi^+)$, the ratio of numbers of events observed, and similarly for the D^-.

$A_{CP}(\phi\pi^{\pm})$ in $D^{\pm} \to \phi\pi^{\pm}$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
−0.9±1.1 OUR AVERAGE					
$-1.8\pm1.6^{+0.2}_{-0.4}$		RUBIN	08	CLEO	Fit-fraction asymmetry
+0.2±1.5±0.6	10k±136	[62] AUBERT	05S	BABR	$e^+e^- \approx \Upsilon(4S)$
−2.8±3.6		[63] AITALA	97B	E791	$-0.087 < A_{CP} < +0.031$ (90% CL)
+6.6±8.6		[63] FRABETTI	94I	E687	$-0.075 < A_{CP} < +0.21$ (90% CL)

[62] AUBERT 05S measures $N(D^+ \to \phi\pi^+)/N(D_s^+ \to K^+K^-\pi^+)$, the ratio of the numbers of events observed, and similarly for the D^-.

[63] FRABETTI 94I and AITALA 97B measure $N(D^+ \to \phi\pi^+)/N(D^+ \to K^-\pi^+\pi^+)$, the ratio of numbers of events observed, and similarly for the D^-.

$A_{CP}(K^{\pm}K_0^*(1430)^0)$ in $D^+ \to K^+\overline{K}_0^*(1430)^0$, $D^- \to K^-K_0^*(1430)^0$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
$\mathbf{+8\pm6^{+4}_{-2}}$	RUBIN	08	CLEO	Fit-fraction asymmetry

$A_{CP}(K^{\pm}K_2^*(1430)^0)$ in $D^+ \to K^+\overline{K}_2^*(1430)^0$, $D^- \to K^-K_2^*(1430)^0$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
$\mathbf{+43\pm19^{+5}_{-18}}$	RUBIN	08	CLEO	Fit-fraction asymmetry

$A_{CP}(K^{\pm}K_0^*(800))$ in $D^+ \to K^+\overline{K}_0^*(800)$, $D^- \to K^-K_0^*(800)$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
$\mathbf{-12\pm11^{+14}_{-6}}$	RUBIN	08	CLEO	Fit-fraction asymmetry

$A_{CP}(a_0(1450)^0\pi^{\pm})$ in $D^{\pm} \to a_0(1450)^0\pi^{\pm}$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
$\mathbf{-19\pm12^{+8}_{-11}}$	RUBIN	08	CLEO	Fit-fraction asymmetry

$A_{CP}(\phi(1680)\pi^{\pm})$ in $D^{\pm} \to \phi(1680)\pi^{\pm}$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
$-9\pm22\pm14$	RUBIN	08	CLEO	Fit-fraction asymmetry

$A_{CP}(\pi^+\pi^-\pi^{\pm})$ in $D^{\pm} \to \pi^+\pi^-\pi^{\pm}$

VALUE	DOCUMENT ID		TECN	COMMENT
-0.017 ± 0.042	[64] AITALA	97B	E791	$-0.086 < A_{CP} < +0.052$ (90% CL)

[64] AITALA 97B measure $N(D^+ \to \pi^+\pi^-\pi^+)/N(D^+ \to K^-\pi^+\pi^+)$, the ratio of numbers of events observed, and similarly for the D^-.

$A_{CP}(K^0_S K^{\pm}\pi^+\pi^-)$ in $D^{\pm} \to K^0_S K^{\pm}\pi^+\pi^-$

This is the difference between D^+ and D^- partial widths for these modes divided by the sum of the widths.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$-0.042\pm0.064\pm0.022$	523 ± 32	LINK	05E	FOCS	γ A, $\overline{E}_{\gamma} \approx 180$ GeV

