

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

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
1869.62 ± 0.15 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	$K^\mp \pi^\pm \pi^\pm$

¹PERUZZI 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, ≈ 180 GeV
1033.6 ± 22.1 ^{+9.9} _{-12.7}	3777	BONVICINI	99 CLEO	$e^+e^- \approx \Upsilon(4S)$
1048 ± 15 ± 11	9k	FRABETTI	94D E687	$D^+ \rightarrow K^- \pi^+ \pi^+$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1075 ± 40 ± 18	2455	FRABETTI	91 E687	γ Be, $D^+ \rightarrow K^- \pi^+ \pi^+$
1030 ± 80 ± 60	200	ALVAREZ	90 NA14	γ , $D^+ \rightarrow K^- \pi^+ \pi^+$
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

²BARLAG 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_S^0 modes, not as \bar{K}^0 modes. Nearly always it is a K_S^0 that is measured, and interference between Cabibbo-allowed and doubly Cabibbo-suppressed modes can invalidate the assumption that $2\Gamma(K_S^0) = \Gamma(\bar{K}^0)$.

Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Inclusive modes		
Γ_1 e^+ semileptonic	$(16.07 \pm 0.30) \%$	
Γ_2 μ^+ anything	$(17.6 \pm 3.2) \%$	
Γ_3 K^- anything	$(25.7 \pm 1.4) \%$	
Γ_4 \bar{K}^0 anything + K^0 anything	$(61 \pm 5) \%$	
Γ_5 K^+ anything	$(5.9 \pm 0.8) \%$	
Γ_6 $K^*(892)^-$ anything	$(6 \pm 5) \%$	
Γ_7 $\bar{K}^*(892)^0$ anything	$(23 \pm 5) \%$	
Γ_8 $K^*(892)^0$ anything	$< 6.6 \%$	CL=90%
Γ_9 η anything	$(6.3 \pm 0.7) \%$	
Γ_{10} η' anything	$(1.04 \pm 0.18) \%$	
Γ_{11} ϕ anything	$(1.03 \pm 0.12) \%$	
Leptonic and semileptonic modes		
Γ_{12} $e^+ \nu_e$	$< 8.8 \times 10^{-6}$	CL=90%
Γ_{13} $\mu^+ \nu_\mu$	$(3.82 \pm 0.33) \times 10^{-4}$	
Γ_{14} $\tau^+ \nu_\tau$	$< 1.2 \times 10^{-3}$	CL=90%
Γ_{15} $\bar{K}^0 e^+ \nu_e$	$(8.83 \pm 0.22) \%$	
Γ_{16} $\bar{K}^0 \mu^+ \nu_\mu$	$(9.2 \pm 0.6) \%$	
Γ_{17} $K^- \pi^+ e^+ \nu_e$	$(4.00 \pm 0.10) \%$	
Γ_{18} $\bar{K}^*(892)^0 e^+ \nu_e, \bar{K}^*(892)^0 \rightarrow K^- \pi^+$	$(3.68 \pm 0.10) \%$	
Γ_{19} $(K^- \pi^+)_{S\text{-wave}} e^+ \nu_e$	$(2.32 \pm 0.10) \times 10^{-3}$	
Γ_{20} $\bar{K}^*(1410)^0 e^+ \nu_e, \bar{K}^*(1410)^0 \rightarrow K^- \pi^+$	$< 6 \times 10^{-3}$	CL=90%
Γ_{21} $\bar{K}_2^*(1430)^0 e^+ \nu_e, \bar{K}_2^*(1430)^0 \rightarrow K^- \pi^+$	$< 5 \times 10^{-4}$	CL=90%
Γ_{22} $K^- \pi^+ e^+ \nu_e$ nonresonant	$< 7 \times 10^{-3}$	CL=90%
Γ_{23} $K^- \pi^+ \mu^+ \nu_\mu$	$(3.8 \pm 0.4) \%$	
Γ_{24} $\bar{K}^*(892)^0 \mu^+ \nu_\mu, \bar{K}^*(892)^0 \rightarrow K^- \pi^+$	$(3.52 \pm 0.10) \%$	
Γ_{25} $K^- \pi^+ \mu^+ \nu_\mu$ nonresonant	$(2.0 \pm 0.5) \times 10^{-3}$	
Γ_{26} $K^- \pi^+ \pi^0 \mu^+ \nu_\mu$	$< 1.6 \times 10^{-3}$	CL=90%
Γ_{27} $\pi^0 e^+ \nu_e$	$(4.05 \pm 0.18) \times 10^{-3}$	

Γ_{28}	$\eta e^+ \nu_e$	$(1.14 \pm 0.10) \times 10^{-3}$	
Γ_{29}	$\rho^0 e^+ \nu_e$	$(2.2 \pm 0.4) \times 10^{-3}$	
Γ_{30}	$\rho^0 \mu^+ \nu_\mu$	$(2.4 \pm 0.4) \times 10^{-3}$	
Γ_{31}	$\omega e^+ \nu_e$	$(1.6^{+0.7}_{-0.6}) \times 10^{-3}$	
Γ_{32}	$\eta'(958) e^+ \nu_e$	$(2.2 \pm 0.5) \times 10^{-4}$	
Γ_{33}	$\phi e^+ \nu_e$	$< 9 \times 10^{-5}$	CL=90%

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

Γ_{34}	$\bar{K}^*(892)^0 e^+ \nu_e$	$(5.52 \pm 0.15) \%$
Γ_{35}	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$	$(5.28 \pm 0.15) \%$
Γ_{36}	$\bar{K}_0^*(1430)^0 \mu^+ \nu_\mu$	$< 2.4 \times 10^{-4}$
Γ_{37}	$\bar{K}^*(1680)^0 \mu^+ \nu_\mu$	$< 1.5 \times 10^{-3}$

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

Γ_{38}	$K_S^0 \pi^+$	$(1.47 \pm 0.07) \%$	S=2.0
Γ_{39}	$K_L^0 \pi^+$	$(1.46 \pm 0.05) \%$	
Γ_{40}	$K^- 2\pi^+$	[a] $(9.13 \pm 0.19) \%$	
Γ_{41}	$(K^- \pi^+)_{S\text{-wave}} \pi^+$	$(7.32 \pm 0.19) \%$	
Γ_{42}	$\bar{K}_0^*(800)^0 \pi^+, \bar{K}_0^*(800) \rightarrow$		
Γ_{43}	$\bar{K}_0^*(1430)^0 \pi^+,$ $\bar{K}_0^*(1430)^0 \rightarrow K^- \pi^+$	[b] $(1.21 \pm 0.06) \%$	
Γ_{44}	$\bar{K}^*(892)^0 \pi^+,$ $\bar{K}^*(892)^0 \rightarrow K^- \pi^+$	$(1.01 \pm 0.11) \%$	
Γ_{45}	$\bar{K}^*(1410)^0 \pi^+, \bar{K}^{*0} \rightarrow$	not seen	
Γ_{46}	$\bar{K}_2^*(1430)^0 \pi^+,$ $\bar{K}_2^*(1430)^0 \rightarrow K^- \pi^+$	[b] $(2.2 \pm 0.7) \times 10^{-4}$	
Γ_{47}	$\bar{K}^*(1680)^0 \pi^+,$ $\bar{K}^*(1680)^0 \rightarrow K^- \pi^+$	[b] $(2.1 \pm 1.1) \times 10^{-4}$	
Γ_{48}	$K^- (2\pi^+)_{I=2}$	$(1.41 \pm 0.26) \%$	
Γ_{49}	$K^- 2\pi^+$ nonresonant		
Γ_{50}	$K_S^0 \pi^+ \pi^0$	[a] $(6.99 \pm 0.27) \%$	
Γ_{51}	$K_S^0 \rho^+$	$(4.8 \pm 1.0) \%$	
Γ_{52}	$\bar{K}^*(892)^0 \pi^+,$ $\bar{K}^*(892)^0 \rightarrow K_S^0 \pi^0$	$(1.3 \pm 0.6) \%$	
Γ_{53}	$K_S^0 \pi^+ \pi^0$ nonresonant	$(9 \pm 7) \times 10^{-3}$	
Γ_{54}	$K^- 2\pi^+ \pi^0$	[c] $(5.99 \pm 0.18) \%$	
Γ_{55}	$K_S^0 2\pi^+ \pi^-$	[c] $(3.12 \pm 0.11) \%$	
Γ_{56}	$K^- 3\pi^+ \pi^-$	[a] $(5.6 \pm 0.5) \times 10^{-3}$	S=1.1
Γ_{57}	$\bar{K}^*(892)^0 2\pi^+ \pi^-,$ $\bar{K}^*(892)^0 \rightarrow K^- \pi^+$	$(1.2 \pm 0.4) \times 10^{-3}$	

Γ_{58}	$\bar{K}^*(892)^0 \rho^0 \pi^+$,	$(2.2 \pm 0.4) \times 10^{-3}$	
	$\bar{K}^*(892)^0 \rightarrow K^- \pi^+$		
Γ_{59}	$\bar{K}^*(892)^0 a_1(1260)^+$	$[d] (9.0 \pm 1.8) \times 10^{-3}$	
Γ_{60}	$\bar{K}^*(892)^0 2\pi^+ \pi^- \text{ no-}\rho$,		
	$\bar{K}^*(892)^0 \rightarrow K^- \pi^+$		
Γ_{61}	$K^- \rho^0 2\pi^+$	$(1.68 \pm 0.27) \times 10^{-3}$	
Γ_{62}	$K^- 3\pi^+ \pi^- \text{ nonresonant}$	$(3.9 \pm 2.9) \times 10^{-4}$	
Γ_{63}	$K^+ 2K_S^0$	$(4.5 \pm 2.0) \times 10^{-3}$	
Γ_{64}	$K^+ K^- K_S^0 \pi^+$	$(2.4 \pm 0.6) \times 10^{-4}$	

Pionic modes

Γ_{65}	$\pi^+ \pi^0$	$(1.19 \pm 0.06) \times 10^{-3}$	
Γ_{66}	$2\pi^+ \pi^-$	$(3.18 \pm 0.18) \times 10^{-3}$	
Γ_{67}	$\rho^0 \pi^+$	$(8.1 \pm 1.5) \times 10^{-4}$	
Γ_{68}	$\pi^+ (\pi^+ \pi^-)_{S\text{-wave}}$	$(1.78 \pm 0.16) \times 10^{-3}$	
Γ_{69}	$\sigma \pi^+, \sigma \rightarrow \pi^+ \pi^-$	$(1.34 \pm 0.12) \times 10^{-3}$	
Γ_{70}	$f_0(980) \pi^+$,	$(1.52 \pm 0.33) \times 10^{-4}$	
	$f_0(980) \rightarrow \pi^+ \pi^-$		
Γ_{71}	$f_0(1370) \pi^+$,	$(8 \pm 4) \times 10^{-5}$	
	$f_0(1370) \rightarrow \pi^+ \pi^-$		
Γ_{72}	$f_2(1270) \pi^+$,	$(4.9 \pm 0.9) \times 10^{-4}$	
	$f_2(1270) \rightarrow \pi^+ \pi^-$		
Γ_{73}	$\rho(1450)^0 \pi^+$,	$< 8 \times 10^{-5}$	CL=95%
	$\rho(1450)^0 \rightarrow \pi^+ \pi^-$		
Γ_{74}	$f_0(1500) \pi^+$,	$(1.1 \pm 0.4) \times 10^{-4}$	
	$f_0(1500) \rightarrow \pi^+ \pi^-$		
Γ_{75}	$f_0(1710) \pi^+$,	$< 5 \times 10^{-5}$	CL=95%
	$f_0(1710) \rightarrow \pi^+ \pi^-$		
Γ_{76}	$f_0(1790) \pi^+$,	$< 6 \times 10^{-5}$	CL=95%
	$f_0(1790) \rightarrow \pi^+ \pi^-$		
Γ_{77}	$(\pi^+ \pi^+)_{S\text{-wave}} \pi^-$	$< 1.2 \times 10^{-4}$	CL=95%
Γ_{78}	$2\pi^+ \pi^- \text{ nonresonant}$	$< 1.1 \times 10^{-4}$	CL=95%
Γ_{79}	$\pi^+ 2\pi^0$	$(4.6 \pm 0.4) \times 10^{-3}$	
Γ_{80}	$2\pi^+ \pi^- \pi^0$	$(1.13 \pm 0.08) \%$	
Γ_{81}	$\eta \pi^+, \eta \rightarrow \pi^+ \pi^- \pi^0$	$(8.0 \pm 0.5) \times 10^{-4}$	
Γ_{82}	$\omega \pi^+, \omega \rightarrow \pi^+ \pi^- \pi^0$	$< 3 \times 10^{-4}$	CL=90%
Γ_{83}	$3\pi^+ 2\pi^-$	$(1.61 \pm 0.16) \times 10^{-3}$	

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

Γ_{84}	$\eta \pi^+$	$(3.53 \pm 0.21) \times 10^{-3}$	
Γ_{85}	$\eta \pi^+ \pi^0$	$(1.38 \pm 0.35) \times 10^{-3}$	
Γ_{86}	$\omega \pi^+$	$< 3.4 \times 10^{-4}$	CL=90%
Γ_{87}	$\eta'(958) \pi^+$	$(4.67 \pm 0.29) \times 10^{-3}$	
Γ_{88}	$\eta'(958) \pi^+ \pi^0$	$(1.6 \pm 0.5) \times 10^{-3}$	

