$D^{\pm}$

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

$D^{\pm}$ 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*
1869.57± 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 $> 100 \times 10^{-15}$ 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
$1033.6 \pm 22.1 ^{+9.9}_{-12.7}$	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	$(17.6\ \pm3.2\ )$ %	
Γ_3	K^- anything	$(25.7\ \pm1.4\ )$ %	
Γ_4	$\overline{K}^0$ anything + K^0 anything	$(61\ \pm5\ )$ %	
Γ_5	K^+ anything	$(\ 5.9\ \pm0.8\ )$ %	
Γ_6	$K^*(892)^-$ anything	$(\ 6\ \pm5\ )$ %	
Γ_7	$\overline{K}^*(892)^0$ anything	$(23\ \pm5\ )$ %	
Γ_8	$K^*(892)^0$ anything	$<\ 6.6$ %	CL=90%
Γ_9	η anything	$(\ 6.3\ \pm0.7\ )$ %	
Γ_{10}	η' anything	$(\ 1.04\pm0.18)$ %	
Γ_{11}	ϕ anything	$(\ 1.03\pm0.12)$ %	
	Leptonic and semileptonic modes		
Γ_{12}	$e^+\nu_e$	$<\ 8.8 \times 10^{-6}$	CL=90%
Γ_{13}	$\mu^+\nu_\mu$	$(\ 3.82\pm0.33) \times 10^{-4}$	
Γ_{14}	$\tau^+\nu_\tau$	$<\ 1.2 \times 10^{-3}$	CL=90%
Γ_{15}	$\overline{K}^0 e^+\nu_e$	$(\ 8.83\pm0.22)$ %	
Γ_{16}	$\overline{K}^0 \mu^+\nu_\mu$	$(\ 9.2\ \pm0.6\ )$ %	
Γ_{17}	$K^-\pi^+ e^+\nu_e$	$(\ 3.5\ ^{+0.7}_{-0.6}\ )$ %	
Γ_{18}	$\overline{K}^*(892)^0 e^+\nu_e$, $\overline{K}^*(892)^0 \to K^-\pi^+$	$(\ 3.68\pm0.21)$ %	
Γ_{19}	$K^-\pi^+ e^+\nu_e$ nonresonant	$<\ 7 \times 10^{-3}$	CL=90%
Γ_{20}	$K^-\pi^+\mu^+\nu_\mu$	$(\ 3.8\ \pm0.4\ )$ %	
Γ_{21}	$\overline{K}^*(892)^0 \mu^+\nu_\mu$, $\overline{K}^*(892)^0 \to K^-\pi^+$	$(\ 3.7\ \pm0.3\ )$ %	
Γ_{22}	$K^-\pi^+\mu^+\nu_\mu$ nonresonant	$(\ 2.0\ \pm0.5\ ) \times 10^{-3}$	
Γ_{23}	$K^-\pi^+\pi^0\mu^+\nu_\mu$	$<\ 1.6 \times 10^{-3}$	CL=90%
Γ_{24}	$\pi^0 e^+\nu_e$	$(\ 4.05\pm0.18) \times 10^{-3}$	
Γ_{25}	$\eta e^+\nu_e$	$(\ 1.33\pm0.21) \times 10^{-3}$	
Γ_{26}	$\rho^0 e^+\nu_e$	$(\ 2.2\ \pm0.4\ ) \times 10^{-3}$	
Γ_{27}	$\rho^0 \mu^+\nu_\mu$	$(\ 2.4\ \pm0.4\ ) \times 10^{-3}$	

Γ_{28}	$\omega e^+ \nu_e$		$(1.6 \ {}^{+0.7}_{-0.6}) \times 10^{-3}$	
Γ_{29}	$\eta'(958) e^+ \nu_e$		$< 3.5 \times 10^{-4}$	CL=90%
Γ_{30}	$\phi e^+ \nu_e$		$< 1.6 \times 10^{-4}$	CL=90%

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

Γ_{31}	$\overline{K}^*(892)^0 e^+ \nu_e$		(5.53 ± 0.13) %	
Γ_{32}	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$		(5.28 ± 0.15) %	
Γ_{33}	$\overline{K}^*_0(1430)^0 \mu^+ \nu_\mu$		$< 2.4 \times 10^{-4}$	
Γ_{34}	$\overline{K}^*(1680)^0 \mu^+ \nu_\mu$		$< 1.5 \times 10^{-3}$	

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

Γ_{35}	$K^0_S \pi^+$		(1.47 ± 0.07) %	S=2.0
Γ_{36}	$K^0_L \pi^+$		(1.46 ± 0.05) %	
Γ_{37}	$K^- 2\pi^+$	[a]	(9.13 ± 0.19) %	S=1.1
Γ_{38}	$(K^- \pi^+)_{S-\text{wave}} \pi^+$		(7.31 ± 0.19) %	
Γ_{39}	$\overline{K}^*_0(800)^0 \pi^+$, $\overline{K}^*_0(800) \to K^- \pi^+$			
Γ_{40}	$\overline{K}^*_0(1430)^0 \pi^+$, $\overline{K}^*_0(1430)^0 \to K^- \pi^+$	[b]	(1.21 ± 0.06) %	
Γ_{41}	$\overline{K}^*(892)^0 \pi^+$, $\overline{K}^*(892)^0 \to K^- \pi^+$		(1.01 ± 0.11) %	
Γ_{42}	$\overline{K}^*(1410)^0 \pi^+$, $\overline{K}^{*0} \to K^- \pi^+$		not seen	
Γ_{43}	$\overline{K}^*_2(1430)^0 \pi^+$, $\overline{K}^*_2(1430)^0 \to K^- \pi^+$	[b]	$(2.2 \pm 0.7) \times 10^{-4}$	
Γ_{44}	$\overline{K}^*(1680)^0 \pi^+$, $\overline{K}^*(1680)^0 \to K^- \pi^+$	[b]	$(2.1 \pm 1.1) \times 10^{-4}$	
Γ_{45}	$K^- (2\pi^+)_{I=2}$		(1.41 ± 0.26) %	
Γ_{46}	$K^- 2\pi^+$ nonresonant			
Γ_{47}	$K^0_S \pi^+ \pi^0$	[a]	(6.99 ± 0.27) %	
Γ_{48}	$K^0_S \rho^+$		(4.8 ± 1.0) %	
Γ_{49}	$\overline{K}^*(892)^0 \pi^+$, $\overline{K}^*(892)^0 \to K^0_S \pi^0$		(1.3 ± 0.6) %	
Γ_{50}	$K^0_S \pi^+ \pi^0$ nonresonant		$(9 \pm 7) \times 10^{-3}$	
Γ_{51}	$K^- 2\pi^+ \pi^0$	[c]	(5.99 ± 0.18) %	
Γ_{52}	$K^0_S 2\pi^+ \pi^-$	[c]	(3.12 ± 0.11) %	
Γ_{53}	$K^- 3\pi^+ \pi^-$	[a]	$(5.6 \pm 0.5) \times 10^{-3}$	S=1.1
Γ_{54}	$\overline{K}^*(892)^0 2\pi^+ \pi^-$, $\overline{K}^*(892)^0 \to K^- \pi^+$		$(1.2 \pm 0.4) \times 10^{-3}$	
Γ_{55}	$\overline{K}^*(892)^0 \rho^0 \pi^+$, $\overline{K}^*(892)^0 \to K^- \pi^+$		$(2.2 \pm 0.4) \times 10^{-3}$	

Γ_{56}	$\overline{K}^*(892)^0 a_1(1260)^+$	[d]	$(9.0 \pm 1.8) \times 10^{-3}$	
Γ_{57}	$\overline{K}^*(892)^0 2\pi^+\pi^-$ no-ρ, $\overline{K}^*(892)^0 \to K^-\pi^+$			
Γ_{58}	$K^-\rho^0 2\pi^+$		$(1.68 \pm 0.27) \times 10^{-3}$	
Γ_{59}	$K^- 3\pi^+\pi^-$ nonresonant		$(3.9 \pm 2.9) \times 10^{-4}$	
Γ_{60}	$K^+ 2K^0_S$		$(4.5 \pm 2.0) \times 10^{-3}$	
Γ_{61}	$K^+K^-K^0_S\pi^+$		$(2.4 \pm 0.6) \times 10^{-4}$	