D^+-D^- *T*-VIOLATING DECAY-RATE ASYMMETRIES

$A_{Tviol}(K^0_S K^{\pm}\pi^+\pi^-)$ in $D^{\pm} \to K^0_S K^{\pm}\pi^+\pi^-$

$C_T \equiv \vec{p}_{K^+} \cdot (\vec{p}_{\pi^+} \times \vec{p}_{\pi^-})$ is a *T*-odd correlation of the K^+, π^+, and π^- momenta for the D^+. $\overline{C}_T \equiv \vec{p}_{K^-} \cdot (\vec{p}_{\pi^-} \times \vec{p}_{\pi^+})$ is the corresponding quantity for the D^-. $A_T \equiv [\Gamma(C_T > 0) - \Gamma(C_T < 0)] / [\Gamma(C_T > 0) + \Gamma(C_T < 0)]$ would, in the absence of strong phases, test for *T* violation in D^+ decays (the Γ's are partial widths). With $\overline{A}_T \equiv [\Gamma(-\overline{C}_T > 0) - \Gamma(-\overline{C}_T < 0)] / [\Gamma(-\overline{C}_T > 0) + \Gamma(-\overline{C}_T < 0)]$, the asymmetry $A_{Tviol} \equiv \frac{1}{2}(A_T - \overline{A}_T)$ tests for *T* violation even with nonzero strong phases.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$+0.023\pm0.062\pm0.022$	523 ± 32	LINK	05E	FOCS	γ A, $\overline{E}_{\gamma} \approx 180$ GeV

$D^+ \to \overline{K}^0/\pi^0\ell^+\nu_\ell$ FORM FACTORS

$f_+(0)|V_{cs}|$ in $D^+ \to \overline{K}^0\ell^+\nu_\ell$

VALUE	DOCUMENT ID		TECN	COMMENT
$0.707\pm0.010\pm0.009$	BESSON	09	CLEO	$\overline{K}^0 e^+\nu_e$ 3-parameter fit

$r_1 \equiv a_1/a_0$ in $D^+ \to \overline{K}^0\ell^+\nu_\ell$

VALUE	DOCUMENT ID		TECN	COMMENT
$-1.66\pm0.44\pm0.10$	BESSON	09	CLEO	$\overline{K}^0 e^+\nu_e$ 3-parameter fit

$r_2 \equiv a_2/a_0$ in $D^+ \to \overline{K}^0\ell^+\nu_\ell$

VALUE	DOCUMENT ID		TECN	COMMENT
$-14\pm11\pm1$	BESSON	09	CLEO	$\overline{K}^0 e^+\nu_e$ 3-parameter fit

$f_+(0)|V_{cd}|$ in $D^+ \to \pi^0\ell^+\nu_\ell$

VALUE	DOCUMENT ID		TECN	COMMENT
$0.146\pm0.007\pm0.002$	BESSON	09	CLEO	$\pi^0 e^+\nu_e$ 3-parameter fit

$r_1 \equiv a_1/a_0$ in $D^+ \to \pi^0 \ell^+ \nu_\ell$

VALUE	DOCUMENT ID		TECN	COMMENT
$-1.37 \pm 0.88 \pm 0.24$	BESSON	09	CLEO	$\pi^0 e^+ \nu_e$ 3-parameter fit

$r_2 \equiv a_2/a_0$ in $D^+ \to \pi^0 \ell^+ \nu_\ell$

VALUE	DOCUMENT ID		TECN	COMMENT
$-4 \pm 5 \pm 1$	BESSON	09	CLEO	$\pi^0 e^+ \nu_e$ 3-parameter fit

