$D^{\pm}$

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

$D^{\pm}$ MASS

The fit includes $D^{\pm}$, D^0, $D_s^{\pm}$, $D^{*\pm}$, D^{*0}, and $D_s^{*\pm}$ mass and mass difference measurements.

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1869.4± 0.5 OUR FIT	Error includes scale factor of 1.1.				
1869.4± 0.5 OUR AVERAGE					
1870.0± 0.5±1.0	317	BARLAG	90C	ACCM	π^- Cu 230 GeV
1863 ± 4		DERRICK	84	HRS	e^+e^- 29 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
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	MRK1	e^+e^- 3.77 GeV
1874 ±11		PICCOLO	77	MRK1	e^+e^- 4.03, 4.41 GeV
1876 ±15	50	PERUZZI	76	MRK1	$K^{\mp}\pi^{\pm}\pi^{\pm}$

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

$D^{\pm}$ MEAN LIFE

Measurements with an error $> 100 \times 10^{-15}$ s have been omitted from the Listings.

VALUE (10^{-15} s)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1040 ± 7 OUR AVERAGE					
1039.4± 4.3± 7.0	110k	LINK	02F	FOCS	γ nucleus, $\approx$ 180 GeV
$1033.6\pm22.1^{+9.9}_{-12.7}$	3777	BONVICINI	99	CLE2	$e^+e^- \approx \Upsilon(4S)$
1048 ±15 ±11	9k	FRABETTI	94D	E687	$D^+ \to K^-\pi^+\pi^+$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1075 ±40 ±18	2455	FRABETTI	91	E687	γ Be, $D^+ \to K^-\pi^+\pi^+$
1030 ±80 ±60	200	ALVAREZ	90	NA14	γ, $D^+ \to K^-\pi^+\pi^+$
1050^{+77}_{-72}	317	[2] BARLAG	90C	ACCM	π^- Cu 230 GeV
1050 ±80 ±70	363	ALBRECHT	88I	ARG	e^+e^- 10 GeV
1090 ±30 ±25	2992	RAAB	88	E691	Photoproduction

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

D^+ DECAY MODES

D^- modes are charge conjugates of the modes below.

	Mode		Fraction (Γ_i/Γ)	Scale factor/ Confidence level
	Inclusive modes			
Γ_1	e^+ anything		(17.2 ± 1.9) %	
Γ_2	K^- anything		(27.5 ± 2.4) %	
Γ_3	$\overline{K}^0$ anything + K^0 anything		(61 ± 8) %	
Γ_4	K^+ anything		(5.5 ± 1.6) %	
Γ_5	η anything	[a]	< 13 %	CL=90%
Γ_6	ϕ anything		< 1.8 %	CL=90%
Γ_7	ϕe^+ anything		< 1.6 %	CL=90%
Γ_8	μ^+ anything			
	Leptonic and semileptonic modes			
Γ_9	$\mu^+ \nu_\mu$		$(8 {}^{+17}_{-5}) \times 10^{-4}$	
Γ_{10}	$\overline{K}^0 \ell^+ \nu_\ell$	[b]	(6.8 ± 0.8) %	
Γ_{11}	$\overline{K}^0 e^+ \nu_e$		(6.7 ± 0.9) %	
Γ_{12}	$\overline{K}^0 \mu^+ \nu_\mu$		$(7.0 {}^{+3.0}_{-2.0})$ %	
Γ_{13}	$K^- \pi^+ e^+ \nu_e$		$(4.5 {}^{+1.0}_{-0.8})$ %	S=1.1
Γ_{14}	$\overline{K}^*(892)^0 e^+ \nu_e$ $\times$ B($\overline{K}^*(892)^0 \to K^- \pi^+$)		(3.7 ± 0.5) %	
Γ_{15}	$K^- \pi^+ e^+ \nu_e$ nonresonant		$< 7 \times 10^{-3}$	CL=90%
Γ_{16}	$K^- \pi^+ \mu^+ \nu_\mu$		(4.00 ± 0.32) %	
	In the fit as $\frac{2}{3}\Gamma_{28} + \Gamma_{18}$, where $\frac{2}{3}\Gamma_{28} = \Gamma_{17}$.			
Γ_{17}	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$ $\times$ B($\overline{K}^*(892)^0 \to K^- \pi^+$)		(3.7 ± 0.3) %	
Γ_{18}	$K^- \pi^+ \mu^+ \nu_\mu$ nonresonant		$(3.3 \pm 1.3) \times 10^{-3}$	
Γ_{19}	$\overline{K}^0 \pi^+ \pi^- e^+ \nu_e$			
Γ_{20}	$K^- \pi^+ \pi^0 e^+ \nu_e$			
Γ_{21}	$(\overline{K}^*(892)\pi)^0 e^+ \nu_e$		< 1.2 %	CL=90%
Γ_{22}	$(\overline{K}\pi\pi)^0 e^+ \nu_e$ non-$\overline{K}^*(892)$		$< 9 \times 10^{-3}$	CL=90%
Γ_{23}	$K^- \pi^+ \pi^0 \mu^+ \nu_\mu$		$< 1.7 \times 10^{-3}$	CL=90%
Γ_{24}	$\pi^0 \ell^+ \nu_\ell$	[c]	$(3.1 \pm 1.5) \times 10^{-3}$	
Γ_{25}	$\pi^+ \pi^- e^+ \nu_e$			