Pionic modes

Γ_{62}	$\pi^+\pi^0$	$(1.19 \pm 0.06) \times 10^{-3}$	
Γ_{63}	$2\pi^+\pi^-$	$(3.18 \pm 0.18) \times 10^{-3}$	
Γ_{64}	$\rho^0\pi^+$	$(8.1 \pm 1.5) \times 10^{-4}$	
Γ_{65}	$\pi^+(\pi^+\pi^-)_{S-\text{wave}}$	$(1.78 \pm 0.16) \times 10^{-3}$	
Γ_{66}	$\sigma\pi^+$, $\sigma \to \pi^+\pi^-$	$(1.34 \pm 0.12) \times 10^{-3}$	
Γ_{67}	$f_0(980)\pi^+$, $f_0(980) \to \pi^+\pi^-$	$(1.52 \pm 0.33) \times 10^{-4}$	
Γ_{68}	$f_0(1370)\pi^+$, $f_0(1370) \to \pi^+\pi^-$	$(8 \pm 4) \times 10^{-5}$	
Γ_{69}	$f_2(1270)\pi^+$, $f_2(1270) \to \pi^+\pi^-$	$(4.9 \pm 0.9) \times 10^{-4}$	
Γ_{70}	$\rho(1450)^0\pi^+$, $\rho(1450)^0 \to \pi^+\pi^-$	$< 8 \times 10^{-5}$	CL=95%
Γ_{71}	$f_0(1500)\pi^+$, $f_0(1500) \to \pi^+\pi^-$	$(1.1 \pm 0.4) \times 10^{-4}$	
Γ_{72}	$f_0(1710)\pi^+$, $f_0(1710) \to \pi^+\pi^-$	$< 5 \times 10^{-5}$	CL=95%
Γ_{73}	$f_0(1790)\pi^+$, $f_0(1790) \to \pi^+\pi^-$	$< 6 \times 10^{-5}$	CL=95%
Γ_{74}	$(\pi^+\pi^+)_{S-\text{wave}}\pi^-$	$< 1.2 \times 10^{-4}$	CL=95%
Γ_{75}	$2\pi^+\pi^-$ nonresonant	$< 1.1 \times 10^{-4}$	CL=95%
Γ_{76}	$\pi^+ 2\pi^0$	$(4.6 \pm 0.4) \times 10^{-3}$	
Γ_{77}	$2\pi^+\pi^-\pi^0$	(1.13 ± 0.08) %	
Γ_{78}	$\eta\pi^+$, $\eta \to \pi^+\pi^-\pi^0$	$(7.8 \pm 0.5) \times 10^{-4}$	
Γ_{79}	$\omega\pi^+$, $\omega \to \pi^+\pi^-\pi^0$	$< 3 \times 10^{-4}$	CL=90%
Γ_{80}	$3\pi^+ 2\pi^-$	$(1.61 \pm 0.16) \times 10^{-3}$	

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

Γ_{81}	$\eta\pi^+$	$(3.53 \pm 0.21) \times 10^{-3}$	
Γ_{82}	$\eta\pi^+\pi^0$	$(1.38 \pm 0.35) \times 10^{-3}$	
Γ_{83}	$\omega\pi^+$	$< 3.4 \times 10^{-4}$	CL=90%
Γ_{84}	$\eta'(958)\pi^+$	$(4.67 \pm 0.29) \times 10^{-3}$	
Γ_{85}	$\eta'(958)\pi^+\pi^0$	$(1.6 \pm 0.5) \times 10^{-3}$	

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

Γ_{86}	$K^+ K^0_S$		$(2.83\pm0.16)\times10^{-3}$	S=2.2
Γ_{87}	$K^+ K^- \pi^+$	[a]	$(9.54\pm0.26)\times10^{-3}$	S=1.1
Γ_{88}	$\phi\pi^+$, $\phi\to K^+K^-$		$(2.65^{+0.08}_{-0.09})\times10^{-3}$	
Γ_{89}	$K^+\overline{K}^*(892)^0$, $\overline{K}^*(892)^0\to K^-\pi^+$		$(2.45^{+0.09}_{-0.14})\times10^{-3}$	
Γ_{90}	$K^+\overline{K}^*_0(1430)^0$, $\overline{K}^*_0(1430)^0\to K^-\pi^+$		$(1.79\pm0.34)\times10^{-3}$	
Γ_{91}	$K^+\overline{K}^*_2(1430)^0$, $\overline{K}^*_2\to K^-\pi^+$		$(1.6\ ^{+1.2}_{-0.8})\times10^{-4}$	
Γ_{92}	$K^+\overline{K}^*_0(800)$, $\overline{K}^*_0\to K^-\pi^+$		$(6.7\ ^{+3.4}_{-2.1})\times10^{-4}$	
Γ_{93}	$a_0(1450)^0\pi^+$, $a^0_0\to K^+K^-$		$(4.4\ ^{+7.0}_{-1.8})\times10^{-4}$	
Γ_{94}	$\phi(1680)\pi^+$, $\phi\to K^+K^-$		$(4.9\ ^{+4.0}_{-1.9})\times10^{-5}$	
Γ_{95}	$K^+K^-\pi^+$ nonresonant		not seen	
Γ_{96}	$K^+K^0_S\pi^+\pi^-$		$(1.75\pm0.18)\times10^{-3}$	
Γ_{97}	$K^0_S K^- 2\pi^+$		$(2.40\pm0.18)\times10^{-3}$	
Γ_{98}	$K^+K^-2\pi^+\pi^-$		$(2.2\ \pm1.2)\times10^{-4}$	

A few poorly measured branching fractions:

Γ_{99}	$\phi\pi^+\pi^0$		$(2.3\ \pm1.0)$ %	
Γ_{100}	$\phi\rho^+$	$<$	1.5 %	CL=90%
Γ_{101}	$K^+K^-\pi^+\pi^0$ non-ϕ		$(1.5\ ^{+0.7}_{-0.6})$ %	
Γ_{102}	$K^*(892)^+K^0_S$		$(1.6\ \pm0.7)$ %	

Doubly Cabibbo-suppressed modes

Γ_{103}	$K^+\pi^0$		$(1.83\pm0.26)\times10^{-4}$	S=1.4
Γ_{104}	$K^+\eta$	$<$	1.4×10^{-4}	CL=90%
Γ_{105}	$K^+\eta'(958)$	$<$	1.8×10^{-4}	CL=90%
Γ_{106}	$K^+\pi^+\pi^-$		$(5.27\pm0.23)\times10^{-4}$	
Γ_{107}	$K^+\rho^0$		$(2.0\ \pm0.5)\times10^{-4}$	
Γ_{108}	$K^*(892)^0\pi^+$, $K^*(892)^0\to K^+\pi^-$		$(2.5\ \pm0.4)\times10^{-4}$	
Γ_{109}	$K^+f_0(980)$, $f_0(980)\to\pi^+\pi^-$		$(4.7\ \pm2.8)\times10^{-5}$	
Γ_{110}	$K^*_2(1430)^0\pi^+$, $K^*_2(1430)^0\to K^+\pi^-$		$(4.2\ \pm2.8)\times10^{-5}$	
Γ_{111}	$K^+\pi^+\pi^-$ nonresonant		not seen	
Γ_{112}	$2K^+K^-$		$(8.7\ \pm2.0)\times10^{-5}$	

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

Γ_{113}	$\pi^+ e^+ e^-$	$C1$		< 5.9	$\times 10^{-6}$	CL=90%
Γ_{114}	$\pi^+ \phi$, $\phi \to e^+ e^-$		[e]	$(1.7\ ^{+1.4}_{-0.9})$	$\times 10^{-6}$	
Γ_{115}	$\pi^+ \mu^+ \mu^-$	$C1$		< 3.9	$\times 10^{-6}$	CL=90%
Γ_{116}	$\pi^+ \phi$, $\phi \to \mu^+ \mu^-$		[e]	(1.8 ± 0.8)	$\times 10^{-6}$	
Γ_{117}	$\rho^+ \mu^+ \mu^-$	$C1$		< 5.6	$\times 10^{-4}$	CL=90%
Γ_{118}	$K^+ e^+ e^-$		[f]	< 3.0	$\times 10^{-6}$	CL=90%
Γ_{119}	$K^+ \mu^+ \mu^-$		[f]	< 9.2	$\times 10^{-6}$	CL=90%
Γ_{120}	$\pi^+ e^\pm \mu^\mp$	LF	[g]	< 3.4	$\times 10^{-5}$	CL=90%
Γ_{121}	$\pi^+ e^+ \mu^-$					
Γ_{122}	$\pi^+ e^- \mu^+$					
Γ_{123}	$K^+ e^\pm \mu^\mp$	LF	[g]	< 6.8	$\times 10^{-5}$	CL=90%
Γ_{124}	$K^+ e^+ \mu^-$					
Γ_{125}	$K^+ e^- \mu^+$					
Γ_{126}	$\pi^- 2e^+$	L		< 1.1	$\times 10^{-6}$	CL=90%
Γ_{127}	$\pi^- 2\mu^+$	L		< 4.8	$\times 10^{-6}$	CL=90%
Γ_{128}	$\pi^- e^+ \mu^+$	L		< 5.0	$\times 10^{-5}$	CL=90%
Γ_{129}	$\rho^- 2\mu^+$	L		< 5.6	$\times 10^{-4}$	CL=90%
Γ_{130}	$K^- 2e^+$	L		< 3.5	$\times 10^{-6}$	CL=90%
Γ_{131}	$K^- 2\mu^+$	L		< 1.3	$\times 10^{-5}$	CL=90%
Γ_{132}	$K^- e^+ \mu^+$	L		< 1.3	$\times 10^{-4}$	CL=90%
Γ_{133}	$K^*(892)^- 2\mu^+$	L		< 8.5	$\times 10^{-4}$	CL=90%