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

Γ_{89}	$K^+ K_S^0$	$(2.83 \pm 0.16) \times 10^{-3}$	S=2.2
Γ_{90}	$K^+ K^- \pi^+$	[a] $(9.54 \pm 0.26) \times 10^{-3}$	S=1.1
Γ_{91}	$\phi \pi^+, \phi \rightarrow K^+ K^-$	$(2.65^{+0.08}_{-0.09}) \times 10^{-3}$	
Γ_{92}	$K^+ \bar{K}^*(892)^0,$ $\bar{K}^*(892)^0 \rightarrow K^- \pi^+$	$(2.45^{+0.09}_{-0.14}) \times 10^{-3}$	
Γ_{93}	$K^+ \bar{K}_0^*(1430)^0, \bar{K}_0^*(1430)^0 \rightarrow$ $K^- \pi^+$	$(1.79 \pm 0.34) \times 10^{-3}$	
Γ_{94}	$K^+ \bar{K}_2^*(1430)^0, \bar{K}_2^* \rightarrow$ $K^- \pi^+$	$(1.6^{+1.2}_{-0.8}) \times 10^{-4}$	
Γ_{95}	$K^+ \bar{K}_0^*(800), \bar{K}_0^* \rightarrow K^- \pi^+$	$(6.7^{+3.4}_{-2.1}) \times 10^{-4}$	
Γ_{96}	$a_0(1450)^0 \pi^+, a_0^0 \rightarrow K^+ K^-$	$(4.4^{+7.0}_{-1.8}) \times 10^{-4}$	
Γ_{97}	$\phi(1680) \pi^+, \phi \rightarrow K^+ K^-$	$(4.9^{+4.0}_{-1.9}) \times 10^{-5}$	
Γ_{98}	$K^+ K^- \pi^+$ nonresonant	not seen	
Γ_{99}	$K^+ K_S^0 \pi^+ \pi^-$	$(1.75 \pm 0.18) \times 10^{-3}$	
Γ_{100}	$K_S^0 K^- 2\pi^+$	$(2.40 \pm 0.18) \times 10^{-3}$	
Γ_{101}	$K^+ K^- 2\pi^+ \pi^-$	$(2.2 \pm 1.2) \times 10^{-4}$	

A few poorly measured branching fractions:

Γ_{102}	$\phi \pi^+ \pi^0$	$(2.3 \pm 1.0) \%$	
Γ_{103}	$\phi \rho^+$	$< 1.5 \%$	CL=90%
Γ_{104}	$K^+ K^- \pi^+ \pi^0$ non- ϕ	$(1.5^{+0.7}_{-0.6}) \%$	
Γ_{105}	$K^*(892)^+ K_S^0$	$(1.6 \pm 0.7) \%$	

Doubly Cabibbo-suppressed modes

Γ_{106}	$K^+ \pi^0$	$(1.83 \pm 0.26) \times 10^{-4}$	S=1.4
Γ_{107}	$K^+ \eta$	$(1.08 \pm 0.17) \times 10^{-4}$	
Γ_{108}	$K^+ \eta'(958)$	$(1.76 \pm 0.22) \times 10^{-4}$	
Γ_{109}	$K^+ \pi^+ \pi^-$	$(5.27 \pm 0.23) \times 10^{-4}$	
Γ_{110}	$K^+ \rho^0$	$(2.0 \pm 0.5) \times 10^{-4}$	
Γ_{111}	$K^*(892)^0 \pi^+, K^*(892)^0 \rightarrow$ $K^+ \pi^-$	$(2.5 \pm 0.4) \times 10^{-4}$	
Γ_{112}	$K^+ f_0(980), f_0(980) \rightarrow$ $\pi^+ \pi^-$	$(4.7 \pm 2.8) \times 10^{-5}$	
Γ_{113}	$K_2^*(1430)^0 \pi^+, K_2^*(1430)^0 \rightarrow$ $K^+ \pi^-$	$(4.2 \pm 2.9) \times 10^{-5}$	
Γ_{114}	$K^+ \pi^+ \pi^-$ nonresonant	not seen	
Γ_{115}	$2K^+ K^-$	$(8.7 \pm 2.0) \times 10^{-5}$	

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

Γ_{116}	$\pi^+ e^+ e^-$	$C1$	< 1.1	$\times 10^{-6}$	CL=90%
Γ_{117}	$\pi^+ \phi, \phi \rightarrow e^+ e^-$		[e]	$(1.7^{+1.4}_{-0.9}) \times 10^{-6}$	
Γ_{118}	$\pi^+ \mu^+ \mu^-$	$C1$	< 3.9	$\times 10^{-6}$	CL=90%
Γ_{119}	$\pi^+ \phi, \phi \rightarrow \mu^+ \mu^-$		[e]	$(1.8 \pm 0.8) \times 10^{-6}$	
Γ_{120}	$\rho^+ \mu^+ \mu^-$	$C1$	< 5.6	$\times 10^{-4}$	CL=90%
Γ_{121}	$K^+ e^+ e^-$		[f]	< 1.0	$\times 10^{-6}$ CL=90%
Γ_{122}	$K^+ \mu^+ \mu^-$		[f]	< 4.3	$\times 10^{-6}$ CL=90%
Γ_{123}	$\pi^+ e^+ \mu^-$	LF	< 2.9	$\times 10^{-6}$	CL=90%
Γ_{124}	$\pi^+ e^- \mu^+$	LF	< 3.6	$\times 10^{-6}$	CL=90%
Γ_{125}	$K^+ e^+ \mu^-$	LF	< 1.2	$\times 10^{-6}$	CL=90%
Γ_{126}	$K^+ e^- \mu^+$	LF	< 2.8	$\times 10^{-6}$	CL=90%
Γ_{127}	$\pi^- 2e^+$	L	< 1.1	$\times 10^{-6}$	CL=90%
Γ_{128}	$\pi^- 2\mu^+$	L	< 2.0	$\times 10^{-6}$	CL=90%
Γ_{129}	$\pi^- e^+ \mu^+$	L	< 2.0	$\times 10^{-6}$	CL=90%
Γ_{130}	$\rho^- 2\mu^+$	L	< 5.6	$\times 10^{-4}$	CL=90%
Γ_{131}	$K^- 2e^+$	L	< 9	$\times 10^{-7}$	CL=90%
Γ_{132}	$K^- 2\mu^+$	L	< 1.0	$\times 10^{-5}$	CL=90%
Γ_{133}	$K^- e^+ \mu^+$	L	< 1.9	$\times 10^{-6}$	CL=90%
Γ_{134}	$K^*(892)^- 2\mu^+$	L	< 8.5	$\times 10^{-4}$	CL=90%

Γ_{135} Unaccounted decay modes (51.2 \pm 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 $D^+ \rightarrow K^- 2\pi^+ \pi^0$ and $K_S^0 2\pi^+ \pi^-$ 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 $\Delta C=1$ weak neutral current, but leads to the $\pi^+ \ell^+ \ell^-$ final state.
- [f] This mode is not a useful test for a $\Delta C=1$ weak neutral current because both quarks must change flavor in this decay.

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

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

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

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.082 ± 0.005 OUR AVERAGE				
0.073 ± 0.008 ± 0.002	73	KAYIS-TOPAK.05	CHRS	ν_μ emulsion
0.095 ± 0.007 ^{+0.014} _{-0.013}	2829	ASTIER	00D	NOMD $\nu_\mu \text{Fe} \rightarrow \mu^- \mu^+ X$
0.090 ± 0.007 ^{+0.007} _{-0.006}	476	⁴ ABBIENDI	99K	OPAL $Z^0 \rightarrow c\bar{c}$
0.086 ± 0.017 ^{+0.008} _{-0.007}	69	⁵ ALBRECHT	92F	ARG $e^+ e^- \approx 10$ GeV
0.078 ± 0.009 ± 0.012		ONG	88	MRK2 $e^+ e^- 29$ GeV
0.078 ± 0.015 ± 0.02		BARTEL	87	JADE $e^+ e^- 34.6$ GeV
0.082 ± 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 ± 0.009 ± 0.009	88	KAYIS-TOPAK.02	CHRS	See KAYIS-TOPAKSU 05
0.089 ± 0.018 ± 0.025		BARTEL	85J	JADE See BARTEL 87

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

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

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

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

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.096 ± 0.004 OUR AVERAGE				
0.0958 ± 0.0042 ± 0.0028	1828	⁶ ABREU	000	DLPH $Z^0 \rightarrow c\bar{c}$
0.095 ± 0.006 ^{+0.007} _{-0.006}	854	⁷ ABBIENDI	99K	OPAL $Z^0 \rightarrow c\bar{c}$

⁶ ABREU 000 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 $D^*(2010)^+ \rightarrow D^0 \pi^+$ decays in $Z^0 \rightarrow c\bar{c}$.

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

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.255 ± 0.015 ± 0.008	2371	⁸ ABREU	000	DLPH $Z^0 \rightarrow c\bar{c}$

⁸ ABREU 000 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 $\bar{K}^0 e^+ \nu_e$, $\bar{K}^*(892)^0 e^+ \nu_e$, $\pi^0 e^+ \nu_e$, $\eta e^+ \nu_e$, $\rho^0 e^+ \nu_e$, and $\omega e^+ \nu_e$ branching fractions is $15.3 \pm 0.4\%$.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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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 $0.985 \pm 0.015 \pm 0.024$.

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

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

Γ_2/Γ

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

¹¹ ABLIKIM 08L finds the ratio of $D^+ \rightarrow \mu^+ X$ and $D^0 \rightarrow \mu^+ X$ branching fractions to be $2.59 \pm 0.70 \pm 0.25$, 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
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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

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

Γ_4/Γ

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

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

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

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

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

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

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

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

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

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

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

$\Gamma(\mu^+ \nu_\mu)/\Gamma_{\text{total}}$ Γ_{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} ± 1.0	3	¹³ ABLIKIM 05D	BES	$e^+ e^- \approx 3.773 \text{ GeV}$
4.40 ± 0.66 ^{+0.09} / _{-0.12}	47 ± 7	¹⁴ ARTUSO 05A	CLEO	See EISENSTEIN 08
3.5 ± 1.4 ± 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 $f_{D^+} = (205.8 \pm 8.5 \pm 2.5) \text{ MeV}$ from this measurement.

¹³ ABLIKIM 05D finds a background-subtracted $2.67 \pm 1.74 D^+ \rightarrow \mu^+ \nu_\mu$ events, and from this obtains $f_{D^+} = 371^{+129}_{-119} \pm 25 \text{ MeV}$.

¹⁴ ARTUSO 05A obtains $f_{D^+} = 222.6 \pm 16.7^{+2.8}_{-3.4} \text{ MeV}$ from this measurement.

¹⁵ BONVICINI 04A finds eight events with an estimated background of one, and from the branching fraction obtains $f_{D^+} = 202 \pm 41 \pm 17 \text{ MeV}$.

¹⁶ BAI 98B obtains $f_{D^+} = (300^{+180+80}_{-150-40}) \text{ MeV}$ from this measurement.

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

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

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

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
8.83±0.22 OUR AVERAGE				
$8.83 \pm 0.10 \pm 0.20$	8467	17 BESSON	09 CLEO	$e^+ e^-$ at $\psi(3770)$
$8.95 \pm 1.59 \pm 0.67$	34 ± 6	18 ABLIKIM	05A BES	$e^+ e^-$ at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$8.53 \pm 0.13 \pm 0.23$		19 DOBBS	08 CLEO	See BESSON 09
$8.71 \pm 0.38 \pm 0.37$	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 $D^0 \rightarrow K^- e^+ \nu_e$ branching fraction of ABLIKIM 04C and Particle Data Group lifetimes gives $\Gamma(D^0 \rightarrow K^- e^+ \nu_e) / \Gamma(D^+ \rightarrow \bar{K}^0 e^+ \nu_e) = 1.08 \pm 0.22 \pm 0.07$; isospin invariance predicts the ratio is 1.0.

¹⁹ DOBBS 08 establishes $|\frac{V_{cd}}{V_{cs}} \cdot \frac{f_+^{\pi}(0)}{f_+^K(0)}| = 0.188 \pm 0.008 \pm 0.002$ from the D^+ and D^0 decays to $\bar{K} e^+ \nu_e$ and $\pi e^+ \nu_e$. It also finds $\Gamma(D^0 \rightarrow K^- e^+ \nu_e) / \Gamma(D^+ \rightarrow \bar{K}^0 e^+ \nu_e) = 1.06 \pm 0.02 \pm 0.03$; isospin invariance predicts the ratio is 1.0.

$\Gamma(\bar{K}^0 \mu^+ \nu_\mu)/\Gamma_{\text{total}}$ 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

$\Gamma(\bar{K}^0 \mu^+ \nu_\mu)/\Gamma(K^- 2\pi^+)$ Γ_{16}/Γ_{40}

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, $\bar{E}_\gamma \approx 180$ GeV

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

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$3.50 \pm 0.75 \pm 0.27$	29 ± 6	ABLIKIM 060	BES2	$e^+ e^-$ at 3773 MeV
$3.5^{+1.2}_{-0.7} \pm 0.4$	14	BAI 91	MRK3	$e^+ e^- \approx 3.77$ GeV

$\Gamma(K^- \pi^+ e^+ \nu_e)/\Gamma(K^- 2\pi^+)$ Γ_{17}/Γ_{40}

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.4380±0.0036±0.0042	$70k \pm 363$	DEL-AMO-SA..11I	BABR	$e^+ e^- \approx 10.6$ GeV

$\Gamma(\bar{K}^*(892)^0 e^+ \nu_e) / \Gamma_{\text{total}}$ Γ_{34} / Γ

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

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
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5.52 ± 0.15 OUR FIT

5.52 ± 0.07 ± 0.13	≈ 5k	BRIERE	10 CLEO	$e^+ e^-$ at $\psi(3770)$
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• • • 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
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5.56 ± 0.27 ± 0.23	422 ± 21	²⁰ HUANG	05B CLEO	$e^+ e^-$ at $\psi(3770)$
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²⁰HUANG 05B finds $\Gamma(D^0 \rightarrow K^{*-} e^+ \nu_e) / \Gamma(D^+ \rightarrow \bar{K}^{*0} e^+ \nu_e) = 0.98 \pm 0.08 \pm 0.04$; isospin invariance predicts the ratio is 1.0.