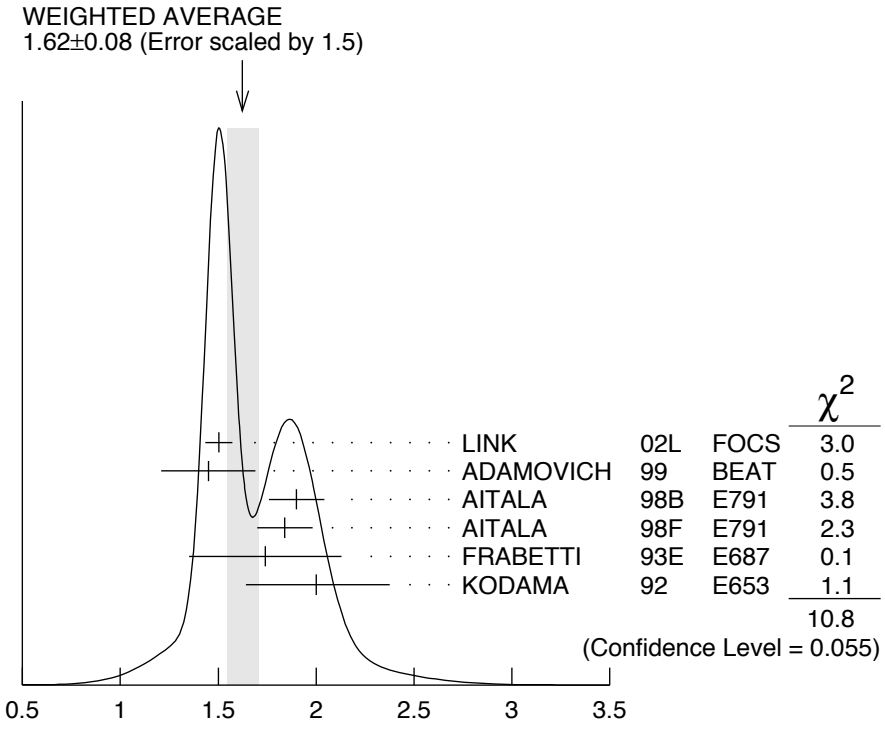
$D^+ \to \overline{K}^*(892)^0 \ell^+ \nu_\ell$ FORM FACTORS

$r_V \equiv V(0)/A_1(0)$ in $D^+ \to \overline{K}^*(892)^0 \ell^+ \nu_\ell$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.62 ±0.08 OUR AVERAGE		Error includes scale factor of 1.5. See the ideogram below.			
$1.504 \pm 0.057 \pm 0.039$	15k	[65] LINK	02L	FOCS	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$1.45 \pm 0.23 \pm 0.07$	763	ADAMOVICH	99	BEAT	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$1.90 \pm 0.11 \pm 0.09$	3000	[66] AITALA	98B	E791	$\overline{K}^*(892)^0 e^+ \nu_e$
$1.84 \pm 0.11 \pm 0.09$	3034	AITALA	98F	E791	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$1.74 \pm 0.27 \pm 0.28$	874	FRABETTI	93E	E687	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$2.00 \, {}^{+0.34}_{-0.32} \pm 0.16$	305	KODAMA	92	E653	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$2.0 \pm 0.6 \pm 0.3$	183	ANJOS	90E	E691	$\overline{K}^*(892)^0 e^+ \nu_e$

[65] LINK 02L includes the effects of interference with an *S*-wave background. This much improves the goodness of fit, but does not much shift the values of the form factors.

[66] This is slightly different from the AITALA 98B value: see ref. [5] in AITALA 98F.



$r_V \equiv V(0)/A_1(0)$ in $D^+ \to \overline{K}^*(892)^0 \ell^+ \nu_\ell$

$r_2 \equiv A_2(0)/A_1(0)$ in $D^+ \to \overline{K}^*(892)^0 \ell^+ \nu_\ell$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.83 ±0.05 OUR AVERAGE					
$0.875 \pm 0.049 \pm 0.064$	15k	[67] LINK	02L	FOCS	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$1.00 \pm 0.15 \pm 0.03$	763	ADAMOVICH	99	BEAT	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$0.71 \pm 0.08 \pm 0.09$	3000	AITALA	98B	E791	$\overline{K}^*(892)^0 e^+ \nu_e$
$0.75 \pm 0.08 \pm 0.09$	3034	AITALA	98F	E791	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$0.78 \pm 0.18 \pm 0.10$	874	FRABETTI	93E	E687	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$0.82 \ ^{+0.22}_{-0.23} \pm 0.11$	305	KODAMA	92	E653	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.0 \pm 0.5 \pm 0.2$	183	ANJOS	90E	E691	$\overline{K}^*(892)^0 e^+ \nu_e$

[67] LINK 02L includes the effects of interference with an S-wave background. This much improves the goodness of fit, but does not much shift the values of the form factors.