Γ_{134} A dummy mode used by the fit. (51.2 ± 1.0) %

[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 $\chi^2 = 39.9$ 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, $x_i \equiv \Gamma_i/\Gamma_{\text{total}}$. The fit constrains the x_i whose labels appear in this array to sum to one.

	x_{16}	x_{26}	x_{31}	x_{32}	x_{35}	x_{37}	x_{47}	x_{51}	x_{52}	x_{53}
x_{26}	0									
x_{31}	0	2								
x_{32}	22	0	0							
x_{35}	6	0	1	1						
x_{37}	14	0	2	3	44					
x_{47}	4	0	1	1	14	31				
x_{51}	6	0	1	1	18	41	56			
x_{52}	7	0	1	2	22	50	50	−1		
x_{53}	3	0	1	1	10	24	7	10	12	
x_{80}	3	0	0	1	9	22	7	9	11	76
x_{86}	5	0	1	1	75	37	12	15	19	9
x_{87}	10	0	1	2	30	68	23	36	36	16
x_{103}	2	0	0	0	6	13	4	5	6	3
x_{134}	−75	−4	−15	−32	−32	−58	−54	−48	−42	−20

	x_{80}	x_{86}	x_{87}	x_{103}
x_{86}	8			
x_{87}	15	25		
x_{103}	3	5	9	
x_{134}	−18	−27	−43	−8

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
$\mathbf{0.103 \pm 0.009 ^{+0.009}_{-0.008}}$	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	$\nu_\mu \text{Fe} \to \mu^- \mu^+ X$
$0.090 \pm 0.007 ^{+0.007}_{-0.006}$	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
$\mathbf{0.255 \pm 0.015 \pm 0.008}$	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

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

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

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

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

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

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

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

$\Gamma(K^*(892)^0 \text{anything})/\Gamma_{total}$ — Γ_8/Γ

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

$\Gamma(\eta \text{ anything})/\Gamma_{total}$ — Γ_9/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 $\psi(3770)$

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

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

$\Gamma(\phi \text{ anything})/\Gamma_{total}$ — Γ_{11}/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

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

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

$\Gamma(\mu^+\nu_\mu)/\Gamma_{total}$ — Γ_{13}/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	[12] EISENSTEIN	08	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$12.2 \ ^{+11.1}_{-5.3} \pm 1.0$	3	[13] ABLIKIM	05D	BES	$e^+e^- \approx$ 3.773 GeV
$4.40 \pm 0.66 ^{+0.09}_{-0.12}$	47 ± 7	[14] ARTUSO	05A	CLEO	See EISENSTEIN 08
$3.5 \pm 1.4 \pm 0.6$	7	[15] BONVICINI	04A	CLEO	Incl. in ARTUSO 05A
$8 \ ^{+16}_{-5} \ ^{+5}_{-2}$	1	[16] BAI	98B	BES	$e^+e^- \rightarrow D^{*+}D^-$

[12] EISENSTEIN 08, using the D^+ lifetime and assuming $|V_{cd}| = |V_{us}|$, gets $f_{D^+} = (205.8 \pm 8.5 \pm 2.5)$ MeV from this measurement.
[13] ABLIKIM 05D finds a background-subtracted 2.67 ± 1.74 $D^+ \rightarrow \mu^+\nu_\mu$ events, and from this obtains $f_{D^+} = 371^{+129}_{-119} \pm 25$ MeV.
[14] ARTUSO 05A obtains $f_{D^+} = 222.6 \pm 16.7^{+2.8}_{-3.4}$ MeV from this measurement.
[15] 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.
[16] BAI 98B obtains $f_{D^+} = (300^{+180}_{-150}{}^{+80}_{-40})$ MeV from this measurement.

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.2\times10^{-3}$	90	EISENSTEIN	08	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.1\times10^{-3}$	90	RUBIN	06A	CLEO	See EISENSTEIN 08

$\Gamma(\overline{K}^0 e^+\nu_e)/\Gamma_{total}$ — Γ_{15}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
8.83±0.22 OUR AVERAGE					
8.83±0.10±0.20	8467	[17] BESSON	09	CLEO	e^+e^- at $\psi(3770)$
8.95±1.59±0.67	34 ± 6	[18] 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		[19] DOBBS	08	CLEO	See BESSON 09
8.71±0.38±0.37	545 ± 24	HUANG	05B	CLEO	See DOBBS 08

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

[18] 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 ± 0.22 ± 0.07; isospin invariance predicts the ratio is 1.0.

[19] DOBBS 08 establishes $\left|\frac{V_{cd}}{V_{cs}}\cdot\frac{f_+^\pi(0)}{f_+^K(0)}\right|$ = 0.188 ± 0.008 ± 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 ± 0.02 ± 0.03; isospin invariance predicts the ratio is 1.0.

$\Gamma(\overline{K}^0 \mu^+\nu_\mu)/\Gamma_{total}$ — Γ_{16}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.092±0.006 OUR FIT					
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_{16}/Γ_{37}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.00 ±0.07 OUR FIT					
1.019±0.076±0.065	555 ± 39	LINK	04E	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^-\pi^+ e^+\nu_e)/\Gamma_{total}$ — Γ_{17}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
$3.5^{+0.7}_{-0.6}$ 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

$\Gamma(\overline{K}^*(892)^0 e^+\nu_e)/\Gamma_{total}$ — Γ_{31}/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.

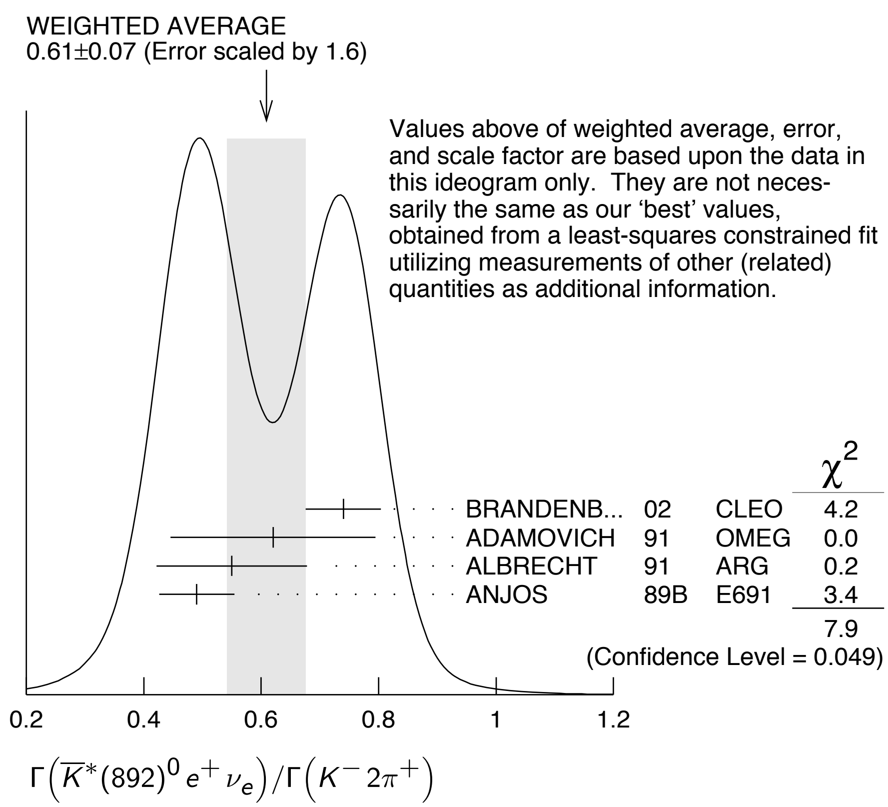
VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
5.53±0.13 OUR FIT				
5.53±0.14 OUR AVERAGE				
5.52±0.07±0.13	≈ 5k	BRIERE 10	CLEO	e^+e^- at $\psi(3770)$
5.56±0.27±0.23	422 ± 21	[20] HUANG 05B	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
5.06±1.21±0.40	28 ± 7	ABLIKIM 06O	BES2	e^+e^- at 3773 MeV

[20] 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.

$\Gamma(\overline{K}^*(892)^0 e^+ \nu_e)/\Gamma(K^- 2\pi^+)$ Γ_{31}/Γ_{37}

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
0.606±0.019 OUR FIT Error includes scale factor of 1.1.				
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



$\Gamma(K^- \pi^+ e^+ \nu_e$ nonresonant$)/\Gamma_{total}$ Γ_{19}/Γ

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

$\Gamma(K^-\pi^+\mu^+\nu_\mu)/\Gamma(\overline{K}^0\mu^+\nu_\mu)$ — Γ_{20}/Γ_{16}

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

$\Gamma(\overline{K}^*(892)^0\mu^+\nu_\mu)/\Gamma_{total}$ — Γ_{32}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
5.28±0.15 OUR FIT					
5.27±0.07±0.14	≈ 5k	BRIERE	10	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(\overline{K}^*(892)^0\mu^+\nu_\mu)/\Gamma(\overline{K}^0\mu^+\nu_\mu)$ — Γ_{32}/Γ_{16}

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 ±0.04 OUR FIT					
0.594±0.043±0.033	555 ± 39	LINK	04E	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(\overline{K}^*(892)^0\mu^+\nu_\mu)/\Gamma(K^-2\pi^+)$ — Γ_{32}/Γ_{37}

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
0.578±0.020 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±0.010±0.021	12k	[21] LINK	02J	FOCS	γ nucleus, ≈ 180 GeV

[21] 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.