$\Gamma(\bar{K}^*(892)^0 e^+ \nu_e) / \Gamma(K^- 2\pi^+)$ $\Gamma_{34} / \Gamma_{40}$

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

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

0.74 ± 0.04 ± 0.05		BRANDENB...	02 CLEO	$e^+ e^- \approx \Upsilon(4S)$
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0.62 ± 0.15 ± 0.09	35	ADAMOVICH	91 OMEG	π^- 340 GeV
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0.55 ± 0.08 ± 0.10	880	ALBRECHT	91 ARG	$e^+ e^- \approx 10.4$ GeV
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0.49 ± 0.04 ± 0.05		ANJOS	89B E691	Photoproduction
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$\Gamma(\bar{K}^*(892)^0 e^+ \nu_e, \bar{K}^*(892)^0 \rightarrow K^- \pi^+) / \Gamma(K^- \pi^+ e^+ \nu_e)$ $\Gamma_{18} / \Gamma_{17}$

VALUE (%)	DOCUMENT ID	TECN	COMMENT
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94.11 ± 0.74 ± 0.75	DEL-AMO-SA..11i	BABR	$e^+ e^- \approx 10.6$ GeV
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$\Gamma((K^- \pi^+)_{S\text{-wave}} e^+ \nu_e) / \Gamma(K^- \pi^+ e^+ \nu_e)$ $\Gamma_{19} / \Gamma_{17}$

VALUE (%)	DOCUMENT ID	TECN	COMMENT
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5.79 ± 0.16 ± 0.15	DEL-AMO-SA..11i	BABR	$e^+ e^- \approx 10.6$ GeV
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$\Gamma(\bar{K}^*(1410)^0 e^+ \nu_e, \bar{K}^*(1410)^0 \rightarrow K^- \pi^+) / \Gamma_{\text{total}}$ Γ_{20} / Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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< 6 × 10⁻³	90	DEL-AMO-SA..11i	BABR	$e^+ e^- \approx 10.6$ GeV
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$\Gamma(\bar{K}_2^*(1430)^0 e^+ \nu_e, \bar{K}_2^*(1430)^0 \rightarrow K^- \pi^+) / \Gamma_{\text{total}}$ Γ_{21} / Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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< 5 × 10⁻⁴	90	DEL-AMO-SA..11i	BABR	$e^+ e^- \approx 10.6$ GeV
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$\Gamma(K^- \pi^+ e^+ \nu_e \text{ nonresonant}) / \Gamma_{\text{total}}$ Γ_{22} / Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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< 0.007	90	ANJOS	89B E691	Photoproduction
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$\Gamma(K^- \pi^+ \mu^+ \nu_\mu) / \Gamma(\bar{K}^0 \mu^+ \nu_\mu)$ $\Gamma_{23} / \Gamma_{16}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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0.417 ± 0.030 ± 0.023	555 ± 39	LINK	04E FOCS	γ nucleus, $\bar{E}_\gamma \approx 180$ GeV
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$\Gamma(\bar{K}^*(892)^0 \mu^+ \nu_\mu) / \Gamma_{\text{total}}$ Γ_{35} / 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 $\psi(3770)$

$\Gamma(\bar{K}^*(892)^0 \mu^+ \nu_\mu) / \Gamma(\bar{K}^0 \mu^+ \nu_\mu)$ $\Gamma_{35} / \Gamma_{16}$

Unseen decay modes of the $\bar{K}^*(892)^0$ are included. See the end of the D^+ Listings for measurements of $D^+ \rightarrow \bar{K}^*(892)^0 \ell^+ \nu_\ell$ 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, $\bar{E}_\gamma \approx 180$ GeV

$\Gamma(\bar{K}^*(892)^0 \mu^+ \nu_\mu) / \Gamma(K^- 2\pi^+)$ $\Gamma_{35} / \Gamma_{40}$

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.578 ± 0.021 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 γ Be $\bar{E}_\gamma \approx 200$ 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

²¹This LINK 02J result includes the effects of an interference of a small S -wave $K^- \pi^+$ amplitude with the dominant \bar{K}^{*0} amplitude. (The interference effect is reported in LINK 02E.) This result is redundant with results of LINK 04E elsewhere in these Listings.

$\Gamma(K^- \pi^+ \mu^+ \nu_\mu \text{ nonresonant}) / \Gamma(K^- \pi^+ \mu^+ \nu_\mu)$ $\Gamma_{25} / \Gamma_{23}$

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

$\Gamma(K^- \pi^+ \pi^0 \mu^+ \nu_\mu) / \Gamma(K^- \pi^+ \mu^+ \nu_\mu)$ $\Gamma_{26} / \Gamma_{23}$

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

$\Gamma(\bar{K}_0^*(1430)^0 \mu^+ \nu_\mu) / \Gamma(K^- \pi^+ \mu^+ \nu_\mu)$ $\Gamma_{36} / \Gamma_{23}$

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

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

$\Gamma(\bar{K}^*(1680)^0 \mu^+ \nu_\mu) / \Gamma(K^- \pi^+ \mu^+ \nu_\mu)$ $\Gamma_{37} / \Gamma_{23}$

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

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

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

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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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 $|\frac{V_{cd}}{V_{cs}} \cdot \frac{f_+^{\pi}(0)}{f_+^{K}(0)}| = 0.188 \pm 0.008 \pm 0.002$ from the D^+ and D^0

decays to $\bar{K} e^+ \nu_e$ and $\pi e^+ \nu_e$. It finds $\Gamma(D^0 \rightarrow \pi^- e^+ \nu_e) / \Gamma(D^+ \rightarrow \pi^0 e^+ \nu_e) = 2.03 \pm 0.14 \pm 0.08$; isospin invariance predicts the ratio is 2.0.

$\Gamma(\eta e^+ \nu_e)/\Gamma_{\text{total}}$ Γ_{28}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
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11.4 ± 0.9 ± 0.4 YELTON 11 CLEO $e^+ e^-$ at $\psi(3770)$

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

13.3 ± 2.0 ± 0.6 46 ± 8 MITCHELL 09B CLEO See YELTON 11

$\Gamma(\rho^0 e^+ \nu_e)/\Gamma_{\text{total}}$ Γ_{29}/Γ

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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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 $\Gamma(D^0 \rightarrow \rho^- e^+ \nu_e) / 2 \Gamma(D^+ \rightarrow \rho^0 e^+ \nu_e) = 1.2^{+0.4}_{-0.3} \pm 0.1$; isospin invariance predicts the ratio is 1.0.

$\Gamma(\rho^0 e^+ \nu_e)/\Gamma(\bar{K}^*(892)^0 e^+ \nu_e)$ Γ_{29}/Γ_{34}

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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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 $D^+ \rightarrow \eta' e^+ \nu_e$ and other backgrounds to get this result.

$\Gamma(\rho^0 \mu^+ \nu_\mu)/\Gamma(\bar{K}^*(892)^0 \mu^+ \nu_\mu)$ Γ_{30}/Γ_{35}

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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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, $\bar{E}_\gamma \approx 180$ 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, $\bar{E}_\gamma \approx 220$ GeV

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

²⁷ Because the reconstruction efficiency for photons is low, this FRABETTI 97 result also includes any $D^+ \rightarrow \eta' \mu^+ \nu_\mu \rightarrow \gamma \rho^0 \mu^+ \nu_\mu$ events in the numerator.

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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0.0016^{+0.0007}_{-0.0006} ± 0.0001 7.6^{+3.3}_{-2.7} HUANG 05B CLEO $e^+ e^-$ at $\psi(3770)$

$\Gamma(\eta'(958)e^+\nu_e)/\Gamma_{\text{total}}$ Γ_{32}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
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2.16 ± 0.53 ± 0.07		YELTON	11	CLEO e^+e^- at $\psi(3770)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<3.5	90	MITCHELL	09B	CLEO See YELTON 11
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$\Gamma(\phi e^+\nu_e)/\Gamma_{\text{total}}$ Γ_{33}/Γ

Unseen decay modes of the ϕ are included.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.9 × 10⁻⁴	90	YELTON	11	CLEO e^+e^- at $\psi(3770)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<1.6 × 10 ⁻⁴	90	MITCHELL	09B	CLEO See YELTON 11
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<0.0201	90	ABLIKIM	06P	BES2 e^+e^- at 3773 MeV
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<0.0209	90	BAI	91	MRK3 $e^+e^- \approx 3.77$ GeV
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———— Hadronic modes with a \bar{K} or $\bar{K}K\bar{K}$ ————

$\Gamma(K_S^0\pi^+)/\Gamma_{\text{total}}$ Γ_{38}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

1.526 ± 0.022 ± 0.038		²⁸ DOBBS	07	CLEO See MENDEZ 10
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1.55 ± 0.05 ± 0.06	2230 ± 60	²⁸ HE	05	CLEO See DOBBS 07
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1.6 ± 0.3 ± 0.1	161	ADLER	88C	MRK3 e^+e^- 3.77 GeV
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²⁸ DOBBS 07 and HE 05 use single- and double-tagged events in an overall fit. DOBBS 07 supersedes HE 05.

$\Gamma(K_S^0\pi^+)/\Gamma(K^-2\pi^+)$ Γ_{38}/Γ_{40}

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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0.161 ± 0.007 OUR FIT				Error includes scale factor of 3.4.
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0.158 ± 0.007 OUR AVERAGE				Error includes scale factor of 3.2.
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0.1682 ± 0.0012 ± 0.0037	30k	MENDEZ	10	CLEO e^+e^- at 3774 MeV
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0.1530 ± 0.0023 ± 0.0016	10.6k	LINK	02B	FOCS γ nucleus, $\bar{E}_\gamma \approx 180$ GeV
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.174 ± 0.012 ± 0.011	473	²⁹ BISHAI	97	CLEO $e^+e^- \approx \Upsilon(4S)$
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0.137 ± 0.015 ± 0.016	264	ANJOS	90C	E691 Photoproduction
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²⁹ See BISHAI 97 for an isospin analysis of $D^+ \rightarrow \bar{K}\pi$ amplitudes.

$\Gamma(K_L^0\pi^+)/\Gamma_{\text{total}}$ Γ_{39}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
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1.460 ± 0.040 ± 0.035	2023 ± 54	³⁰ HE	08	CLEO e^+e^- at $\psi(3770)$
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³⁰ The difference of CLEO $D^+ \rightarrow K_S^0\pi^+$ and $K_L^0\pi^+$ branching fractions over the sum (DOBBS 07 and HE 08) is $+0.022 \pm 0.016 \pm 0.018$.

$$\Gamma(K^- 2\pi^+)/\Gamma_{\text{total}} \qquad \Gamma_{40}/\Gamma$$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
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9.13±0.19 OUR FIT**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 079.3 ±0.6 ±0.8 1502 ³² BALEST 94 CLEO $e^+e^- \approx \Upsilon(4S)$ 6.4 $\begin{matrix} +1.5 \\ -1.4 \end{matrix}$ ³³ BARLAG 92C ACCM π^- Cu 230 GeV9.1 ±1.3 ±0.4 1164 ADLER 88C MRK3 e^+e^- 3.77 GeV9.1 ±1.9 239 ³⁴ SCHINDLER 81 MRK2 e^+e^- 3.771 GeV³¹ 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 $D^+ \rightarrow K^- \pi^+ \pi^+$ and $D^0 \rightarrow K^- \pi^+$ branching fractions to be $2.35 \pm 0.16 \pm 0.16$ and uses their absolute measurement of the $D^0 \rightarrow K^- \pi^+$ fraction (AKERIB 93).³³ BARLAG 92C computes the branching fraction by topological normalization.³⁴ SCHINDLER 81 (MARK-2) measures $\sigma(e^+e^- \rightarrow \psi(3770)) \times$ 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.

A REVIEW GOES HERE – Check our WWW List of Reviews

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$$\Gamma((K^- \pi^+)_{S\text{-wave}} \pi^+)/\Gamma(K^- 2\pi^+) \qquad \Gamma_{41}/\Gamma_{40}$$
This is the “fit fraction” from the Dalitz-plot analysis. The $K^- \pi^+$ S-wave includes a broad scalar κ ($\bar{K}_0^*(800)$), the $\bar{K}_0^*(1430)^0$, and non-resonant background.

VALUE	DOCUMENT ID	TECN	COMMENT
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0.801 ±0.012 OUR AVERAGE0.8024±0.0138±0.0043 ³⁵ LINK 09 FOCS MIPWA fit, 53k evts0.838 ±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 09³⁵ 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 $\bar{K}_0^*(1430)^0$.³⁷ This LINK 07B fit uses a K matrix. The $K^- \pi^+$ S-wave fit fraction given above breaks down into $(207.3 \pm 25.5 \pm 12.4)\%$ isospin-1/2 and $(40.5 \pm 9.6 \pm 3.2)\%$ isospin-3/2 — with large interference between the two. The isospin-1/2 component includes the κ (or $\bar{K}_0^*(800)^0$) and $\bar{K}_0^*(1430)^0$.
$$\Gamma(\bar{K}_0^*(800)^0 \pi^+, \bar{K}_0^*(800) \rightarrow K^- \pi^+)/\Gamma(K^- 2\pi^+) \qquad \Gamma_{42}/\Gamma_{40}$$

This is the “fit fraction” from the Dalitz-plot analysis.