$r_3 \equiv A_3(0)/A_1(0)$ in $D^+ \to \overline{K}^*(892)^0 \ell^+ \nu_\ell$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.04±0.33±0.29	3034	AITALA	98F	E791	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$

Γ_L/Γ_T in $D^+ \to \overline{K}^*(892)^0 \ell^+ \nu_\ell$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.13±0.08 OUR AVERAGE					
$1.09 \pm 0.10 \pm 0.02$	763	ADAMOVICH	99	BEAT	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$1.20 \pm 0.13 \pm 0.13$	874	FRABETTI	93E	E687	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$1.18 \pm 0.18 \pm 0.08$	305	KODAMA	92	E653	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.8 \ ^{+0.6}_{-0.4} \pm 0.3$	183	ANJOS	90E	E691	$\overline{K}^*(892)^0 e^+ \nu_e$

Γ_+/Γ_- in $D^+ \to \overline{K}^*(892)^0 \ell^+ \nu_\ell$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.22±0.06 OUR AVERAGE Error includes scale factor of 1.6.					
$0.28 \pm 0.05 \pm 0.02$	763	ADAMOVICH	99	BEAT	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$0.16 \pm 0.05 \pm 0.02$	305	KODAMA	92	E653	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.15 \ ^{+0.07}_{-0.05} \pm 0.03$	183	ANJOS	90E	E691	$\overline{K}^*(892)^0 e^+ \nu_e$

$D^\pm$ REFERENCES

ANASHIN	10A	PL B686 84	V.V. Anashin *et al.*	(VEPP-4M KEDR Collab.)
ASNER	10	PR D81 052007	D.M. Asner *et al.*	(CLEO Collab.)
BESSON	09	PR D80 032005	D. Besson *et al.*	(CLEO Collab.)
Also		PR D79 052010	J.Y. Ge *et al.*	(CLEO Collab.)
KO	09	PRL 102 221802	B.R. Ko *et al.*	(BELLE Collab.)
LINK	09	PL B681 14	J.M. Link *et al.*	(FNAL FOCUS Collab.)
MITCHELL	09B	PRL 102 081801	R.E. Mitchell *et al.*	(CLEO Collab.)
WON	09	PR D80 111101R	E. Won *et al.*	(BELLE Collab.)
ABAZOV	08D	PRL 100 101801	V.M. Abazov *et al.*	(D0 Collab.)
ABLIKIM	08L	PL B665 16	M. Ablikim *et al.*	(BES Collab.)
ARTUSO	08	PR D77 092003	M. Artuso *et al.*	(CLEO Collab.)
BONVICINI	08	PR D77 091106R	G. Bonvicini *et al.*	(CLEO Collab.)