$\Gamma(K^-\pi^+\mu^+\nu_\mu$ nonresonant$)/\Gamma(K^-\pi^+\mu^+\nu_\mu)$ — Γ_{22}/Γ_{20}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.0530\pm0.0074^{+0.0099}_{-0.0096}$	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_{23}/Γ_{20}

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_{33}/Γ_{20}

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_{34}/Γ_{20}

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

$\Gamma(\pi^0 e^+ \nu_e)/\Gamma_{total}$ — Γ_{24}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.405±0.016±0.009	838	[22] BESSON	09	CLEO	$e^+ e^-$ at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.373±0.022±0.013		[23] DOBBS	08	CLEO	See BESSON 09
0.44 ±0.06 ±0.03	63 ± 9	HUANG	05B	CLEO	See DOBBS 08

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

[23] 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.

$\Gamma(\eta e^+ \nu_e)/\Gamma_{total}$ — Γ_{25}/Γ

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

$\Gamma(\rho^0 e^+ \nu_e)/\Gamma_{total}$ — Γ_{26}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0022±0.0004 OUR FIT					
0.0021±0.0004±0.0001	27 ± 6	[24] HUANG	05B	CLEO	$e^+ e^-$ at $\psi(3770)$

[24] 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_{26}/Γ_{31}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.039±0.007 OUR FIT					
0.045±0.014±0.009	49	[25] AITALA	97	E791	π^- nucleus, 500 GeV

[25] 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_{27}/Γ_{32}

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	[26] AITALA	97	E791	π^- nucleus, 500 GeV
0.079±0.019±0.013	39	[27] FRABETTI	97	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV

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

[27] 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.

$\Gamma(\omega e^+ \nu_e)/\Gamma_{total}$ — Γ_{28}/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 $\psi(3770)$

$\Gamma(\eta'(958) e^+ \nu_e)/\Gamma_{total}$ — Γ_{29}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$\mathbf{<3.5\times10^{-4}}$	90	MITCHELL	09B	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(\phi e^+ \nu_e)/\Gamma_{total}$ — Γ_{30}/Γ

Unseen decay modes of the ϕ are included.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$\mathbf{<1.6\times10^{-4}}$	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 $\overline{K}K\overline{K}$

$\Gamma(K^0_S \pi^+)/\Gamma_{total}$ — Γ_{35}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.526\pm0.022\pm0.038$		[28] DOBBS	07	CLEO	See MENDEZ 10
$1.55\pm0.05\pm0.06$	2230 ± 60	[28] HE	05	CLEO	See DOBBS 07
$1.6\pm0.3\pm0.1$	161	ADLER	88C	MRK3	e^+e^- 3.77 GeV

[28] 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_{35}/Γ_{37}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.161 ±0.007 OUR FIT Error includes scale factor of 3.4.					
0.158 ±0.007 OUR AVERAGE Error includes scale factor of 3.2.					
$0.1682\pm0.0012\pm0.0037$	30k	MENDEZ	10	CLEO	e^+e^- at 3774 MeV
$0.1530\pm0.0023\pm0.0016$	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. • • •					
$0.174\pm0.012\pm0.011$	473	[29] BISHAI	97	CLEO	$e^+e^-\approx\Upsilon(4S)$
$0.137\pm0.015\pm0.016$	264	ANJOS	90C	E691	Photoproduction

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

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

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{1.460\pm0.040\pm0.035}$	2023 ± 54	[30] HE	08	CLEO	e^+e^- at $\psi(3770)$

[30] The difference of CLEO $D^+\rightarrow K^0_S\pi^+$ and $K^0_L\pi^+$ branching fractions over the sum (DOBBS 07 and HE 08) is $+0.022\pm0.016\pm0.018$.

$\Gamma(K^- 2\pi^+)/\Gamma_{total}$ — Γ_{37}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
9.13±0.19 OUR FIT Error includes scale factor of 1.1.					
9.14±0.10±0.17		[31] 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	[31] HE	05	CLEO	See DOBBS 07
9.3 ±0.6 ±0.8	1502	[32] BALEST	94	CLEO	$e^+e^- \approx \Upsilon(4S)$
6.4 $^{+1.5}_{-1.4}$		[33] 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	[34] SCHINDLER	81	MRK2	e^+e^- 3.771 GeV

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

[32] 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).

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

[34] 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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$\Gamma((K^-\pi^+)_{S-wave}\pi^+)/\Gamma(K^- 2\pi^+)$ — Γ_{38}/Γ_{37}

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	[35] LINK	09	FOCS	MIPWA fit, 53k evts
0.838 ±0.038	[36] 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	[37] LINK	07B	FOCS	See LINK 09

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

[36] 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 $\overline{K}^*_0(1430)^0$.

[37] 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_{39}/Γ_{37}

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

$\Gamma\big(\overline{K}^*(892)^0\pi^+, \overline{K}^*(892)^0 \rightarrow K^-\pi^+\big)/\Gamma\big(K^-2\pi^+\big)$ Γ_{41}/Γ_{37}

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	[38] 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

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

$\Gamma\big(\overline{K}^*(1410)^0\pi^+, \overline{K}^{*0} \rightarrow K^-\pi^+\big)/\Gamma\big(K^-2\pi^+\big)$ Γ_{42}/Γ_{37}

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

$\Gamma\big(\overline{K}_0^*(1430)^0\pi^+, \overline{K}_0^*(1430)^0 \rightarrow K^-\pi^+\big)/\Gamma\big(K^-2\pi^+\big)$ Γ_{40}/Γ_{37}

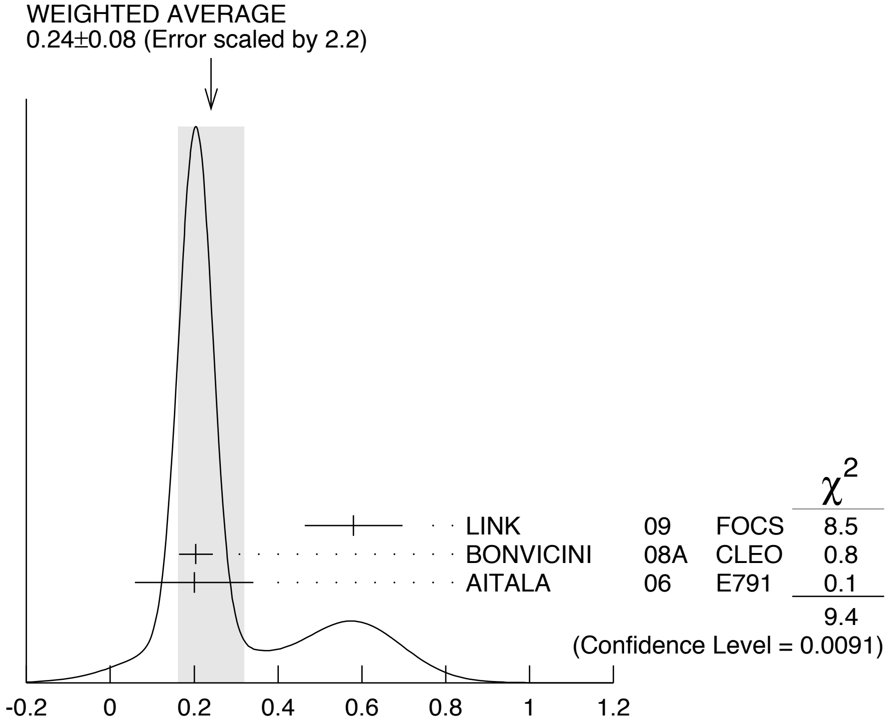
This is the "fit fraction" from the Dalitz-plot analysis.