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

0.478±0.121±0.053 AITALA 02 E791 See AITALA 06

$$\Gamma(\bar{K}^*(892)^0 \pi^+, \bar{K}^*(892)^0 \rightarrow K^- \pi^+) / \Gamma(K^- 2\pi^+) \quad \Gamma_{44} / \Gamma_{40}$$

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

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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 γ Be 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

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

$$\Gamma(\bar{K}^*(1410)^0 \pi^+, \bar{K}^{*0} \rightarrow K^- \pi^+) / \Gamma(K^- 2\pi^+) \quad \Gamma_{45} / \Gamma_{40}$$

<u>VALUE (units 10⁻³)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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

$$\Gamma(\bar{K}_0^*(1430)^0 \pi^+, \bar{K}_0^*(1430)^0 \rightarrow K^- \pi^+) / \Gamma(K^- 2\pi^+) \quad \Gamma_{43} / \Gamma_{40}$$

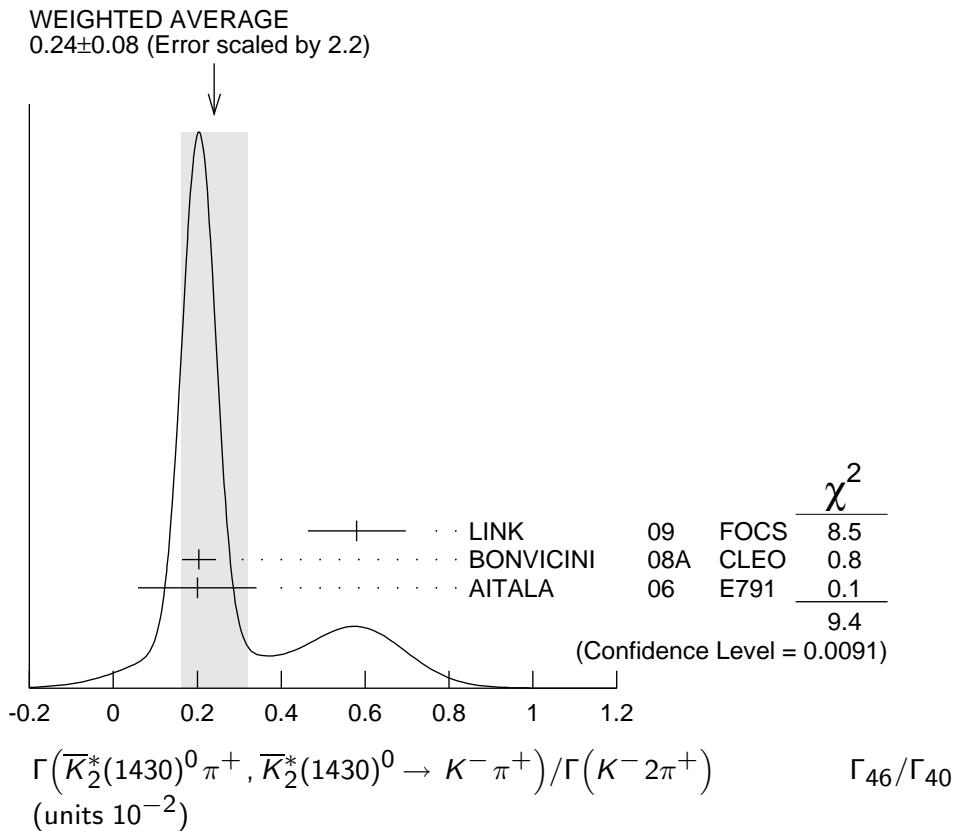
This is the "fit fraction" from the Dalitz-plot analysis.

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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 γ Be 90–260 GeV

$$\Gamma(\bar{K}_2^*(1430)^0 \pi^+, \bar{K}_2^*(1430)^0 \rightarrow K^- \pi^+) / \Gamma(K^- 2\pi^+) \quad \Gamma_{46} / \Gamma_{40}$$

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

<u>VALUE (units 10⁻²)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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



$\Gamma(\bar{K}^*(1680)^0 \pi^+, \bar{K}^*(1680)^0 \rightarrow K^- \pi^+) / \Gamma(K^- 2\pi^+)$ **Γ_{47}/Γ_{40}**
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 γ Be 90–260 GeV

$\Gamma(K^- (2\pi^+)_{I=2}) / \Gamma(K^- 2\pi^+)$ **Γ_{48}/Γ_{40}**

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

$\Gamma(K^- 2\pi^+ \text{ nonresonant}) / \Gamma(K^- 2\pi^+)$ **Γ_{49}/Γ_{40}**
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 γ Be 90–260 GeV
0.79 ± 0.07 ± 0.15	ADLER	87	MRK3 e^+e^- 3.77 GeV

$$\Gamma(K_S^0 \pi^+ \pi^0) / \Gamma_{\text{total}} \qquad \Gamma_{50} / \Gamma$$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
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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 075.1 ± 1.3 ± 0.8 159 ADLER 88C MRK3 $e^+ e^-$ 3.77 GeV³⁹ DOBBS 07 and HE 05 use single- and double-tagged events in an overall fit. DOBBS 07 supersedes HE 05.
$$\Gamma(K_S^0 \rho^+) / \Gamma(K_S^0 \pi^+ \pi^0) \qquad \Gamma_{51} / \Gamma_{50}$$

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

VALUE	DOCUMENT ID	TECN	COMMENT
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0.68 ± 0.08 ± 0.12 ADLER 87 MRK3 $e^+ e^-$ 3.77 GeV
$$\Gamma(\bar{K}^*(892)^0 \pi^+, \bar{K}^*(892)^0 \rightarrow K_S^0 \pi^0) / \Gamma(K_S^0 \pi^+ \pi^0) \qquad \Gamma_{52} / \Gamma_{50}$$

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

VALUE	DOCUMENT ID	TECN	COMMENT
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0.19 ± 0.06 ± 0.06 ADLER 87 MRK3 $e^+ e^-$ 3.77 GeV
$$\Gamma(K_S^0 \pi^+ \pi^0 \text{ nonresonant}) / \Gamma(K_S^0 \pi^+ \pi^0) \qquad \Gamma_{53} / \Gamma_{50}$$

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

VALUE	DOCUMENT ID	TECN	COMMENT
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0.13 ± 0.07 ± 0.08 ADLER 87 MRK3 $e^+ e^-$ 3.77 GeV
$$\Gamma(K^- 2\pi^+ \pi^0) / \Gamma_{\text{total}} \qquad \Gamma_{54} / \Gamma$$
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
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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 075.8 ± 1.2 ± 1.2 142 COFFMAN 92B MRK3 $e^+ e^-$ 3.77 GeV6.3 $\begin{smallmatrix} +1.4 \\ -1.3 \end{smallmatrix}$ ± 1.2 175 BALTRUSAIT..86E MRK3 See COFFMAN 92B⁴⁰ DOBBS 07 and HE 05 use single- and double-tagged events in an overall fit. DOBBS 07 supersedes HE 05.
$$\Gamma(K_S^0 2\pi^+ \pi^-) / \Gamma_{\text{total}} \qquad \Gamma_{55} / \Gamma$$
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
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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.

$\Gamma(K^- 3\pi^+ \pi^-) / \Gamma(K^- 2\pi^+)$ $\Gamma_{56} / \Gamma_{40}$

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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, $\bar{E}_\gamma \approx 180$ GeV
0.077 ± 0.008 ± 0.010	239	FRABETTI	97C E687	γ Be, $\bar{E}_\gamma \approx 200$ GeV

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

0.09	± 0.01	± 0.01	113	ANJOS	90D	E691	Photoproduction
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$\Gamma(\bar{K}^*(892)^0 2\pi^+ \pi^-, \bar{K}^*(892)^0 \rightarrow K^- \pi^+) / \Gamma(K^- 3\pi^+ \pi^-)$ $\Gamma_{57} / \Gamma_{56}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.21 ± 0.04 ± 0.06	LINK	03D FOCS	γ A, $\bar{E}_\gamma \approx 180$ GeV

$\Gamma(\bar{K}^*(892)^0 \rho^0 \pi^+, \bar{K}^*(892)^0 \rightarrow K^- \pi^+) / \Gamma(K^- 3\pi^+ \pi^-)$ $\Gamma_{58} / \Gamma_{56}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.40 ± 0.03 ± 0.06	LINK	03D FOCS	γ A, $\bar{E}_\gamma \approx 180$ GeV

$\Gamma(\bar{K}^*(892)^0 \rho^0 \pi^+, \bar{K}^*(892)^0 \rightarrow K^- \pi^+) / \Gamma(K^- 2\pi^+)$ $\Gamma_{58} / \Gamma_{40}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.16 ± 0.007 ± 0.004	FRABETTI	97C E687	γ Be, $\bar{E}_\gamma \approx 200$ GeV

$\Gamma(\bar{K}^*(892)^0 2\pi^+ \pi^- \text{no-}\rho, \bar{K}^*(892)^0 \rightarrow K^- \pi^+) / \Gamma(K^- 2\pi^+)$ $\Gamma_{60} / \Gamma_{40}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.032 ± 0.010 ± 0.008	FRABETTI	97C E687	γ Be, $\bar{E}_\gamma \approx 200$ GeV

$\Gamma(K^- \rho^0 2\pi^+) / \Gamma(K^- 3\pi^+ \pi^-)$ $\Gamma_{61} / \Gamma_{56}$

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

$\Gamma(K^- \rho^0 2\pi^+) / \Gamma(K^- 2\pi^+)$ $\Gamma_{61} / \Gamma_{40}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.034 ± 0.009 ± 0.005	FRABETTI	97C E687	γ Be, $\bar{E}_\gamma \approx 200$ GeV

$\Gamma(\bar{K}^*(892)^0 a_1(1260)^+)/\Gamma(K^- 2\pi^+)$ Γ_{59}/Γ_{40}

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

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

$\Gamma(K^- 3\pi^+ \pi^- \text{ nonresonant})/\Gamma(K^- 3\pi^+ \pi^-)$ Γ_{62}/Γ_{56}

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
0.07 ±0.05±0.01		LINK	03D FOCS	γ A, $\bar{E}_\gamma \approx 180$ GeV

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

<0.026	90	FRABETTI	97C E687	γ Be, $\bar{E}_\gamma \approx 200$ GeV
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$\Gamma(K^+ 2K_S^0)/\Gamma(K^- 2\pi^+)$ Γ_{63}/Γ_{40}

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

$\Gamma(K^+ K^- K_S^0 \pi^+)/\Gamma(K_S^0 2\pi^+ \pi^-)$ Γ_{64}/Γ_{55}

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

———— Pionic modes ————

$\Gamma(\pi^+ \pi^0)/\Gamma(K^- 2\pi^+)$ Γ_{65}/Γ_{40}

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

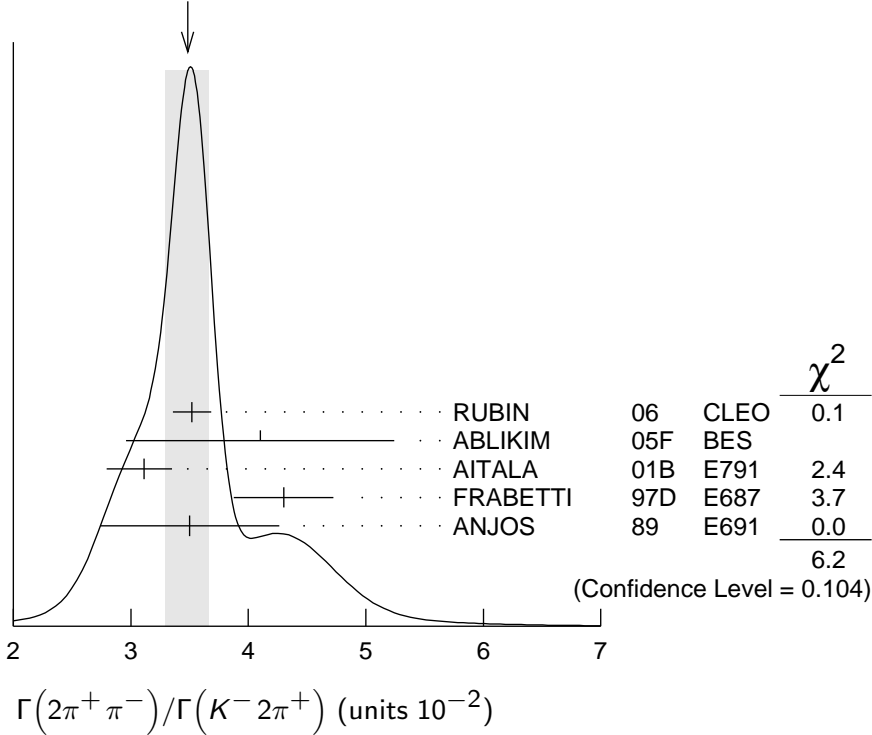
• • • We do not use the following data for averages, fits, limits, etc. • • •

1.33±0.07±0.06	914 ± 46	RUBIN	06 CLEO	See MENDEZ 10
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$\Gamma(2\pi^+ \pi^-)/\Gamma(K^- 2\pi^+)$ Γ_{66}/Γ_{40}

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±0.18 ^{+0.16} _{-0.26}	1172	AITALA	01B E791	π^- nucleus, 500 GeV
4.3 ±0.3 ±0.3	236	FRABETTI	97D E687	γ Be ≈ 200 GeV
3.5 ±0.7 ±0.3	83	ANJOS	89 E691	Photoproduction

WEIGHTED AVERAGE
 3.48 ± 0.19 (Error scaled by 1.4)