BONVICINI	08A	PR D78 052001	G. Bonvicini *et al.*	(CLEO Collab.)
DOBBS	08	PR D77 112005	S. Dobbs *et al.*	(CLEO Collab.)
Also		PRL 100 251802	D. Cronin-Hennessy *et al.*	(CLEO Collab.)
EISENSTEIN	08	PR D78 052003	B.I. Eisenstein *et al.*	(CLEO Collab.)
HE	08	PRL 100 091801	Q. He *et al.*	(CLEO Collab.)
PDG	08	PL B667 1	C. Amsler *et al.*	(PDG Collab.)
RUBIN	08	PR D78 072003	P. Rubin *et al.*	(CLEO Collab.)
ABLIKIM	07	PL B644 20	M. Ablikim *et al.*	(BES Collab.)
ABLIKIM	07G	PL B658 1	M. Ablikim *et al.*	(BES Collab.)
BONVICINI	07	PR D76 012001	G. Bonvicini *et al.*	(CLEO Collab.)
DOBBS	07	PR D76 112001	S. Dobbs *et al.*	(CLEO Collab.)
LINK	07B	PL B653 1	J.M. Link *et al.*	(FNAL FOCUS Collab.)
ABLIKIM	06O	EPJ C47 31	M. Ablikim *et al.*	(BES Collab.)
ABLIKIM	06P	EPJ C47 39	M. Ablikim *et al.*	(BES Collab.)
ABLIKIM	06U	PL B643 246	M. Ablikim *et al.*	(BES Collab.)
ADAM	06A	PRL 97 251801	N.E. Adam *et al.*	(CLEO Collab.)
AITALA	06	PR D73 032004	E.M. Aitala *et al.*	(FNAL E791 Collab.)
Also		PR D74 059901 (errat.)	E.M. Aitala *et al.*	(FNAL E791 Collab.)
AUBERT,B	06F	PR D74 011107R	B. Aubert *et al.*	(BABAR Colla.b)
DYTMAN	06	PR D74 071102R	S.A. Dytman *et al.*	(CLEO Collab.)
HUANG	06B	PR D74 112005	G.S. Huang *et al.*	(CLEO Collab.)
LINK	06B	PL B637 32	J.M. Link *et al.*	(FNAL FOCUS Collab.)
RUBIN	06	PRL 96 081802	P. Rubin *et al.*	(CLEO Collab.)
RUBIN	06A	PR D73 112005	P. Rubin *et al.*	(CLEO Collab.)
ABLIKIM	05A	PL B608 24	M. Ablikim *et al.*	(BES Collab.)
ABLIKIM	05D	PL B610 183	M. Ablikim *et al.*	(BES Collab.)
ABLIKIM	05F	PL B622 6	M. Ablikim *et al.*	(BES Collab.)
ABLIKIM	05P	PL B625 196	M. Ablikim *et al.*	(BES Collab.)
ARTUSO	05A	PRL 95 251801	M. Artuso *et al.*	(CLEO Collab.)
AUBERT	05S	PR D71 091101R	B. Aubert *et al.*	(BABAR Collab.)
HE	05	PRL 95 121801	Q. He *et al.*	(CLEO Collab.)
Also		PRL 96 199903 (errat.)	Q. He *et al.*	(CLEO Collab.)
HE	05A	PRL 95 221802	Q. He *et al.*	(CLEO Collab.)
HUANG	05B	PRL 95 181801	G.S. Huang *et al.*	(CLEO Collab.)
KAYIS-TOPAK...	05	PL B626 24	A. Kayis-Topaksu *et al.*	(CERN CHORUS Collab.)
LINK	05E	PL B622 239	J.M. Link *et al.*	(FNAL FOCUS Collab.)