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
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

$\Gamma\big(\overline{K}_2^*(1430)^0\pi^+, \overline{K}_2^*(1430)^0 \rightarrow K^-\pi^+\big)/\Gamma\big(K^-2\pi^+\big)$ Γ_{43}/Γ_{37}

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



$\Gamma\left(\overline{K}{}_2^*(1430)^0\pi^+, \overline{K}{}_2^*(1430)^0 \to K^-\pi^+\right)/\Gamma\left(K^-2\pi^+\right)$ Γ_{43}/Γ_{37}
(units 10^{-2})

$\Gamma\left(\overline{K}{}^*(1680)^0\pi^+, \overline{K}{}^*(1680)^0 \to K^-\pi^+\right)/\Gamma\left(K^-2\pi^+\right)$ Γ_{44}/Γ_{37}

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

$\Gamma\left(K^-(2\pi^+)_{I=2}\right)/\Gamma\left(K^-2\pi^+\right)$ Γ_{45}/Γ_{37}

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

$\Gamma\left(K^-2\pi^+ \text{ nonresonant}\right)/\Gamma\left(K^-2\pi^+\right)$ Γ_{46}/Γ_{37}

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_{47}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
6.99±0.27 OUR FIT					
6.99±0.09±0.25		[39] 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	[39] HE	05	CLEO	See DOBBS 07
5.1 ±1.3 ±0.8	159	ADLER	88C	MRK3	e^+e^- 3.77 GeV

[39] 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_{48}/Γ_{47}

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_{49}/Γ_{47}

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_{50}/Γ_{47}

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_{51}/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
5.99±0.18 OUR FIT					
5.98±0.08±0.16		[40] 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	[40] 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

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

$\Gamma(K^0_S 2\pi^+\pi^-)/\Gamma_{total}$ — 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 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
3.12 ±0.11 OUR FIT					
3.122±0.046±0.096		[41] 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	[41] HE	05	CLEO	See DOBBS 07
2.1 $^{+1.0}_{-0.9}$		[42] BARLAG	92C	ACCM	π^- Cu 230 GeV
3.3 ±0.8 ±0.2	168	ADLER	88C	MRK3	e^+e^- 3.77 GeV

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

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

$\Gamma(K^-3\pi^+\pi^-)/\Gamma(K^-2\pi^+)$ — Γ_{53}/Γ_{37}

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_{54}/Γ_{53}

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_{55}/Γ_{53}

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_{55}/Γ_{37}

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

$\Gamma(\overline{K}^*(892)^0 2\pi^+\pi^- \text{no-}\rho, \overline{K}^*(892)^0 \to K^-\pi^+)/\Gamma(K^-2\pi^+)$ — Γ_{57}/Γ_{37}

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.032±0.010±0.008	FRABETTI	97C	E687	γBe, $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma(K^-\rho^0 2\pi^+)/\Gamma(K^-3\pi^+\pi^-)$ — Γ_{58}/Γ_{53}

VALUE	DOCUMENT ID		TECN	COMMENT
0.30±0.04±0.01	LINK	03D	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^-\rho^0 2\pi^+)/\Gamma(K^-2\pi^+)$ — Γ_{58}/Γ_{37}

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.034±0.009±0.005	FRABETTI	97C	E687	γBe, $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma(\overline{K}^*(892)^0 a_1(1260)^+)/\Gamma(K^- 2\pi^+)$ — Γ_{56}/Γ_{37}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.099±0.008±0.018	LINK	03D	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^- 3\pi^+ \pi^-$ nonresonant$)/\Gamma(K^- 3\pi^+ \pi^-)$ — Γ_{59}/Γ_{53}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
0.07 ±0.05±0.01		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

$\Gamma(K^+ 2K^0_S)/\Gamma(K^- 2\pi^+)$ — Γ_{60}/Γ_{37}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.049±0.022 OUR AVERAGE	Error includes scale factor of 2.4.				
0.035±0.010±0.005	39 ± 9	ALBRECHT	94I	ARG	$e^+ e^- \approx$ 10 GeV
0.085±0.018	70 ± 12	AMMAR	91	CLEO	$e^+ e^- \approx$ 10.5 GeV

$\Gamma(K^+ K^- K^0_S \pi^+)/\Gamma(K^0_S 2\pi^+ \pi^-)$ — Γ_{61}/Γ_{52}

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
7.7±1.5±0.9	35 ± 7	LINK	01C	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

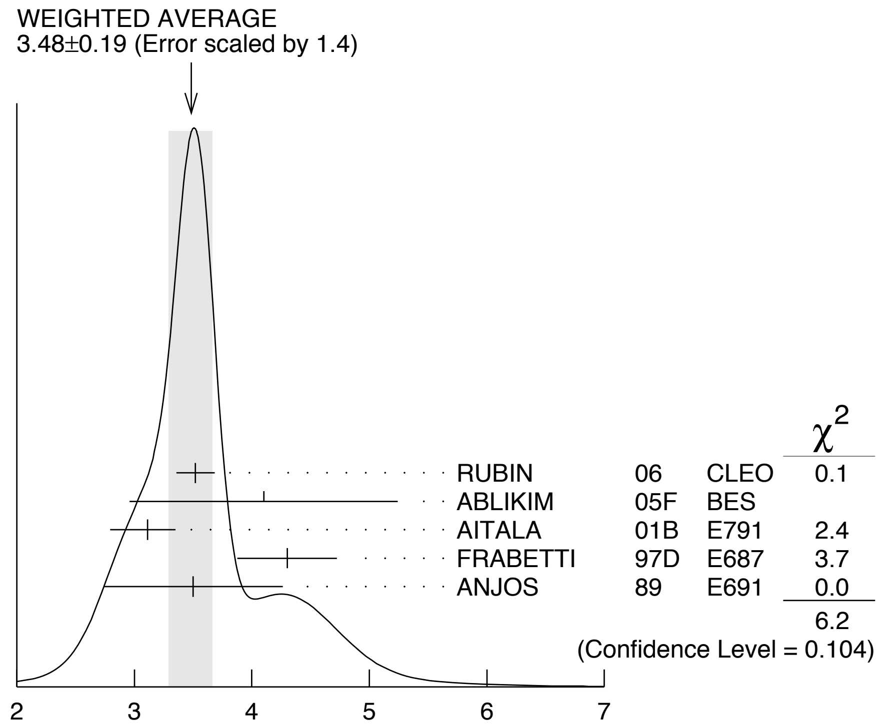
Pionic modes

$\Gamma(\pi^+ \pi^0)/\Gamma(K^- 2\pi^+)$ — Γ_{62}/Γ_{37}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.31±0.06 OUR AVERAGE					
1.29±0.04±0.05	2649 ± 76	MENDEZ	10	CLEO	$e^+ e^-$ at 3774 MeV
1.33±0.11±0.09	1229 ± 99	AUBERT,B	06F	BABR	$e^+ e^- \approx \Upsilon(4S)$
1.44±0.19±0.10	171 ± 22	ARMS	04	CLEO	$e^+ e^- \approx$ 10 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.33±0.07±0.06	914 ± 46	RUBIN	06	CLEO	See MENDEZ 10

$\Gamma(2\pi^+ \pi^-)/\Gamma(K^- 2\pi^+)$ — Γ_{63}/Γ_{37}

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±0.11±0.12	3303 ± 95	RUBIN	06	CLEO	$e^+ e^-$ at $\psi(3770)$
4.1 ±1.1 ±0.3	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 ±0.3 ±0.3	236	FRABETTI	97D	E687	γ Be $\approx$ 200 GeV
3.5 ±0.7 ±0.3	83	ANJOS	89	E691	Photoproduction

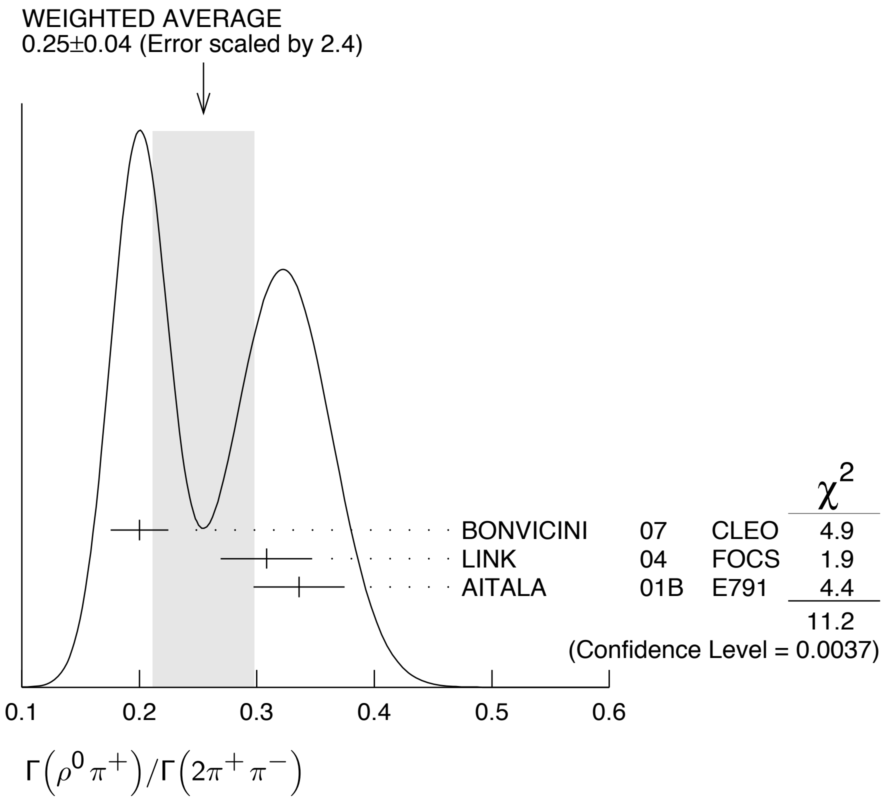


$\Gamma(2\pi^+\pi^-)/\Gamma(K^-2\pi^+)$ (units 10^{-2})

$\Gamma(\rho^0\pi^+)/\Gamma(2\pi^+\pi^-)$ — Γ_{64}/Γ_{63}

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 ±0.023 ±0.009	BONVICINI	07	CLEO	Dalitz fit, ≈ 2240 evts
0.3082±0.0314±0.0230	LINK	04	FOCS	Dalitz fit, 1527 ± 51 evts
0.336 ±0.032 ±0.022	AITALA	01B	E791	Dalitz fit, 1172 evts



$\Gamma\left(\pi^+(\pi^+\pi^-)_{S-\text{wave}}\right)/\Gamma\left(2\pi^+\pi^-\right)$ — Γ_{65}/Γ_{63}

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	[43] LINK	04	FOCS	Dalitz fit, 1527 ± 51 evts

[43] 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 $f_0(980)$, $f_0(1300)$, $f_0(1200\text{–}1600)$, $f_0(1500)$, and $f_0(1750)$. See LINK 04 for details and discussion.