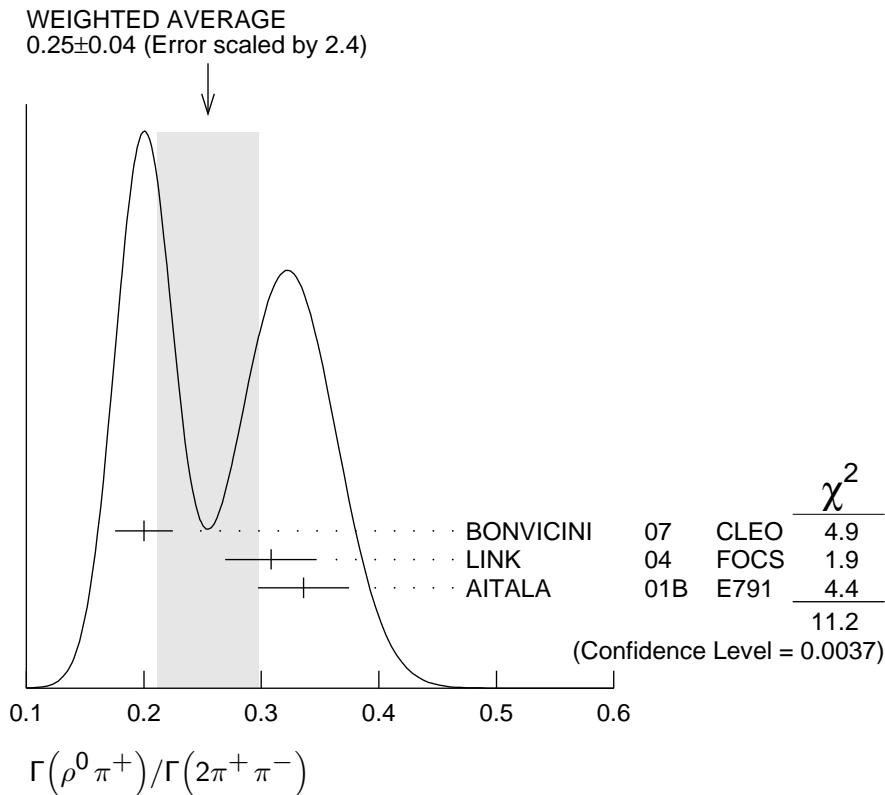


$\Gamma(\rho^0 \pi^+) / \Gamma(2\pi^+ \pi^-)$

$\Gamma_{67} / \Gamma_{66}$

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



$\Gamma(\pi^+(\pi^+\pi^-)_{S\text{-wave}}) / \Gamma(2\pi^+\pi^-)$ $\Gamma_{68} / \Gamma_{66}$

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

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.5600 \pm 0.0324 \pm 0.0214$	⁴³ LINK	04	FOCS Dalitz fit, 1527 ± 51 evts

⁴³LINK 04 borrows a K-matrix parametrization from ANISOVICH 03 of the full $\pi\text{-}\pi$ 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.

$\Gamma(\sigma\pi^+, \sigma \rightarrow \pi^+\pi^-) / \Gamma(2\pi^+\pi^-)$ $\Gamma_{69} / \Gamma_{66}$

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

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.422 ± 0.027 OUR AVERAGE			
$0.418 \pm 0.014 \pm 0.025$	BONVICINI	07	CLEO Dalitz fit, ≈ 2240 evts
$0.463 \pm 0.090 \pm 0.021$	AITALA	01B	E791 Dalitz fit, 1172 evts

$\Gamma(f_0(980)\pi^+, f_0(980) \rightarrow \pi^+\pi^-) / \Gamma(2\pi^+\pi^-)$ $\Gamma_{70} / \Gamma_{66}$

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

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.048 ± 0.010 OUR AVERAGE			
$0.041 \pm 0.009 \pm 0.003$	BONVICINI	07	CLEO Dalitz fit, ≈ 2240 evts
$0.062 \pm 0.013 \pm 0.004$	AITALA	01B	E791 Dalitz fit, 1172 evts

$\Gamma(f_0(1370)\pi^+, f_0(1370) \rightarrow \pi^+\pi^-)/\Gamma(2\pi^+\pi^-)$ Γ_{71}/Γ_{66}

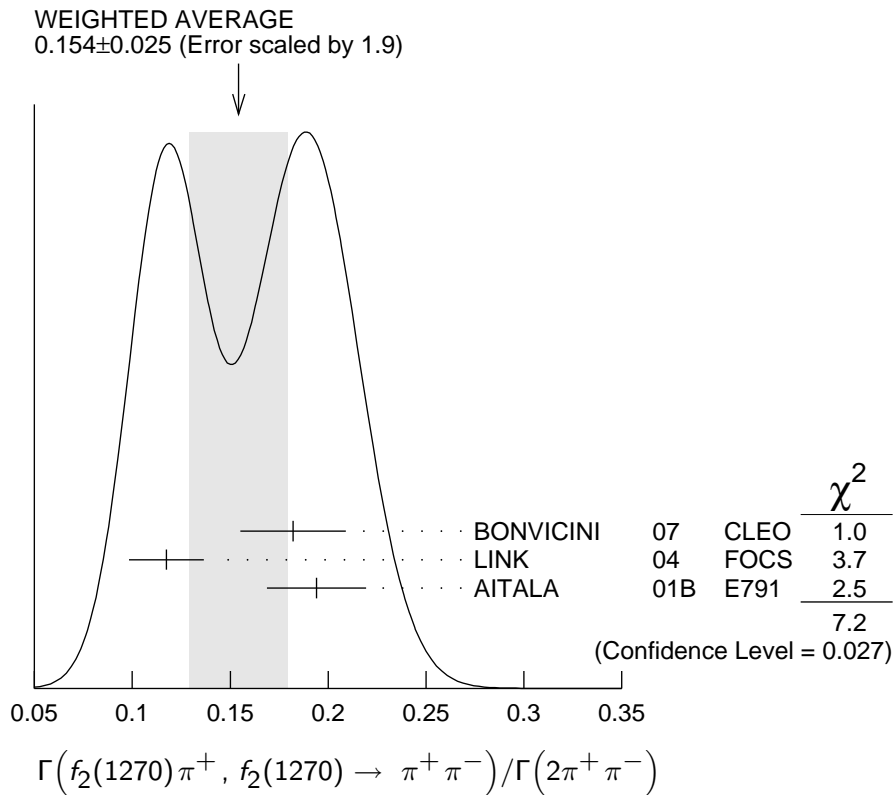
This is the "fit fraction" from the Dalitz-plot analysis.

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

$\Gamma(f_2(1270)\pi^+, f_2(1270) \rightarrow \pi^+\pi^-)/\Gamma(2\pi^+\pi^-)$ Γ_{72}/Γ_{66}

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

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



$\Gamma(\rho(1450)^0\pi^+, \rho(1450)^0 \rightarrow \pi^+\pi^-)/\Gamma(2\pi^+\pi^-)$ Γ_{73}/Γ_{66}

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

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

$\Gamma(f_0(1500)\pi^+, f_0(1500) \rightarrow \pi^+\pi^-)/\Gamma(2\pi^+\pi^-)$ Γ_{74}/Γ_{66}

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

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

$\Gamma(f_0(1710)\pi^+, f_0(1710) \rightarrow \pi^+\pi^-)/\Gamma(2\pi^+\pi^-)$ Γ_{75}/Γ_{66}

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

$\Gamma(f_0(1790)\pi^+, f_0(1790) \rightarrow \pi^+\pi^-)/\Gamma(2\pi^+\pi^-)$ Γ_{76}/Γ_{66}

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

$\Gamma((\pi^+\pi^+)_{S\text{-wave}}\pi^-)/\Gamma(2\pi^+\pi^-)$ Γ_{77}/Γ_{66}

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

$\Gamma(2\pi^+\pi^- \text{ nonresonant})/\Gamma(2\pi^+\pi^-)$ Γ_{78}/Γ_{66}

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_{79}/Γ_{40}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
5.0\pm0.3\pm0.3	1535 \pm 89	RUBIN 06	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(2\pi^+\pi^-\pi^0)/\Gamma(K^-2\pi^+)$ Γ_{80}/Γ_{40}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
12.4\pm0.5\pm0.6	5701 \pm 205	RUBIN 06	CLEO	e^+e^- at $\psi(3770)$

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

Unseen decay modes of the η are included.

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
34.3\pm1.4\pm1.7	1033 \pm 42	ARTUSO 08	CLEO	See MENDEZ 10

$\Gamma(\eta\pi^+)/\Gamma(K^-2\pi^+)$ Γ_{84}/Γ_{40}

Unseen decay modes of the η are included.

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
3.87\pm0.09\pm0.19	2940 \pm 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 \pm 26 RUBIN 06 CLEO See ARTUSO 08

$\Gamma(\omega\pi^+)/\Gamma_{\text{total}}$ Γ_{86}/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_{83}/Γ_{40}

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 γ Be, $\bar{E}_\gamma \approx 200$ GeV

$\Gamma(3\pi^+2\pi^-)/\Gamma(K^-3\pi^+\pi^-)$ Γ_{83}/Γ_{56}

VALUE EVTS DOCUMENT ID TECN COMMENT

0.289±0.019 OUR FIT

0.290±0.017±0.011 835 LINK 03D FOCS γ A, $\bar{E}_\gamma \approx 180$ GeV

$\Gamma(\eta\pi^+\pi^0)/\Gamma_{\text{total}}$ Γ_{85}/Γ

VALUE (units 10^{-4}) EVTS DOCUMENT ID TECN COMMENT

13.8±3.1±1.6 149 ± 34 ARTUSO 08 CLEO e^+e^- at $\psi(3770)$

$\Gamma(\eta'(958)\pi^+)/\Gamma_{\text{total}}$ Γ_{87}/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_{87}/Γ_{40}

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

$\Gamma(\eta'(958)\pi^+\pi^0)/\Gamma_{\text{total}}$ Γ_{88}/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 $K\bar{K}$ pair** —————

$\Gamma(K^+K_S^0)/\Gamma_{\text{total}}$ Γ_{89}/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

$\Gamma(K^+K_S^0)/\Gamma(K_S^0\pi^+)$ Γ_{89}/Γ_{38}

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, $\bar{E}_\gamma \approx 180$ 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 $\bar{E}_\gamma \approx 200$ 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

$\Gamma(K^+ K_S^0)/\Gamma(K^- 2\pi^+)$

Γ_{89}/Γ_{40}

<u>VALUE (units 10^{-2})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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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, $\bar{E}_\gamma \approx 180$ GeV

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

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

Γ_{90}/Γ

<u>VALUE (units 10^{-2})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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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_{90}/Γ_{40}

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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0.1045±0.0022 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 $\begin{smallmatrix} +0.008 \\ -0.006 \end{smallmatrix}$ JUN 00 SELX Σ^- nucleus, 600 GeV

0.0976±0.0042±0.0046 FRABETTI 95B E687 γ Be, $\bar{E}_\gamma \approx 200$ GeV

$\Gamma(\phi\pi^+, \phi \rightarrow K^+ K^-)/\Gamma(K^+ K^- \pi^+)$

Γ_{91}/Γ_{90}

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

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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27.8±0.4 $\begin{smallmatrix} +0.2 \\ -0.5 \end{smallmatrix}$ 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

$\Gamma(K^+ \bar{K}^*(892)^0, \bar{K}^*(892)^0 \rightarrow K^- \pi^+)/\Gamma(K^+ K^- \pi^+)$

Γ_{92}/Γ_{90}

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

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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25.7±0.5 $\begin{smallmatrix} +0.4 \\ -1.2 \end{smallmatrix}$ 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

$\Gamma(K^+\bar{K}_0^*(1430)^0, \bar{K}_0^*(1430)^0 \rightarrow K^-\pi^+)/\Gamma(K^+K^-\pi^+)$ Γ_{93}/Γ_{90}

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

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$18.8 \pm 1.2^{+3.3}_{-3.4}$	RUBIN	08	CLEO Dalitz fit, 19,458 ± 163 evts

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

$37.0 \pm 3.5 \pm 1.8$	FRABETTI	95B	E687 Dalitz fit, 915 evts
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$\Gamma(K^+\bar{K}_2^*(1430)^0, \bar{K}_2^* \rightarrow K^-\pi^+)/\Gamma(K^+K^-\pi^+)$ Γ_{94}/Γ_{90}

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

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$1.7 \pm 0.4^{+1.2}_{-0.7}$	RUBIN	08	CLEO Dalitz fit, 19,458 ± 163 evts

$\Gamma(K^+\bar{K}_0^*(800), \bar{K}_0^* \rightarrow K^-\pi^+)/\Gamma(K^+K^-\pi^+)$ Γ_{95}/Γ_{90}

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

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$7.0 \pm 0.8^{+3.5}_{-2.0}$	RUBIN	08	CLEO Dalitz fit, 19,458 ± 163 evts

$\Gamma(a_0(1450)^0\pi^+, a_0^0 \rightarrow K^+K^-)/\Gamma(K^+K^-\pi^+)$ Γ_{96}/Γ_{90}

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

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$4.6 \pm 0.6^{+7.2}_{-1.8}$	RUBIN	08	CLEO Dalitz fit, 19,458 ± 163 evts

$\Gamma(\phi(1680)\pi^+, \phi \rightarrow K^+K^-)/\Gamma(K^+K^-\pi^+)$ Γ_{97}/Γ_{90}

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

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$0.51 \pm 0.11^{+0.37}_{-0.16}$	RUBIN	08	CLEO Dalitz fit, 19,458 ± 163 evts

$\Gamma(K^*(892)^+K_S^0)/\Gamma(K_S^0\pi^+)$ Γ_{105}/Γ_{38}

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
$1.1 \pm 0.3 \pm 0.4$	67	FRABETTI	95	E687 γ Be $\bar{E}_\gamma \approx 200$ GeV

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

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

$\Gamma(\phi\rho^+)/\Gamma(K^-2\pi^+)$ Γ_{103}/Γ_{40}

Unseen decay modes of the ϕ are included.