LINK	05I	PL B621 72	J.M. Link *et al.*	(FNAL FOCUS Collab.)
ABLIKIM	04C	PL B597 39	M. Ablikim *et al.*	(BEPC BES Collab.)
ARMS	04	PR D69 071102R	K. Arms *et al.*	(CLEO Collab.)
BONVICINI	04A	PR D70 112004	G. Bonvicini *et al.*	(CLEO Collab.)
LINK	04	PL B585 200	J.M. Link *et al.*	(FNAL FOCUS Collab.)
LINK	04E	PL B598 33	J.M. Link *et al.*	(FNAL FOCUS Collab.)
LINK	04F	PL B601 10	J.M. Link *et al.*	(FNAL FOCUS Collab.)
ANISOVICH	03	EPJ A16 229	V.V. Anisovich *et al.*	
LINK	03D	PL B561 225	J.M. Link *et al.*	(FNAL FOCUS Collab.)
LINK	03F	PL B572 21	J.M. Link *et al.*	(FNAL FOCUS Collab.)
AITALA	02	PRL 89 121801	E.M. Aitala *et al.*	(FNAL E791 Collab.)
BRANDENB...	02	PRL 89 222001	G. Brandenburg *et al.*	(CLEO Collab.)
KAYIS-TOPAK...	02	PL B549 48	A. Kayis-Topaksu *et al.*	(CERN CHORUS Collab.)
LINK	02B	PRL 88 041602	J.M. Link *et al.*	(FNAL FOCUS Collab.)
Also		PRL 88 159903 (erratum)	J.M. Link *et al.*	(FNAL FOCUS Collab.)
LINK	02E	PL B535 43	J.M. Link *et al.*	(FNAL FOCUS Collab.)
LINK	02F	PL B537 192	J.M. Link *et al.*	(FNAL FOCUS Collab.)
LINK	02I	PL B541 227	J.M. Link *et al.*	(FNAL FOCUS Collab.)
LINK	02J	PL B541 243	J.M. Link *et al.*	(FNAL FOCUS Collab.)
LINK	02L	PL B544 89	J.M. Link *et al.*	(FNAL FOCUS Collab.)
AITALA	01B	PRL 86 770	E.M. Aitala *et al.*	(FNAL E791 Collab.)
LINK	01C	PRL 87 162001	J.M. Link *et al.*	(FNAL FOCUS Collab.)
ABREU	00O	EPJ C12 209	P. Abreu *et al.*	(DELPHI Collab.)
ASTIER	00D	PL B486 35	P. Astier *et al.*	(CERN NOMAD Collab.)
JUN	00	PRL 84 1857	S.Y. Jun *et al.*	(FNAL SELEX Collab.)
LINK	00B	PL B491 232	J.M. Link *et al.*	(FNAL FOCUS Collab.)
Also		PL B495 443 (erratum)	J.M. Link *et al.*	(FNAL FOCUS Collab.)
ABBIENDI	99K	EPJ C8 573	G. Abbiendi *et al.*	(OPAL Collab.)
ADAMOVICH	99	EPJ C6 35	M. Adamovich *et al.*	(CERN BEATRICE Collab.)
AITALA	99G	PL B462 401	E.M. Aitala *et al.*	(FNAL E791 Collab.)
BONVICINI	99	PRL 82 4586	G. Bonvicini *et al.*	(CLEO Collab.)
AITALA	98B	PRL 80 1393	E.M. Aitala *et al.*	(FNAL E791 Collab.)
AITALA	98C	PL B421 405	E.M. Aitala *et al.*	(FNAL E791 Collab.)
AITALA	98F	PL B440 435	E.M. Aitala *et al.*	(FNAL E791 Collab.)
BAI	98B	PL B429 188	J.Z. Bai *et al.*	(BEPC BES Collab.)