$\Gamma\left(\sigma\pi^+, \sigma\to\pi^+\pi^-\right)/\Gamma\left(2\pi^+\pi^-\right)$ — Γ_{66}/Γ_{63}

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

$\Gamma\left(f_0(980)\pi^+, f_0(980)\to\pi^+\pi^-\right)/\Gamma\left(2\pi^+\pi^-\right)$ — Γ_{67}/Γ_{63}

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_{68}/Γ_{63}

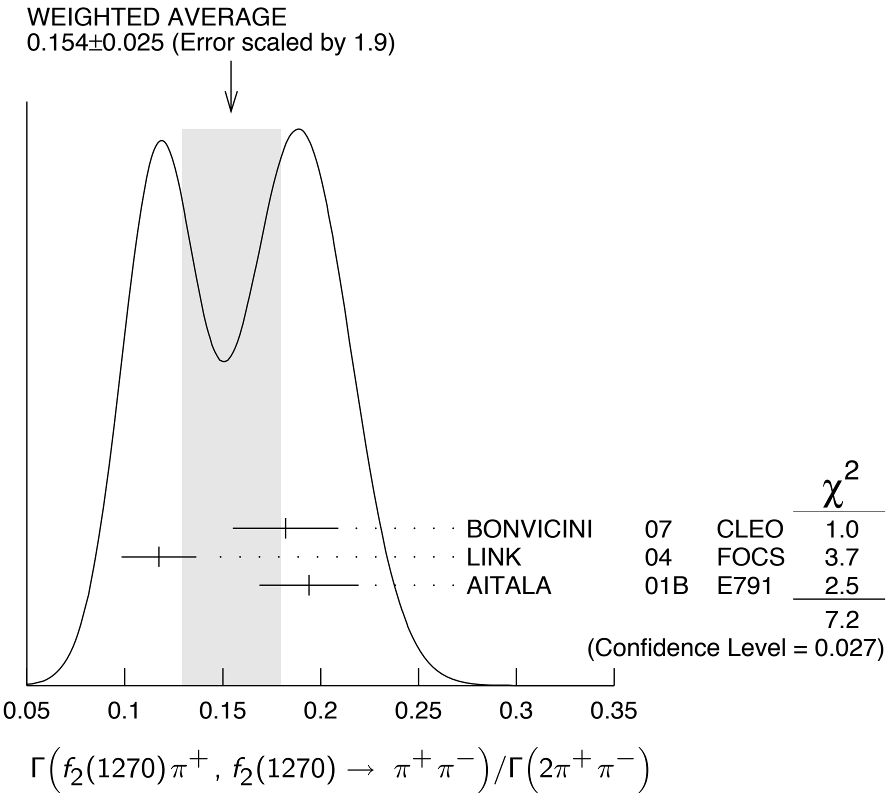
This is the "fit fraction" from the Dalitz-plot analysis.

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_{69}/Γ_{63}

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_{70}/Γ_{63}

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_{71}/Γ_{63}

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_{72}/Γ_{63}

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

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

$\Gamma(f_0(1790)\pi^+,\ f_0(1790) \to \pi^+\pi^-)/\Gamma(2\pi^+\pi^-)$ — Γ_{73}/Γ_{63}

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

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

$\Gamma((\pi^+\pi^+)_{S-wave}\pi^-)/\Gamma(2\pi^+\pi^-)$ — Γ_{74}/Γ_{63}

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

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

$\Gamma(2\pi^+\pi^-$ nonresonant$)/\Gamma(2\pi^+\pi^-)$ — Γ_{75}/Γ_{63}

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.035	95	BONVICINI	07	CLEO	Dalitz fit, ≈ 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_{76}/Γ_{37}

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_{77}/Γ_{37}

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

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

Unseen decay modes of the η are included.

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$34.3 \pm 1.4 \pm 1.7$	1033 ± 42	ARTUSO	08	CLEO	See MENDEZ 10

$\Gamma(\eta\pi^+)/\Gamma(K^- 2\pi^+)$ — Γ_{81}/Γ_{37}

Unseen decay modes of the η are included.

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
3.87±0.09±0.19	2940 ± 68	MENDEZ	10	CLEO	e^+e^- at 3774 MeV
• • • 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

$\Gamma(\omega\pi^+)/\Gamma_{total}$ — Γ_{83}/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_{80}/Γ_{37}

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_{80}/Γ_{53}

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

$\Gamma(\eta\pi^+\pi^0)/\Gamma_{total}$ — Γ_{82}/Γ

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

$\Gamma(\eta'(958)\pi^+)/\Gamma_{total}$ — Γ_{84}/Γ

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

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
44.2±2.5±2.9	352 ± 20	ARTUSO	08	CLEO	See MENDEZ 10

$\Gamma(\eta'(958)\pi^+)/\Gamma(K^-2\pi^+)$ — Γ_{84}/Γ_{37}

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

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
5.12±0.17±0.25	1037 ± 35	MENDEZ	10	CLEO	e^+e^- at 3774 MeV

$\Gamma(\eta'(958)\pi^+\pi^0)/\Gamma_{total}$ — Γ_{85}/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

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

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3.14±0.09±0.08	1971 ± 51	BONVICINI	08	CLEO	See MENDEZ 10

$\Gamma(K^+K^0_S)/\Gamma(K^0_S\pi^+)$ — Γ_{86}/Γ_{35}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.193 ±0.007 OUR FIT Error includes scale factor of 3.2.					
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	γ Be $\overline{E}_\gamma \approx$ 200 GeV
0.271 ±0.065 ±0.039	69	ANJOS	90C	E691	γ Be
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_{86}/Γ_{37}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
3.11±0.16 OUR FIT Error includes scale factor of 3.3.					
3.35±0.06±0.07	5161 ± 86	MENDEZ	10	CLEO	e^+e^- at 3774 MeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3.02±0.18±0.15	949	[44] LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

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

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

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
0.954±0.026 OUR FIT Error includes scale factor of 1.1.					
0.935±0.017±0.024		[45] 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	[45] HE	05	CLEO	See DOBBS 07

[45] 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_{87}/Γ_{37}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.1045±0.0021 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 ±0.010 $^{+0.008}_{-0.006}$		JUN	00	SELX	Σ^- nucleus, 600 GeV
0.0976±0.0042±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_{88}/Γ_{87}

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

VALUE (%)	DOCUMENT ID		TECN	COMMENT
27.8±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±3.1±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_{89}/Γ_{87}

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

VALUE (%)	DOCUMENT ID		TECN	COMMENT
25.7±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±2.0±2.5	FRABETTI	95B	E687	Dalitz fit, 915 evts

$\Gamma\left(K^+ \overline{K}^*_0(1430)^0, \overline{K}^*_0(1430)^0 \to K^-\pi^+\right)/\Gamma\left(K^+K^-\pi^+\right)$ Γ_{90}/Γ_{87}

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

VALUE (%)	DOCUMENT ID		TECN	COMMENT
$18.8\pm1.2^{+3.3}_{-3.4}$	RUBIN	08	CLEO	Dalitz fit, 19,458±163 evts
• • • We do not use the following data for averages, fits, limits, etc. • • •				
37.0±3.5±1.8	FRABETTI	95B	E687	Dalitz fit, 915 evts

$\Gamma\left(K^+ \overline{K}^*_2(1430)^0, \overline{K}^*_2 \to K^-\pi^+\right)/\Gamma\left(K^+K^-\pi^+\right)$ Γ_{91}/Γ_{87}

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

$\Gamma\left(K^+ \overline{K}^*_0(800), \overline{K}^*_0 \to K^-\pi^+\right)/\Gamma\left(K^+K^-\pi^+\right)$ Γ_{92}/Γ_{87}

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

$\Gamma\left(a_0(1450)^0\pi^+, a_0^0 \to K^+K^-\right)/\Gamma\left(K^+K^-\pi^+\right)$ Γ_{93}/Γ_{87}

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

$\Gamma\left(\phi(1680)\pi^+, \phi \to K^+K^-\right)/\Gamma\left(K^+K^-\pi^+\right)$ Γ_{94}/Γ_{87}

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

$\Gamma\left(K^*(892)^+K^0_S\right)/\Gamma\left(K^0_S\pi^+\right)$ Γ_{102}/Γ_{35}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.1±0.3±0.4	67	FRABETTI	95	E687	γBe $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma\left(\phi\pi^+\pi^0\right)/\Gamma_{total}$ Γ_{99}/Γ

Unseen decay modes of the ϕ are included.