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

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

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

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

$\Gamma(K^+ K^- \pi^+ \pi^0 \text{non-}\phi) / \Gamma(K^- 2\pi^+)$ $\Gamma_{104} / \Gamma_{40}$

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

<0.25	90	ANJOS	89E E691	Photoproduction
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$\Gamma(K^+ K_S^0 \pi^+ \pi^-) / \Gamma(K_S^0 2\pi^+ \pi^-)$ $\Gamma_{99} / \Gamma_{55}$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
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5.62 ± 0.39 ± 0.40	469 ± 32	LINK	01C FOCS	γ nucleus, $\bar{E}_\gamma \approx 180$ GeV
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$\Gamma(K_S^0 K^- 2\pi^+) / \Gamma(K_S^0 2\pi^+ \pi^-)$ $\Gamma_{100} / \Gamma_{55}$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
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7.68 ± 0.41 ± 0.32	670 ± 35	LINK	01C FOCS	γ nucleus, $\bar{E}_\gamma \approx 180$ GeV
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$\Gamma(K^+ K^- 2\pi^+ \pi^-) / \Gamma(K^- 3\pi^+ \pi^-)$ $\Gamma_{101} / \Gamma_{56}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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0.040 ± 0.009 ± 0.019	38	LINK	03D FOCS	γ A, $\bar{E}_\gamma \approx 180$ GeV
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———— Doubly Cabibbo-suppressed modes ————

$\Gamma(K^+ \pi^0) / \Gamma_{\text{total}}$ Γ_{106} / Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
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1.83 ± 0.26 OUR FIT	Error includes scale factor of 1.4.			
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2.52 ± 0.47 ± 0.26	189 ± 37	AUBERT,B	06F BABR	$e^+ e^- \approx \Upsilon(4S)$
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• • • 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
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$\Gamma(K^+ \pi^0) / \Gamma(K^- 2\pi^+)$ $\Gamma_{106} / \Gamma_{40}$

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
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2.01 ± 0.29 OUR FIT	Error includes scale factor of 1.4.			
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1.9 ± 0.2 ± 0.1	343 ± 37	MENDEZ	10 CLEO	$e^+ e^-$ at 3774 MeV
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$\Gamma(K^+ \eta) / \Gamma(\eta \pi^+)$ $\Gamma_{107} / \Gamma_{84}$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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3.06 ± 0.43 ± 0.14	166 ± 23	WON	11 BELL	$e^+ e^- \approx \Upsilon(4S)$
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$\Gamma(K^+ \eta) / \Gamma(K^- 2\pi^+)$ $\Gamma_{107} / \Gamma_{40}$

Unseen decay modes of the η are included.

VALUE (units 10^{-2})	CL%	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.15	90	MENDEZ	10 CLEO	$e^+ e^-$ at 3774 MeV
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$\Gamma(K^+ \eta'(958)) / \Gamma(\eta'(958) \pi^+)$ $\Gamma_{108} / \Gamma_{87}$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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3.77 ± 0.39 ± 0.10	180 ± 19	WON	11 BELL	$e^+ e^- \approx \Upsilon(4S)$
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$\Gamma(K^+ \eta'(958))/\Gamma(K^- 2\pi^+)$ Γ_{108}/Γ_{40}

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

VALUE (units 10^{-2})	CL%	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.20	90	MENDEZ	10	CLEO $e^+ e^-$ at 3774 MeV
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$\Gamma(K^+ \pi^+ \pi^-)/\Gamma(K^- 2\pi^+)$ Γ_{109}/Γ_{40}

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
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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, $\bar{E}_\gamma \approx 180$ 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 γ Be, $\bar{E}_\gamma = 220$ GeV

$\Gamma(K^+ \rho^0)/\Gamma(K^+ \pi^+ \pi^-)$ $\Gamma_{110}/\Gamma_{109}$

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

VALUE	DOCUMENT ID	TECN	COMMENT
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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

$\Gamma(K^+ f_0(980), f_0(980) \rightarrow \pi^+ \pi^-)/\Gamma(K^+ \pi^+ \pi^-)$ $\Gamma_{112}/\Gamma_{109}$

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

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

$\Gamma(K^*(892)^0 \pi^+, K^*(892)^0 \rightarrow K^+ \pi^-)/\Gamma(K^+ \pi^+ \pi^-)$ $\Gamma_{111}/\Gamma_{109}$

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

VALUE	DOCUMENT ID	TECN	COMMENT
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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

$\Gamma(K_2^*(1430)^0 \pi^+, K_2^*(1430)^0 \rightarrow K^+ \pi^-)/\Gamma(K^+ \pi^+ \pi^-)$ $\Gamma_{113}/\Gamma_{109}$

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

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

$\Gamma(K^+ \pi^+ \pi^- \text{ nonresonant})/\Gamma(K^+ \pi^+ \pi^-)$ $\Gamma_{114}/\Gamma_{109}$

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

VALUE	DOCUMENT ID	TECN	COMMENT
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• • • 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
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⁴⁸LINK 04F, with three times as many events, finds no need for a nonresonant amplitude.

$\Gamma(2K^+ K^-)/\Gamma(K^- 2\pi^+)$ Γ_{115}/Γ_{40}

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

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

————— Rare or forbidden modes —————

$\Gamma(\pi^+ e^+ e^-)/\Gamma_{\text{total}}$ **Γ_{116}/Γ**
 A test for the $\Delta C = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

<u>VALUE</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<1.1 \times 10^{-6}$	90	-3.9 ± 2.3	LEES	11G BABR	$e^+ e^- \approx \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<5.9 \times 10^{-6}$	90		⁵⁰ RUBIN	10 CLEO	$e^+ e^-$ at $\psi(3770)$
$<7.4 \times 10^{-6}$	90		HE	05A CLEO	See RUBIN 10
$<5.2 \times 10^{-5}$	90		AITALA	99G E791	$\pi^- N$ 500 GeV
$<1.1 \times 10^{-4}$	90		FRABETTI	97B E687	γ Be, $\bar{E}_\gamma \approx 220$ GeV
$<6.6 \times 10^{-5}$	90		AITALA	96 E791	$\pi^- N$ 500 GeV
$<2.5 \times 10^{-3}$	90		WEIR	90B MRK2	$e^+ e^-$ 29 GeV
$<2.6 \times 10^{-3}$	90	39	HAAS	88 CLEO	$e^+ e^-$ 10 GeV

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

$\Gamma(\pi^+ \phi, \phi \rightarrow e^+ e^-)/\Gamma_{\text{total}}$ **Γ_{117}/Γ**
 This is *not* a test for the $\Delta C = 1$ weak neutral current, but leads to the $\pi^+ e^+ e^-$ final state.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$(1.7^{+1.4}_{-0.9} \pm 0.1) \times 10^{-6}$	4	⁵¹ RUBIN	10 CLEO	$e^+ e^-$ at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$(2.7^{+3.6}_{-1.8} \pm 0.2) \times 10^{-6}$	2	HE	05A CLEO	See RUBIN 10

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

$\Gamma(\pi^+ \mu^+ \mu^-)/\Gamma_{\text{total}}$ **Γ_{118}/Γ**
 A test for the $\Delta C = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

<u>VALUE</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<3.9 \times 10^{-6}$	90		⁵² ABAZOV	08D D0	$p\bar{p}$, $E_{\text{cm}} = 1.96$ TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<6.5 \times 10^{-6}$	90	-0.2 ± 2.9	LEES	11G BABR	$e^+ e^- \approx \Upsilon(4S)$
$<8.8 \times 10^{-6}$	90		LINK	03F FOCS	γ nucleus, $\bar{E}_\gamma \approx 180$ GeV
$<1.5 \times 10^{-5}$	90		AITALA	99G E791	$\pi^- N$ 500 GeV
$<8.9 \times 10^{-5}$	90		FRABETTI	97B E687	γ Be, $\bar{E}_\gamma \approx 220$ GeV
$<1.8 \times 10^{-5}$	90		AITALA	96 E791	$\pi^- N$ 500 GeV
$<2.2 \times 10^{-4}$	90	0	KODAMA	95 E653	π^- emulsion 600 GeV
$<5.9 \times 10^{-3}$	90		WEIR	90B MRK2	$e^+ e^-$ 29 GeV
$<2.9 \times 10^{-3}$	90	36	HAAS	88 CLEO	$e^+ e^-$ 10 GeV

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

$\Gamma(\pi^+ \phi, \phi \rightarrow \mu^+ \mu^-) / \Gamma_{\text{total}}$ Γ_{119} / 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
$(1.8 \pm 0.5 \pm 0.6) \times 10^{-6}$	⁵³ ABAZOV 08D D0		$p\bar{p}$, $E_{\text{cm}} = 1.96$ TeV

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

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

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

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

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

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

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$< 1.0 \times 10^{-6}$	90	-3.7 ± 4.4	LEES 11G BABR		$e^+ e^- \approx \mathcal{R}(4S)$

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

$< 3.0 \times 10^{-6}$	90		RUBIN 10 CLEO		$e^+ e^-$ at $\psi(3770)$
$< 6.2 \times 10^{-6}$	90		HE 05A CLEO		See RUBIN 10
$< 2.0 \times 10^{-4}$	90		AITALA 99G E791		$\pi^- N$ 500 GeV
$< 2.0 \times 10^{-4}$	90		FRABETTI 97B E687		γ Be, $\bar{E}_\gamma \approx 220$ GeV
$< 4.8 \times 10^{-3}$	90		WEIR 90B MRK2		$e^+ e^-$ 29 GeV

$\Gamma(K^+ \mu^+ \mu^-) / \Gamma_{\text{total}}$ Γ_{122} / Γ

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

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$< 4.3 \times 10^{-6}$	90	-1.3 ± 3.0	LEES 11G BABR		$e^+ e^- \approx \mathcal{R}(4S)$

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

$< 9.2 \times 10^{-6}$	90		LINK 03F FOCS		γ nucleus, $\bar{E}_\gamma \approx 180$ GeV
$< 4.4 \times 10^{-5}$	90		AITALA 99G E791		$\pi^- N$ 500 GeV
$< 9.7 \times 10^{-5}$	90		FRABETTI 97B E687		γ Be, $\bar{E}_\gamma \approx 220$ 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

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

A test of lepton-family-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$< 2.9 \times 10^{-6}$	90	-2.9 ± 4.2	LEES 11G BABR		$e^+ e^- \approx \mathcal{R}(4S)$

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

$< 1.1 \times 10^{-4}$	90		FRABETTI 97B E687		γ Be, $\bar{E}_\gamma \approx 220$ GeV
$< 3.3 \times 10^{-3}$	90		WEIR 90B MRK2		$e^+ e^-$ 29 GeV

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

A test of lepton-family-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<3.6 \times 10^{-6}$	90	3.6 ± 4.5	LEES	11G	BABR $e^+ e^- \approx \Upsilon(4S)$

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

$<1.3 \times 10^{-4}$	90		FRABETTI	97B	E687 γ Be, $\bar{E}_\gamma \approx 220$ GeV
$<3.3 \times 10^{-3}$	90		WEIR	90B	MRK2 $e^+ e^- 29$ GeV

$\Gamma(K^+ e^+ \mu^-)/\Gamma_{\text{total}}$ Γ_{125}/Γ

A test of lepton-family-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<1.2 \times 10^{-6}$	90	-4.3 ± 1.9	LEES	11G	BABR $e^+ e^- \approx \Upsilon(4S)$

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

$<1.3 \times 10^{-4}$	90		FRABETTI	97B	E687 γ Be, $\bar{E}_\gamma \approx 220$ GeV
$<3.4 \times 10^{-3}$	90		WEIR	90B	MRK2 $e^+ e^- 29$ GeV

$\Gamma(K^+ e^- \mu^+)/\Gamma_{\text{total}}$ Γ_{126}/Γ

A test of lepton-family-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<2.8 \times 10^{-6}$	90	3.2 ± 4.0	LEES	11G	BABR $e^+ e^- \approx \Upsilon(4S)$

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

$<1.2 \times 10^{-4}$	90		FRABETTI	97B	E687 γ Be, $\bar{E}_\gamma \approx 220$ GeV
$<3.4 \times 10^{-3}$	90		WEIR	90B	MRK2 $e^+ e^- 29$ GeV

$\Gamma(\pi^- 2e^+)/\Gamma_{\text{total}}$ Γ_{127}/Γ

A test of lepton-number conservation.