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

Γ_{26}	$\overline{K}^*(892)^0 \ell^+ \nu_\ell$	[b]	(5.73 ± 0.35) %	
Γ_{27}	$\overline{K}^*(892)^0 e^+ \nu_e$		(5.5 ± 0.7) %	S=1.4
Γ_{28}	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$		(5.5 ± 0.4) %	

Γ_{29}	$\overline{K}_1(1270)^0 \mu^+ \nu_\mu$		$<$ 4	%	CL=95%
Γ_{30}	$\overline{K}^*(1410)^0 \mu^+ \nu_\mu$				
Γ_{31}	$\overline{K}_2^*(1430)^0 \mu^+ \nu_\mu$		$<$ 1.0	%	CL=95%
Γ_{32}	$\rho^0 e^+ \nu_e$		(2.5 $\pm$ 1.0)	$\times 10^{-3}$	
Γ_{33}	$\rho^0 \mu^+ \nu_\mu$		(3.4 $\pm$ 0.8)	$\times 10^{-3}$	
Γ_{34}	$\phi e^+ \nu_e$		$<$ 2.09	%	CL=90%
Γ_{35}	$\phi \mu^+ \nu_\mu$		$<$ 3.72	%	CL=90%
Γ_{36}	$\eta \ell^+ \nu_\ell$		$<$ 5	$\times 10^{-3}$	CL=90%
Γ_{37}	$\eta'(958) \mu^+ \nu_\mu$		$<$ 1.1	%	CL=90%

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

Γ_{38}	$\overline{K}^0 \pi^+$		(2.82 $\pm$ 0.19)	%	
Γ_{39}	$K^- \pi^+ \pi^+$	[d]	(9.2 $\pm$ 0.6)	%	
Γ_{40}	$K_0^*(800)^0 \pi^+$				
Γ_{41}	$\overline{K}^*(892)^0 \pi^+$ $\times$ B($\overline{K}^*(892)^0 \to K^- \pi^+$)		(1.30 $\pm$ 0.13)	%	
Γ_{42}	$\overline{K}_0^*(1430)^0 \pi^+$ $\times$ B($\overline{K}_0^*(1430)^0 \to K^- \pi^+$)		(2.3 $\pm$ 0.3)	%	
Γ_{43}	$\overline{K}_2^*(1430)^0 \pi^+$ $\times$ B($\overline{K}_2^*(1430)^0 \to K^- \pi^+$)				
Γ_{44}	$\overline{K}^*(1680)^0 \pi^+$ $\times$ B($\overline{K}^*(1680)^0 \to K^- \pi^+$)		(3.8 $\pm$ 0.8)	$\times 10^{-3}$	
Γ_{45}	$K^- \pi^+ \pi^+$ nonresonant		(8.8 $\pm$ 0.9)	%	
Γ_{46}	$\overline{K}^0 \pi^+ \pi^0$	[d]	(9.7 $\pm$ 3.0)	%	S=1.1
Γ_{47}	$\overline{K}^0 \rho^+$		(6.6 $\pm$ 2.5)	%	
Γ_{48}	$\overline{K}^*(892)^0 \pi^+$ $\times$ B($\overline{K}^*(892)^0 \to \overline{K}^0 \pi^0$)		(6.5 $\pm$ 0.6)	$\times 10^{-3}$	
Γ_{49}	$\overline{K}^0 \pi^+ \pi^0$ nonresonant		(1.3 $\pm$ 1.1)	%	
Γ_{50}	$K^- \pi^+ \pi^+ \pi^0$	[d]	(6.5 $\pm$ 1.1)	%	
Γ_{51}	$\overline{K}^*(892)^0 \rho^+$ total $\times$ B($\overline{K}^*(892)^0 \to K^- \pi^+$)		(1.4 $\pm$ 0.9)	%	
Γ_{52}	$\overline{K}_1(1400)^0 \pi^+$ $\times$ B($\overline{K}_1(1400)^0 \to K^- \pi^+ \pi^0$)		(2.2 $\pm$ 0.6)	%	
Γ_{53}	$K^- \rho^+ \pi^+$ total		(3.1 $\pm$ 1.1)	%	
Γ_{54}	$K^- \rho^+ \pi^+$ 3-body		(1.1 $\pm$ 0.4)	%	
Γ_{55}	$\overline{K}^*(892)^0 \pi^+ \pi^0$ total $\times$ B($\overline{K}^*(892)^0 \to K^- \pi^+$)		(4.5 $\pm$ 0.9)	%	
Γ_{56}	$\overline{K}^*(892)^0 \pi^+ \pi^0$ 3-body $\times$ B($\overline{K}^*(892)^0 \to K^- \pi^+$)		(2.9 $\pm$ 0.9)	%	
Γ_{57}	$K^*(892)^- \pi^+ \pi^+$ 3-body $\times$ B($K^*(892)^- \to K^- \pi^0$)		(7 $\pm$ 3)	$\times 10^{-3}$	
Γ_{58}	$K^- \pi^+ \pi^+ \pi^0$ nonresonant	[e]	(1.2 $\pm$ 0.6)	%	
Γ_{59}	$\overline{K}^0 \pi^+ \pi^+ \pi^-$	[d]	(7.1 $\pm$ 1.0)	%	