VALUE	DOCUMENT ID		TECN	COMMENT
0.023±0.010	[46] BARLAG	92C	ACCM	π^- Cu 230 GeV

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

$\Gamma\left(\phi\rho^+\right)/\Gamma\left(K^-2\pi^+\right)$ Γ_{100}/Γ_{37}

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

$\Gamma\left(K^+K^-\pi^+\pi^0 \text{ non-}\phi\right)/\Gamma_{total}$ Γ_{101}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$0.015^{+0.007}_{-0.006}$	[47] BARLAG	92C	ACCM	π^- Cu 230 GeV

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

$\Gamma(K^+ K^- \pi^+ \pi^0 \text{ non-}\phi)/\Gamma(K^- 2\pi^+)$ — Γ_{101}/Γ_{37}

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_{96}/Γ_{52}

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_{97}/Γ_{52}

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_{98}/Γ_{53}

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_{103}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
(1.83+-0.26) OUR FIT Error includes scale factor of 1.4.					
2.52±0.47±0.26	189 ± 37	AUBERT,B	06F	BABR	$e^+ e^- \approx \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2.28±0.36±0.17	148 ± 23	DYTMAN	06	CLEO	See MENDEZ 10

$\Gamma(K^+ \pi^0)/\Gamma(K^- 2\pi^+)$ — Γ_{103}/Γ_{37}

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
2.01±0.29 OUR FIT Error includes scale factor of 1.4.					
1.9 ±0.2 ±0.1	343 ± 37	MENDEZ	10	CLEO	$e^+ e^-$ at 3774 MeV

$\Gamma(K^+ \eta)/\Gamma(K^- 2\pi^+)$ — Γ_{104}/Γ_{37}

Unseen decay modes of the η are included.

VALUE (units 10^{-2})	CL%	DOCUMENT ID		TECN	COMMENT
<0.15	90	MENDEZ	10	CLEO	$e^+ e^-$ at 3774 MeV

$\Gamma(K^+ \eta'(958))/\Gamma(K^- 2\pi^+)$ — Γ_{105}/Γ_{37}

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

VALUE (units 10^{-2})	CL%	DOCUMENT ID		TECN	COMMENT
<0.20	90	MENDEZ	10	CLEO	$e^+ e^-$ at 3774 MeV

$\Gamma(K^+ \pi^+ \pi^-)/\Gamma(K^- 2\pi^+)$ — Γ_{106}/Γ_{37}

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

$\Gamma(K^+\rho^0)/\Gamma(K^+\pi^+\pi^-)$ — $\Gamma_{107}/\Gamma_{106}$

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

$\Gamma(K^+f_0(980), f_0(980)\to\pi^+\pi^-)/\Gamma(K^+\pi^+\pi^-)$ — $\Gamma_{109}/\Gamma_{106}$

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

$\Gamma(K^*(892)^0\pi^+, K^*(892)^0\to K^+\pi^-)/\Gamma(K^+\pi^+\pi^-)$ — $\Gamma_{108}/\Gamma_{106}$

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

$\Gamma(K_2^*(1430)^0\pi^+, K_2^*(1430)^0\to K^+\pi^-)/\Gamma(K^+\pi^+\pi^-)$ — $\Gamma_{110}/\Gamma_{106}$

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

$\Gamma(K^+\pi^+\pi^-$ nonresonant$)/\Gamma(K^+\pi^+\pi^-)$ — $\Gamma_{111}/\Gamma_{106}$

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±0.14±0.07	[48] AITALA	97C	E791	Dalitz fit, 59 evts

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

$\Gamma(2K^+K^-)/\Gamma(K^-2\pi^+)$ — Γ_{112}/Γ_{37}

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
9.49±2.17±0.22	65	[49] LINK	02I	FOCS	γ nucleus, ≈ 180 GeV

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

Rare or forbidden modes

$\Gamma(\pi^+e^+e^-)/\Gamma_{total}$ — Γ_{113}/Γ

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<5.9\times10^{-6}$	90		[50] RUBIN	10	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<7.4\times10^{-6}$	90		HE	05A	CLEO	See RUBIN 10
$<5.2\times10^{-5}$	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

[50] This RUBIN 10 limit is for the e^+e^- mass in the continuum away from the $\phi(1020)$. See the next data block.

$\Gamma(\pi^+\phi, \phi\to e^+e^-)/\Gamma_{total}$ — Γ_{114}/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
$(1.7^{+1.4}_{-0.9}\pm0.1)\times10^{-6}$	4	[51] RUBIN	10	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$(2.7^{+3.6}_{-1.8}\pm0.2)\times10^{-6}$	2	HE	05A	CLEO	See RUBIN 10

[51] This RUBIN 10 result is consistent with the known $D^+ \to \phi\pi^+$ and $\phi \to e^+e^-$ fractions.

$\Gamma(\pi^+\mu^+\mu^-)/\Gamma_{total}$ — Γ_{115}/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		[52] ABAZOV	08D	D0	$p\overline{p}$, $E_{cm} = 1.96$ 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	$\pi^- N$ 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	$\pi^- N$ 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

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

$\Gamma(\pi^+\phi,\ \phi\to\mu^+\mu^-)/\Gamma_{total}$ — Γ_{116}/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
$(1.8\pm0.5\pm0.6)\times10^{-6}$	[53] ABAZOV	08D	D0	$p\overline{p}$, $E_{cm} = 1.96$ TeV

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

$\Gamma(\rho^+\mu^+\mu^-)/\Gamma_{total}$ — Γ_{117}/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

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

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.0\times10^{-6}$	90	RUBIN	10	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<6.2\times10^{-6}$	90	HE	05A	CLEO	See RUBIN 10
$<2.0\times10^{-4}$	90	AITALA	99G	E791	$\pi^- N$ 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

$\Gamma(K^+\mu^+\mu^-)/\Gamma_{total}$ Γ_{119}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<9.2 \times 10^{-6}$	90	LINK	03F	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<4.4 \times 10^{-5}$	90	AITALA	99G	E791	$\pi^- N$ 500 GeV
$<9.7 \times 10^{-5}$	90	FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<3.2 \times 10^{-4}$	90	KODAMA	95	E653	π^- emulsion 600 GeV
$<9.2 \times 10^{-3}$	90	WEIR	90B	MRK2	e^+e^- 29 GeV

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

A test of lepton-family-number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.4 \times 10^{-5}$	90	AITALA	99G	E791	$\pi^- N$ 500 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. • • •					
$<1.1 \times 10^{-4}$	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

$\Gamma(\pi^+e^-\mu^+)/\Gamma_{total}$ Γ_{122}/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_{123}/Γ

A test of lepton-family-number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<6.8 \times 10^{-5}$	90	AITALA	99G	E791	$\pi^- N$ 500 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. • • •					
$<1.3 \times 10^{-4}$	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_{125}/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_{126}/Γ

A test of lepton-number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.1 \times 10^{-6}$	90	RUBIN	10	CLEO	$e^+ e^-$ at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<3.6 \times 10^{-6}$	90	HE	05A	CLEO	See RUBIN 10
$<9.6 \times 10^{-5}$	90	AITALA	99G	E791	$\pi^- N$ 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_{127}/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	$\pi^- N$ 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_{128}/Γ

A test of lepton-number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.0 \times 10^{-5}$	90	AITALA	99G	E791	$\pi^- N$ 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_{129}/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_{130}/Γ

A test of lepton-number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.5 \times 10^{-6}$	90	RUBIN	10	CLEO	$e^+ e^-$ at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<4.5 \times 10^{-6}$	90	HE	05A	CLEO	See RUBIN 10
$<1.2 \times 10^{-4}$	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_{131}/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_{132}/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_{133}/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
+8±8	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
−0.80±0.26 OUR AVERAGE					
−0.71±0.19±0.20		KO	10	BELL	$e^+e^- \approx \Upsilon(4S)$
−1.3 ±0.7 ±0.3	30k	MENDEZ	10	CLEO	e^+e^- at 3774 MeV
−1.6 ±1.5 ±0.9	10.6k	[54] LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
−0.6 ±1.0 ±0.3		DOBBS	07	CLEO	See MENDEZ 10

[54] 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 (%)	EVTS	DOCUMENT ID		TECN	COMMENT
−0.1±0.4±0.9	231k	MENDEZ	10	CLEO	e^+e^- at 3774 MeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
−0.5±0.4±0.9		DOBBS	07	CLEO	See MENDEZ 10

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

VALUE (%)	DOCUMENT ID		TECN	COMMENT
+1.0±0.9±0.9	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
+0.3±0.9±0.3	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
+0.1±1.1±0.6	DOBBS	07	CLEO	e^+e^- at $\psi(3770)$

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

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
+2.9±2.9±0.3	2.6k	MENDEZ	10	CLEO	e^+e^- at 3774 MeV

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

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
−2.0±2.3±0.3	2.9k	MENDEZ	10	CLEO	e^+e^- at 3774 MeV

$A_{CP}(\pi^\pm\eta'(958))$ in $D^\pm \to \pi^\pm\eta'(958)$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
−4.0±3.4±0.3	1.0k	MENDEZ	10	CLEO	e^+e^- at 3774 MeV

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

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
−0.1 ±0.6 OUR AVERAGE					
−0.16±0.58±0.25		KO	10	BELL	$e^+e^- \approx \Upsilon(4S)$
−0.2 ±1.5 ±0.9	5.2k	MENDEZ	10	CLEO	e^+e^- at 3774 MeV
+7.1 ±6.1 ±1.2	949	[55] LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx 180$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
+6.9 ±6.0 ±1.5	949	[56] LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx 180$ GeV

[55] 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^-.