VALUE	CL%	EVTS	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. • • •

$<1.9 \times 10^{-6}$	90	4.7 ± 4.7	LEES	11G	BABR $e^+ e^- \approx \Upsilon(4S)$
$<3.6 \times 10^{-6}$	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, $\bar{E}_\gamma \approx 220$ GeV
$<4.8 \times 10^{-3}$	90		WEIR	90B	MRK2 $e^+ e^- 29$ GeV

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

A test of lepton-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<2.0 \times 10^{-6}$	90	-3.1 ± 1.3	LEES	11G	BABR $e^+ e^- \approx \Upsilon(4S)$

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

$<4.8 \times 10^{-6}$	90		LINK	03F	FOCS γ nucleus, $\bar{E}_\gamma \approx 180$ GeV
$<1.7 \times 10^{-5}$	90		AITALA	99G	E791 $\pi^- N 500$ GeV
$<8.7 \times 10^{-5}$	90		FRABETTI	97B	E687 γ Be, $\bar{E}_\gamma \approx 220$ 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

$\Gamma(\pi^- e^+ \mu^+)/\Gamma_{\text{total}}$ Γ_{129}/Γ

A test of lepton-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<2.0 \times 10^{-6}$	90	-5.1 ± 4.7	LEES	11G BABR	$e^+ e^- \approx \Upsilon(4S)$

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

$<5.0 \times 10^{-5}$	90		AITALA	99G E791	$\pi^- N$ 500 GeV
$<1.1 \times 10^{-4}$	90		FRABETTI	97B E687	γ Be, $\bar{E}_\gamma \approx 220$ GeV
$<3.7 \times 10^{-3}$	90		WEIR	90B MRK2	$e^+ e^-$ 29 GeV

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

$\Gamma(K^- 2e^+)/\Gamma_{\text{total}}$ Γ_{131}/Γ

A test of lepton-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<0.9 \times 10^{-6}$	90	-2.8 ± 2.4	LEES	11G BABR	$e^+ e^- \approx \Upsilon(4S)$

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

$<3.5 \times 10^{-6}$	90		RUBIN	10 CLEO	$e^+ e^-$ at $\psi(3770)$
$<4.5 \times 10^{-6}$	90		HE	05A CLEO	See RUBIN 10
$<1.2 \times 10^{-4}$	90		FRABETTI	97B E687	γ Be, $\bar{E}_\gamma \approx 220$ GeV
$<9.1 \times 10^{-3}$	90		WEIR	90B MRK2	$e^+ e^-$ 29 GeV

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

A test of lepton-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<10 \times 10^{-6}$	90	7.2 ± 5.6	LEES	11G BABR	$e^+ e^- \approx \Upsilon(4S)$

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

$<1.3 \times 10^{-5}$	90		LINK	03F FOCS	γ nucleus, $\bar{E}_\gamma \approx 180$ GeV
$<1.2 \times 10^{-4}$	90		FRABETTI	97B E687	γ Be, $\bar{E}_\gamma \approx 220$ 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

$\Gamma(K^- e^+ \mu^+)/\Gamma_{\text{total}}$ Γ_{133}/Γ

A test of lepton-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<1.9 \times 10^{-6}$	90	-11.6 ± 5.1	LEES	11G BABR	$e^+ e^- \approx \Upsilon(4S)$

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

$<1.3 \times 10^{-4}$	90		FRABETTI	97B E687	γ Be, $\bar{E}_\gamma \approx 220$ GeV
$<4.0 \times 10^{-3}$	90		WEIR	90B MRK2	$e^+ e^-$ 29 GeV

$\Gamma(K^*(892)^- 2\mu^+)/\Gamma_{\text{total}}$ Γ_{134}/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 ASYMMETRIESThis 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 $D^+ \rightarrow \mu^+ \nu_\mu$, $D^- \rightarrow \mu^- \bar{\nu}_\mu$

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$+8 \pm 8$	EISENSTEIN 08	CLEO	$e^+ e^-$ at $\psi(3770)$

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

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
-0.54 ± 0.14 OUR AVERAGE				
$-0.44 \pm 0.13 \pm 0.10$	807k	DEL-AMO-SA..11H	BABR	$e^+ e^- \approx \Upsilon(4S)$
$-0.71 \pm 0.19 \pm 0.20$		KO	10	BELL $e^+ e^- \approx \Upsilon(4S)$
$-1.3 \pm 0.7 \pm 0.3$	30k	MENDEZ	10	CLEO $e^+ e^-$ at 3774 MeV
$-1.6 \pm 1.5 \pm 0.9$	10.6k	⁵⁴ LINK	02B	FOCS γ nucleus, $\bar{E}_\gamma \approx 180$ GeV

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

 $-0.6 \pm 1.0 \pm 0.3$ DOBBS 07 CLEO See MENDEZ 10⁵⁴ LINK 02B measures $N(D^+ \rightarrow K_S^0 \pi^+)/N(D^+ \rightarrow K^- \pi^+ \pi^+)$, the ratio of numbers of events observed, and similarly for the D^- . $A_{CP}(K^\mp 2\pi^\pm)$ in $D^+ \rightarrow K^- 2\pi^+$, $D^- \rightarrow K^+ 2\pi^-$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
$-0.1 \pm 0.4 \pm 0.9$	231k	MENDEZ	10	CLEO $e^+ e^-$ at 3774 MeV

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

 $-0.5 \pm 0.4 \pm 0.9$ DOBBS 07 CLEO See MENDEZ 10 $A_{CP}(K^\mp \pi^\pm \pi^\pm \pi^0)$ in $D^+ \rightarrow K^- \pi^+ \pi^+ \pi^0$, $D^- \rightarrow K^+ \pi^- \pi^- \pi^0$

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$+1.0 \pm 0.9 \pm 0.9$	DOBBS 07	CLEO	$e^+ e^-$ at $\psi(3770)$

 $A_{CP}(K_S^0 \pi^\pm \pi^0)$ in $D^+ \rightarrow K_S^0 \pi^+ \pi^0$, $D^- \rightarrow K_S^0 \pi^- \pi^0$

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$+0.3 \pm 0.9 \pm 0.3$	DOBBS 07	CLEO	$e^+ e^-$ at $\psi(3770)$

 $A_{CP}(K_S^0 \pi^\pm \pi^+ \pi^-)$ in $D^+ \rightarrow K_S^0 \pi^+ \pi^+ \pi^-$, $D^- \rightarrow K_S^0 \pi^- \pi^- \pi^+$

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

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

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

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

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
1.0 ± 1.5 OUR AVERAGE		Error includes scale factor of 1.4.		
+1.74 ± 1.13 ± 0.19		WON	11	BELL $e^+ e^- \approx \Upsilon(4S)$
-2.0 ± 2.3 ± 0.3	2.9k	MENDEZ	10	CLEO $e^+ e^-$ at 3774 MeV

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

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
-0.5 ± 1.2 OUR AVERAGE		Error includes scale factor of 1.1.		
-0.12 ± 1.12 ± 0.17		WON	11	BELL $e^+ e^- \approx \Upsilon(4S)$
-4.0 ± 3.4 ± 0.3	1.0k	MENDEZ	10	CLEO $e^+ e^-$ at 3774 MeV

$A_{CP}(K_S^0 K^\pm)$ in $D^\pm \rightarrow K_S^0 K^\pm$

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, $\bar{E}_\gamma \approx 180$ 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, $\bar{E}_\gamma \approx 180$ GeV
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⁵⁵LINK 02B measures $N(D^+ \rightarrow K_S^0 K^+)/N(D^+ \rightarrow K_S^0 \pi^+)$, the ratio of numbers of events observed, and similarly for the D^- .

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

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

See also AAIJ 11G for a search for CP asymmetry in the $D^\pm \rightarrow K^+ K^- \pi^\pm$ Dalitz plots using 370k decays and four different binning schemes. No evidence for CP asymmetry was found.

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)

⁵⁷AUBERT 05S measures $N(D^+ \rightarrow K^+ K^- \pi^+)/N(D_S^+ \rightarrow K^+ K^- \pi^+)$, the ratio of the numbers of events observed, and similarly for the D^- .

⁵⁸FRABETTI 94I, AITALA 98C, and LINK 00B measure $N(D^+ \rightarrow K^- K^+ \pi^+)/N(D^+ \rightarrow K^- \pi^+ \pi^+)$, the ratio of numbers of events observed, and similarly for the D^- .

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

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 $N(D^+ \rightarrow K^+ \bar{K}^{*0})/N(D_S^+ \rightarrow K^+ K^- \pi^+)$, the ratio of the numbers of events observed, and similarly for the D^- .

⁶⁰ FRABETTI 94I and AITALA 97B measure $N(D^+ \rightarrow K^+ \bar{K}^*(892)^0)/N(D^+ \rightarrow K^- \pi^+ \pi^+)$, the ratio of numbers of events observed, and similarly for the D^- .

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

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.42 ± 0.28 OUR AVERAGE				
+0.51 ± 0.28 ± 0.05	237k	STARIC	12 BELL	Mainly at $\Upsilon(4S)$
-1.8 ± 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 $N(D^+ \rightarrow \phi\pi^+)/N(D_S^+ \rightarrow K^+ K^- \pi^+)$, the ratio of the numbers of events observed, and similarly for the D^- .

⁶² FRABETTI 94I and AITALA 97B measure $N(D^+ \rightarrow \phi\pi^+)/N(D^+ \rightarrow K^- \pi^+ \pi^+)$, the ratio of numbers of events observed, and similarly for the D^- .

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

VALUE (%)	DOCUMENT ID	TECN	COMMENT
+8 ± 6 ⁺⁴/₋₂	RUBIN	08 CLEO	Fit-fraction asymmetry

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

VALUE (%)	DOCUMENT ID	TECN	COMMENT
+43 ± 19 ⁺⁵/₋₁₈	RUBIN	08 CLEO	Fit-fraction asymmetry

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

VALUE (%)	DOCUMENT ID	TECN	COMMENT
-12 ± 11 ⁺¹⁴/₋₆	RUBIN	08 CLEO	Fit-fraction asymmetry

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

VALUE (%)	DOCUMENT ID	TECN	COMMENT
-19 ± 12 ⁺⁸/₋₁₁	RUBIN	08 CLEO	Fit-fraction asymmetry

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

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$-9 \pm 22 \pm 14$	RUBIN	08	CLEO Fit-fraction asymmetry

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

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 $N(D^+ \rightarrow \pi^+\pi^-\pi^+)/N(D^+ \rightarrow K^-\pi^+\pi^+)$, the ratio of numbers of events observed, and similarly for the D^- .			

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

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

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

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

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

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

$C_T \equiv \vec{p}_{K^+} \cdot (\vec{p}_{\pi^+} \times \vec{p}_{\pi^-})$ is a T -odd correlation of the K^+ , π^+ , and π^- momenta for the D^+ . $\bar{C}_T \equiv \vec{p}_{K^-} \cdot (\vec{p}_{\pi^-} \times \vec{p}_{\pi^+})$ 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 $\bar{A}_T \equiv [\Gamma(-\bar{C}_T > 0) - \Gamma(-\bar{C}_T < 0)] / [\Gamma(-\bar{C}_T > 0) + \Gamma(-\bar{C}_T < 0)]$, the asymmetry $A_{Tviol} \equiv \frac{1}{2}(A_T - \bar{A}_T)$ tests for T violation even with nonzero strong phases.

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$-12.0 \pm 10.0 \pm 4.6$	21.2 ± 0.4 k	LEES	11E BABR	$e^+e^- \approx \Upsilon(4S)$

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

$23 \pm 62 \pm 22$	523 ± 32	LINK	05E FOCS	γ A, $\bar{E}_\gamma \approx 180$ GeV
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$D^+ \rightarrow (\bar{K}^0/\pi^0/\eta/\bar{K}^{*0})\ell^+\nu_\ell$ FORM FACTORS

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

VALUE	DOCUMENT ID	TECN	COMMENT
$0.707 \pm 0.010 \pm 0.009$	BESSON	09	CLEO $\bar{K}^0 e^+ \nu_e$ 3-parameter fit

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

VALUE	DOCUMENT ID	TECN	COMMENT
$-1.66 \pm 0.44 \pm 0.10$	BESSON	09	CLEO $\bar{K}^0 e^+ \nu_e$ 3-parameter fit

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

VALUE	DOCUMENT ID	TECN	COMMENT
$-14 \pm 11 \pm 1$	BESSON	09	CLEO $\bar{K}^0 e^+ \nu_e$ 3-parameter fit

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

VALUE	DOCUMENT ID	TECN	COMMENT
$0.146 \pm 0.007 \pm 0.002$	BESSON 09	CLEO	$\pi^0 e^+ \nu_e$ 3-parameter fit

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

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 $D^+ \rightarrow \pi^0 \ell^+ \nu_\ell$

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

$f_+(0)|V_{cd}|$ in $D^+ \rightarrow \eta e^+ \nu_e$

VALUE	DOCUMENT ID	TECN	COMMENT
$0.086 \pm 0.006 \pm 0.001$	YELTON 11	CLEO	z expansion

$r_1 \equiv a_1/a_0$ in $D^+ \rightarrow \eta e^+ \nu_e$

VALUE	DOCUMENT ID	TECN	COMMENT
$-1.83 \pm 2.23 \pm 0.28$	YELTON 11	CLEO	z expansion

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

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
1.51 ± 0.07 OUR AVERAGE				Error includes scale factor of 2.2. See the ideogram below.
1.463 ± 0.017 ± 0.031		⁶⁴ DEL-AMO-SA..11i	BABR	
1.504 ± 0.057 ± 0.039	15k	⁶⁵ LINK 02L	FOCS	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
1.45 ± 0.23 ± 0.07	763	ADAMOVICH 99	BEAT	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
1.90 ± 0.11 ± 0.09	3000	⁶⁶ AITALA 98B	E791	$\bar{K}^*(892)^0 e^+ \nu_e$
1.84 ± 0.11 ± 0.09	3034	AITALA 98F	E791	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
1.74 ± 0.27 ± 0.28	874	FRABETTI 93E	E687	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
2.00 ^{+0.34} / _{-0.32} ± 0.16	305	KODAMA 92	E653	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$

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

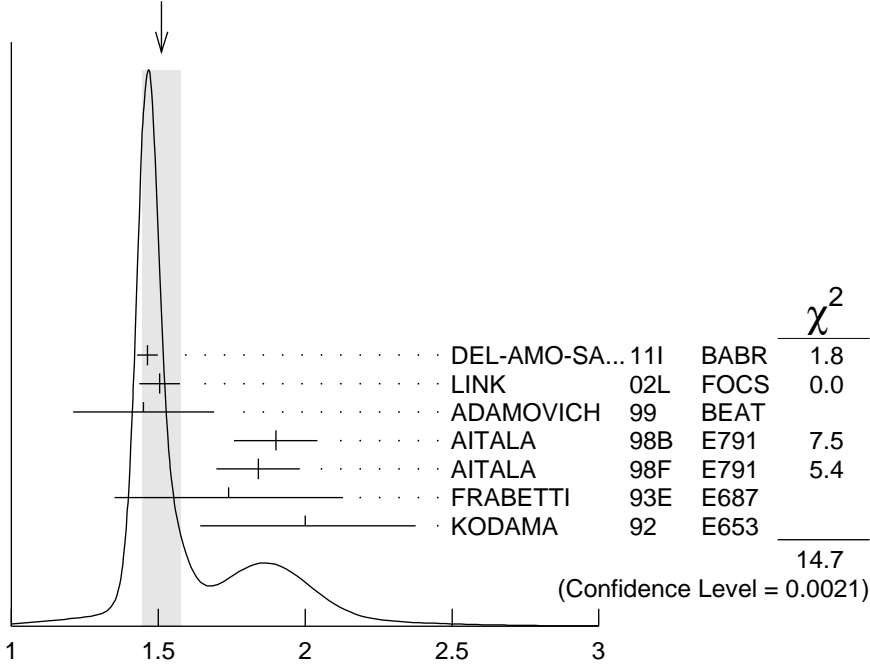
2.0 ± 0.6 ± 0.3	183	ANJOS 90E	E691	$\bar{K}^*(892)^0 e^+ \nu_e$
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⁶⁴ DEL-AMO-SANCHEZ 11i finds the pole mass $m_A = (2.63 \pm 0.10 \pm 0.13)$ GeV (m_V is fixed at 2 GeV).