AITALA	97	PL B397 325	E.M. Aitala *et al.*	(FNAL E791 Collab.)
AITALA	97B	PL B403 377	E.M. Aitala *et al.*	(FNAL E791 Collab.)
AITALA	97C	PL B404 187	E.M. Aitala *et al.*	(FNAL E791 Collab.)
BISHAI	97	PRL 78 3261	M. Bishai *et al.*	(CLEO Collab.)
FRABETTI	97	PL B391 235	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	97B	PL B398 239	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	97C	PL B401 131	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	97D	PL B407 79	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
AITALA	96	PRL 76 364	E.M. Aitala *et al.*	(FNAL E791 Collab.)
FRABETTI	95	PL B346 199	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	95B	PL B351 591	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	95E	PL B359 403	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
KODAMA	95	PL B345 85	K. Kodama *et al.*	(FNAL E653 Collab.)
ALBRECHT	94I	ZPHY C64 375	H. Albrecht *et al.*	(ARGUS Collab.)
BALEST	94	PRL 72 2328	R. Balest *et al.*	(CLEO Collab.)
FRABETTI	94D	PL B323 459	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	94G	PL B331 217	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	94I	PR D50 R2953	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
AKERIB	93	PRL 71 3070	D.S. Akerib *et al.*	(CLEO Collab.)
ANJOS	93	PR D48 56	J.C. Anjos *et al.*	(FNAL E691 Collab.)
FRABETTI	93E	PL B307 262	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
ALBRECHT	92F	PL B278 202	H. Albrecht *et al.*	(ARGUS Collab.)
ANJOS	92C	PR D46 1941	J.C. Anjos *et al.*	(FNAL E691 Collab.)
BARLAG	92C	ZPHY C55 383	S. Barlag *et al.*	(ACCMOR Collab.)
Also		ZPHY C48 29	S. Barlag *et al.*	(ACCMOR Collab.)
COFFMAN	92B	PR D45 2196	D.M. Coffman *et al.*	(Mark III Collab.)
DAOUDI	92	PR D45 3965	M. Daoudi *et al.*	(CLEO Collab.)
KODAMA	92	PL B274 246	K. Kodama *et al.*	(FNAL E653 Collab.)
KODAMA	92C	PL B286 187	K. Kodama *et al.*	(FNAL E653 Collab.)
ADAMOVICH	91	PL B268 142	M.I. Adamovich *et al.*	(WA82 Collab.)
ALBRECHT	91	PL B255 634	H. Albrecht *et al.*	(ARGUS Collab.)
ALVAREZ	91B	ZPHY C50 11	M.P. Alvarez *et al.*	(CERN NA14/2 Collab.)
AMMAR	91	PR D44 3383	R. Ammar *et al.*	(CLEO Collab.)
BAI	91	PRL 66 1011	Z. Bai *et al.*	(Mark III Collab.)
COFFMAN	91	PL B263 135	D.M. Coffman *et al.*	(Mark III Collab.)
FRABETTI	91	PL B263 584	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
ALVAREZ	90	ZPHY C47 539	M.P. Alvarez *et al.*	(CERN NA14/2 Collab.)
ANJOS	90C	PR D41 2705	J.C. Anjos *et al.*	(FNAL E691 Collab.)
ANJOS	90D	PR D42 2414	J.C. Anjos *et al.*	(FNAL E691 Collab.)
ANJOS	90E	PRL 65 2630	J.C. Anjos *et al.*	(FNAL E691 Collab.)
BARLAG	90C	ZPHY C46 563	S. Barlag *et al.*	(ACCMOR Collab.)
WEIR	90B	PR D41 1384	A.J. Weir *et al.*	(Mark II Collab.)
ANJOS	89	PRL 62 125	J.C. Anjos *et al.*	(FNAL E691 Collab.)
ANJOS	89B	PRL 62 722	J.C. Anjos *et al.*	(FNAL E691 Collab.)
ANJOS	89E	PL B223 267	J.C. Anjos *et al.*	(FNAL E691 Collab.)
ADLER	88C	PRL 60 89	J. Adler *et al.*	(Mark III Collab.)
ALBRECHT	88I	PL B210 267	H. Albrecht *et al.*	(ARGUS Collab.)
HAAS	88	PRL 60 1614	P. Haas *et al.*	(CLEO Collab.)
ONG	88	PRL 60 2587	R.A. Ong *et al.*	(Mark II Collab.)
RAAB	88	PR D37 2391	J.R. Raab *et al.*	(FNAL E691 Collab.)
ADAMOVICH	87	EPL 4 887	M.I. Adamovich *et al.*	(Photon Emulsion Collab.)
ADLER	87	PL B196 107	J. Adler *et al.*	(Mark III Collab.)
BARTEL	87	ZPHY C33 339	W. Bartel *et al.*	(JADE Collab.)
BALTRUSAIT...	86E	PRL 56 2140	R.M. Baltrusaitis *et al.*	(Mark III Collab.)
BALTRUSAIT...	85B	PRL 54 1976	R.M. Baltrusaitis *et al.*	(Mark III Collab.)
BALTRUSAIT...	85E	PRL 55 150	R.M. Baltrusaitis *et al.*	(Mark III Collab.)
BARTEL	85J	PL 163B 277	W. Bartel *et al.*	(JADE Collab.)
ADAMOVICH	84	PL 140B 119	M.I. Adamovich *et al.*	(CERN WA58 Collab.)
ALTHOFF	84G	ZPHY C22 219	M. Althoff *et al.*	(TASSO Collab.)
DERRICK	84	PRL 53 1971	M. Derrick *et al.*	(HRS Collab.)
SCHINDLER	81	PR D24 78	R.H. Schindler *et al.*	(Mark II Collab.)
TRILLING	81	PRPL 75 57	G.H. Trilling	(LBL, UCB) J
ZHOLENTZ	80	PL 96B 214	A.A. Zholents *et al.*	(NOVO)
Also		SJNP 34 814	A.A. Zholents *et al.*	(NOVO)
		Translated from YAF 34 1471.		
GOLDHABER	77	PL 69B 503	G. Goldhaber *et al.*	(Mark I Collab.)
PERUZZI	77	PRL 39 1301	I. Peruzzi *et al.*	(LGW Collab.)
PICCOLO	77	PL 70B 260	M. Piccolo *et al.*	(Mark I Collab.)
PERUZZI	76	PRL 37 569	I. Peruzzi *et al.*	(Mark I Collab.)

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