[56] 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±0.84±0.29		RUBIN	08	CLEO	e^+e^-, 3774 MeV
−0.1 ±1.5 ±0.8		DOBBS	07	CLEO	e^+e^- at $\psi(3770)$
+1.4 ±1.0 ±0.8	43k±321	[57] AUBERT	05S	BABR	$e^+e^- \approx \Upsilon(4S)$
+0.6 ±1.1 ±0.5	14k	[58] LINK	00B	FOCS	
−1.4 ±2.9		[58] AITALA	97B	E791	$-0.062 < A_{CP} < +0.034$ (90% CL)
−3.1 ±6.8		[58] FRABETTI	94I	E687	$-0.14 < A_{CP} < +0.081$ (90% CL)

[57] 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^-.

[58] 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	[59] AUBERT	05S	BABR	$e^+ e^- \approx \Upsilon(4S)$
− 1.0± 5.0		[60] AITALA	97B	E791	$-0.092 < A_{CP} < +0.072$ (90% CL)
−12 ±13		[60] FRABETTI	94I	E687	$-0.33 < A_{CP} < +0.094$ (90% CL)

[59] 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^-.

[60] 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					
$-1.8 \pm 1.6^{+0.2}_{-0.4}$		RUBIN	08	CLEO	Fit-fraction asymmetry
+0.2±1.5±0.6	10k±136	[61] AUBERT	05S	BABR	$e^+ e^- \approx \Upsilon(4S)$
−2.8±3.6		[62] AITALA	97B	E791	$-0.087 < A_{CP} < +0.031$ (90% CL)
+6.6±8.6		[62] FRABETTI	94I	E687	$-0.075 < A_{CP} < +0.21$ (90% CL)

[61] 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^-.

[62] 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
$\mathbf{+8 \pm 6^{+4}_{-2}}$	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
$\mathbf{+43 \pm 19^{+5}_{-18}}$	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
$\mathbf{-12 \pm 11^{+14}_{-6}}$	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
$\mathbf{-19 \pm 12^{+8}_{-11}}$	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±22±14	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
−1.7±4.2	[63] AITALA	97B	E791	$-0.086 < A_{CP} < +0.052$ (90% CL)

[63] 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 $D^{\pm} \to K^0_S K^{\pm}\pi^+\pi^-$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
−4.2±6.4±2.2	523 ± 32	LINK	05E	FOCS	γ A, $\overline{E}_{\gamma} \approx$ 180 GeV

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

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
−3.5±10.7±0.9	343 ± 37	MENDEZ	10	CLEO	e^+e^- at 3774 MeV

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±0.062±0.022	523 ± 32	LINK	05E	FOCS	γ A, $\overline{E}_{\gamma} \approx$ 180 GeV

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

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.707±0.010±0.009	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±0.44±0.10	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±11±1	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±0.007±0.002	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

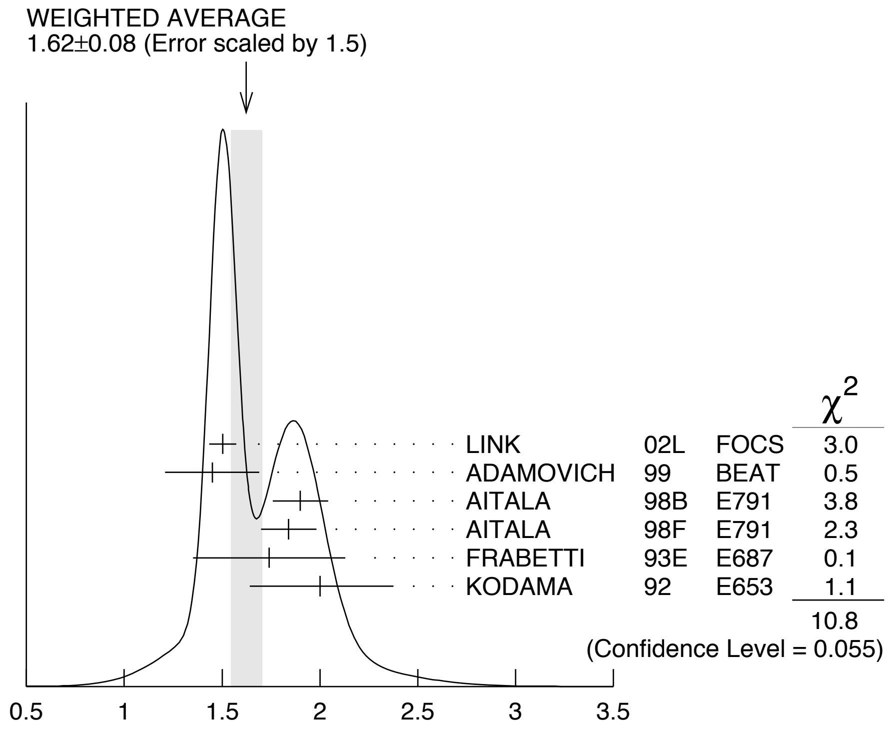
$r_v \equiv V(0)/A_1(0)$ in $D^+ \to \overline{K}^*(892)^0 \ell^+ \nu_\ell$

See also BRIERE 10 for $\overline{K}^* \ell^+ \nu_\ell$ helicity-basis form-factor measurements.

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	[64] 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	[65] 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	$\overline{K}^*(892)^0 e^+ \nu_e$

[64] 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.

[65] 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 $D^+ \rightarrow \overline{K}^*(892)^0 \ell^+ \nu_\ell$

See also BRIERE 10 for $\overline{K}^* \ell^+ \nu_\ell$ helicity-basis form-factor measurements.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.83 ±0.05 OUR AVERAGE					
0.875±0.049±0.064	15k	[66] LINK	02L	FOCS	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
1.00 ±0.15 ±0.03	763	ADAMOVICH	99	BEAT	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
0.71 ±0.08 ±0.09	3000	AITALA	98B	E791	$\overline{K}^*(892)^0 e^+ \nu_e$
0.75 ±0.08 ±0.09	3034	AITALA	98F	E791	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
0.78 ±0.18 ±0.10	874	FRABETTI	93E	E687	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
0.82 $^{+0.22}_{-0.23}$ ±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 ±0.5 ±0.2	183	ANJOS	90E	E691	$\overline{K}^*(892)^0 e^+ \nu_e$

[66] 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 $D^+ \rightarrow \overline{K}^*(892)^0 \ell^+ \nu_\ell$

See also BRIERE 10 for $\overline{K}^* \ell^+ \nu_\ell$ helicity-basis form-factor measurements.

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

See also BRIERE 10 for $\overline{K}^* \ell^+ \nu_\ell$ helicity-basis form-factor measurements.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.13±0.08 OUR AVERAGE					
1.09±0.10±0.02	763	ADAMOVICH	99	BEAT	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
1.20±0.13±0.13	874	FRABETTI	93E	E687	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
1.18±0.18±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 $^{+0.6}_{-0.4}$ ±0.3	183	ANJOS	90E	E691	$\overline{K}^*(892)^0 e^+ \nu_e$

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

See also BRIERE 10 for $\overline{K}^* \ell^+ \nu_\ell$ helicity-basis form-factor measurements.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.22±0.06 OUR AVERAGE Error includes scale factor of 1.6.					
0.28±0.05±0.02	763	ADAMOVICH	99	BEAT	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
0.16±0.05±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$^{+0.07}_{-0.05}$±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.)
BRIERE	10	PR D81 112001	R.A. Briere *et al.*	(CLEO Collab.)
KO	10	PRL 104 181602	B.R. Ko *et al.*	(BELLE Collab.)
MENDEZ	10	PR D81 052013	H. Mendez *et al.*	(CLEO Collab.)
RUBIN	10	PR D82 092007	P. Rubin *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.)

OTHER RELATED PAPERS

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