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

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

WEIGHTED AVERAGE
 1.51 ± 0.07 (Error scaled by 2.2)



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

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

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.807 ± 0.025 OUR AVERAGE				
$0.801 \pm 0.020 \pm 0.020$		⁶⁷ DEL-AMO-SA...11I	BABR	
$0.875 \pm 0.049 \pm 0.064$	15k	⁶⁸ LINK 02L	FOCS	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
$1.00 \pm 0.15 \pm 0.03$	763	ADAMOVICH 99	BEAT	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
$0.71 \pm 0.08 \pm 0.09$	3000	AITALA 98B	E791	$\bar{K}^*(892)^0 e^+ \nu_e$
$0.75 \pm 0.08 \pm 0.09$	3034	AITALA 98F	E791	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
$0.78 \pm 0.18 \pm 0.10$	874	FRABETTI 93E	E687	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
$0.82 \begin{smallmatrix} +0.22 \\ -0.23 \end{smallmatrix} \pm 0.11$	305	KODAMA 92	E653	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$

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

$0.0 \pm 0.5 \pm 0.2$	183	ANJOS 90E	E691	$\bar{K}^*(892)^0 e^+ \nu_e$
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⁶⁷ DEL-AMO-SANCHEZ 11I finds the pole mass $m_A = (2.63 \pm 0.10 \pm 0.13) \text{ GeV}$ (m_V is fixed at 2 GeV).

⁶⁸ 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.

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

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

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

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

See also BRIERE 10 for $\bar{K}^* \ell^+ \nu_\ell$ 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	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
1.20±0.13±0.13	874	FRABETTI 93E	E687	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
1.18±0.18±0.08	305	KODAMA 92	E653	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.8 ^{+0.6} _{-0.4} ±0.3	183	ANJOS 90E	E691	$\bar{K}^*(892)^0 e^+ \nu_e$

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

See also BRIERE 10 for $\bar{K}^* \ell^+ \nu_\ell$ 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	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
0.16±0.05±0.02	305	KODAMA 92	E653	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.15 ^{+0.07} _{-0.05} ±0.03	183	ANJOS 90E	E691	$\bar{K}^*(892)^0 e^+ \nu_e$

D^\pm REFERENCES

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DEL-AMO-SA... 11I	PR D83 072001	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
LEES 11E	PR D84 031103	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES 11G	PR D84 072006	J.P. Lees <i>et al.</i>	(BABAR Collab.)
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ANASHIN 10A	PL B686 84	V.V. Anashin <i>et al.</i>	(VEPP-4M KEDR Collab.)
ASNER 10	PR D81 052007	D.M. Asner <i>et al.</i>	(CLEO Collab.)
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KO 10	PRL 104 181602	B.R. Ko <i>et al.</i>	(BELLE Collab.)
MENDEZ 10	PR D81 052013	H. Mendez <i>et al.</i>	(CLEO Collab.)
RUBIN 10	PR D82 092007	P. Rubin <i>et al.</i>	(CLEO Collab.)
BESSION 09	PR D80 032005	D. Besson <i>et al.</i>	(CLEO Collab.)
Also	PR D79 052010	J.Y. Ge <i>et al.</i>	(CLEO Collab.)
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LINK 09	PL B681 14	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
MITCHELL 09B	PRL 102 081801	R.E. Mitchell <i>et al.</i>	(CLEO Collab.)
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ABAZOV 08D	PRL 100 101801	V.M. Abazov <i>et al.</i>	(D0 Collab.)
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HE 08	PRL 100 091801	Q. He <i>et al.</i>	(CLEO Collab.)
PDG 08	PL B667 1	C. Amsler <i>et al.</i>	(PDG Collab.)
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ABLIKIM 07	PL B644 20	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM 07G	PL B658 1	M. Ablikim <i>et al.</i>	(BES Collab.)
BONVICINI 07	PR D76 012001	G. Bonvicini <i>et al.</i>	(CLEO Collab.)
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LINK 07B	PL B653 1	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
ABLIKIM 06O	EPJ C47 31	M. Ablikim <i>et al.</i>	(BES Collab.)

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ABLIKIM	06U	PL B643 246	M. Ablikim <i>et al.</i>	(BES Collab.)
ADAM	06A	PRL 97 251801	N.E. Adam <i>et al.</i>	(CLEO Collab.)
AITALA	06	PR D73 032004	E.M. Aitala <i>et al.</i>	(FNAL E791 Collab.)
Also		PR D74 059901 (errata.)	E.M. Aitala <i>et al.</i>	(FNAL E791 Collab.)
AUBERT,B	06F	PR D74 011107R	B. Aubert <i>et al.</i>	(BABAR Collab.)
DYTMAN	06	PR D74 071102R	S.A. Dytman <i>et al.</i>	(CLEO Collab.)
HUANG	06B	PR D74 112005	G.S. Huang <i>et al.</i>	(CLEO Collab.)
LINK	06B	PL B637 32	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
RUBIN	06	PRL 96 081802	P. Rubin <i>et al.</i>	(CLEO Collab.)
RUBIN	06A	PR D73 112005	P. Rubin <i>et al.</i>	(CLEO Collab.)
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ABLIKIM	05D	PL B610 183	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	05F	PL B622 6	M. Ablikim <i>et al.</i>	(BES Collab.)
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ARTUSO	05A	PRL 95 251801	M. Artuso <i>et al.</i>	(CLEO Collab.)
AUBERT	05S	PR D71 091101R	B. Aubert <i>et al.</i>	(BABAR Collab.)
HE	05	PRL 95 121801	Q. He <i>et al.</i>	(CLEO Collab.)
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HUANG	05B	PRL 95 181801	G.S. Huang <i>et al.</i>	(CLEO Collab.)
KAYIS-TOPAK...	05	PL B626 24	A. Kayis-Topaksu <i>et al.</i>	(CERN CHORUS Collab.)
LINK	05E	PL B622 239	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
LINK	05I	PL B621 72	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
ABLIKIM	04C	PL B597 39	M. Ablikim <i>et al.</i>	(BEPC BES Collab.)
ARMS	04	PR D69 071102R	K. Arms <i>et al.</i>	(CLEO Collab.)
BONVICINI	04A	PR D70 112004	G. Bonvicini <i>et al.</i>	(CLEO Collab.)
LINK	04	PL B585 200	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
LINK	04E	PL B598 33	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
LINK	04F	PL B601 10	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
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LINK	03D	PL B561 225	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
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LINK	02B	PRL 88 041602	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
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LINK	02E	PL B535 43	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
LINK	02F	PL B537 192	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
LINK	02I	PL B541 227	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
LINK	02J	PL B541 243	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
LINK	02L	PL B544 89	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
AITALA	01B	PRL 86 770	E.M. Aitala <i>et al.</i>	(FNAL E791 Collab.)
LINK	01C	PRL 87 162001	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
ABREU	00O	EPJ C12 209	P. Abreu <i>et al.</i>	(DELPHI Collab.)
ASTIER	00D	PL B486 35	P. Astier <i>et al.</i>	(CERN NOMAD Collab.)
JUN	00	PRL 84 1857	S.Y. Jun <i>et al.</i>	(FNAL SELEX Collab.)
LINK	00B	PL B491 232	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
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ADAMOVICH	99	EPJ C6 35	M. Adamovich <i>et al.</i>	(CERN BEATRICE Collab.)
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BAI	98B	PL B429 188	J.Z. Bai <i>et al.</i>	(BEPC BES Collab.)
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FRABETTI	97	PL B391 235	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
FRABETTI	97B	PL B398 239	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
FRABETTI	97C	PL B401 131	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
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FRABETTI	95	PL B346 199	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
FRABETTI	95B	PL B351 591	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
FRABETTI	95E	PL B359 403	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
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ALBRECHT	94I	ZPHY C64 375	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
BALEST	94	PRL 72 2328	R. Balest <i>et al.</i>	(CLEO Collab.)
FRABETTI	94D	PL B323 459	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
FRABETTI	94G	PL B331 217	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
FRABETTI	94I	PR D50 R2953	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
AKERIB	93	PRL 71 3070	D.S. Akerib <i>et al.</i>	(CLEO Collab.)
ANJOS	93	PR D48 56	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
FRABETTI	93E	PL B307 262	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
ALBRECHT	92F	PL B278 202	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ANJOS	92C	PR D46 1941	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
BARLAG	92C	ZPHY C55 383	S. Barlag <i>et al.</i>	(ACCMOR Collab.)
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COFFMAN	92B	PR D45 2196	D.M. Coffman <i>et al.</i>	(Mark III Collab.)
DAOUDI	92	PR D45 3965	M. Daoudi <i>et al.</i>	(CLEO Collab.)
KODAMA	92	PL B274 246	K. Kodama <i>et al.</i>	(FNAL E653 Collab.)
KODAMA	92C	PL B286 187	K. Kodama <i>et al.</i>	(FNAL E653 Collab.)
ADAMOVICH	91	PL B268 142	M.I. Adamovich <i>et al.</i>	(WA82 Collab.)
ALBRECHT	91	PL B255 634	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALVAREZ	91B	ZPHY C50 11	M.P. Alvarez <i>et al.</i>	(CERN NA14/2 Collab.)
AMMAR	91	PR D44 3383	R. Ammar <i>et al.</i>	(CLEO Collab.)
BAI	91	PRL 66 1011	Z. Bai <i>et al.</i>	(Mark III Collab.)
COFFMAN	91	PL B263 135	D.M. Coffman <i>et al.</i>	(Mark III Collab.)
FRABETTI	91	PL B263 584	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
ALVAREZ	90	ZPHY C47 539	M.P. Alvarez <i>et al.</i>	(CERN NA14/2 Collab.)
ANJOS	90C	PR D41 2705	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
ANJOS	90D	PR D42 2414	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
ANJOS	90E	PRL 65 2630	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
BARLAG	90C	ZPHY C46 563	S. Barlag <i>et al.</i>	(ACCMOR Collab.)
WEIR	90B	PR D41 1384	A.J. Weir <i>et al.</i>	(Mark II Collab.)
ANJOS	89	PRL 62 125	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
ANJOS	89B	PRL 62 722	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
ANJOS	89E	PL B223 267	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
ADLER	88C	PRL 60 89	J. Adler <i>et al.</i>	(Mark III Collab.)
ALBRECHT	88I	PL B210 267	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
HAAS	88	PRL 60 1614	P. Haas <i>et al.</i>	(CLEO Collab.)
ONG	88	PRL 60 2587	R.A. Ong <i>et al.</i>	(Mark II Collab.)
RAAB	88	PR D37 2391	J.R. Raab <i>et al.</i>	(FNAL E691 Collab.)
ADAMOVICH	87	EPL 4 887	M.I. Adamovich <i>et al.</i>	(Photon Emulsion Collab.)
ADLER	87	PL B196 107	J. Adler <i>et al.</i>	(Mark III Collab.)
BARTEL	87	ZPHY C33 339	W. Bartel <i>et al.</i>	(JADE Collab.)
BALTRUSAITIS...	86E	PRL 56 2140	R.M. Baltrusaitis <i>et al.</i>	(Mark III Collab.)
BALTRUSAITIS...	85B	PRL 54 1976	R.M. Baltrusaitis <i>et al.</i>	(Mark III Collab.)
BALTRUSAITIS...	85E	PRL 55 150	R.M. Baltrusaitis <i>et al.</i>	(Mark III Collab.)
BARTEL	85J	PL 163B 277	W. Bartel <i>et al.</i>	(JADE Collab.)
ADAMOVICH	84	PL 140B 119	M.I. Adamovich <i>et al.</i>	(CERN WA58 Collab.)
ALTHOFF	84G	ZPHY C22 219	M. Althoff <i>et al.</i>	(TASSO Collab.)
DERRICK	84	PRL 53 1971	M. Derrick <i>et al.</i>	(HRS Collab.)
SCHINDLER	81	PR D24 78	R.H. Schindler <i>et al.</i>	(Mark II Collab.)
TRILLING	81	PRPL 75 57	G.H. Trilling	(LBL, UCB) J
ZHOLENTZ	80	PL 96B 214	A.A. Zholents <i>et al.</i>	(NOVO)
	Also	SJNP 34 814	A.A. Zholents <i>et al.</i>	(NOVO)
		Translated from YAF 34 1471.		
GOLDHABER	77	PL 69B 503	G. Goldhaber <i>et al.</i>	(Mark I Collab.)
PERUZZI	77	PRL 39 1301	I. Peruzzi <i>et al.</i>	(LGW Collab.)
PICCOLO	77	PL 70B 260	M. Piccolo <i>et al.</i>	(Mark I Collab.)
PERUZZI	76	PRL 37 569	I. Peruzzi <i>et al.</i>	(Mark I Collab.)

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