Γ_{60}	$\overline{K}^0 a_1(1260)^+ \times B(a_1(1260)^+ \to \pi^+\pi^+\pi^-)$		(4.0 ± 0.9) %	
Γ_{61}	$\overline{K}_1(1400)^0\pi^+ \times B(\overline{K}_1(1400)^0 \to \overline{K}^0\pi^+\pi^-)$		(2.2 ± 0.6) %	
Γ_{62}	$K^*(892)^-\pi^+\pi^+$ 3-body $\times B(K^*(892)^- \to \overline{K}^0\pi^-)$		(1.4 ± 0.6) %	
Γ_{63}	$\overline{K}^0\rho^0\pi^+$ total		(4.3 ± 0.9) %	
Γ_{64}	$\overline{K}^0\rho^0\pi^+$ 3-body		$(5 \pm 5) \times 10^{-3}$	
Γ_{65}	$\overline{K}^0\pi^+\pi^+\pi^-$ nonresonant		$(9 \pm 4) \times 10^{-3}$	
Γ_{66}	$K^-3\pi^+\pi^-$	[d]	$(6.2 \pm 0.8) \times 10^{-3}$	S=1.3
Γ_{67}	$\overline{K}^*(892)^0\pi^+\pi^+\pi^- \times B(\overline{K}^*(892)^0 \to K^-\pi^+)$		$(2.1 \pm 0.8) \times 10^{-3}$	
Γ_{68}	$\overline{K}^*(892)^0\rho^0\pi^+ \times B(\overline{K}^*(892)^0 \to K^-\pi^+)$		$(2.0 \pm 0.5) \times 10^{-3}$	
Γ_{69}	$\overline{K}^*(892)^0\pi^+\pi^+\pi^-$ no-ρ $\times B(\overline{K}^*(892)^0 \to K^-\pi^+)$		$(2.9 \pm 1.1) \times 10^{-3}$	
Γ_{70}	$K^-\rho^0\pi^+\pi^+$		$(1.94 \pm 0.35) \times 10^{-3}$	S=1.1
Γ_{71}	$K^-3\pi^+\pi^-$ nonresonant		$(4.3 \pm 3.2) \times 10^{-4}$	
Γ_{72}	$K^-2\pi^+2\pi^0$			
Γ_{73}	$\overline{K}^0 2\pi^+\pi^-\pi^0$			
Γ_{74}	$\overline{K}^0 3\pi^+2\pi^-$			
Γ_{75}	$K^-3\pi^+\pi^-\pi^0$			
Γ_{76}	$\overline{K}^0\overline{K}^0K^+$		(1.8 ± 0.8) %	
Γ_{77}	$K^+K^-\overline{K}^0\pi^+$		$(5.5 \pm 1.4) \times 10^{-4}$	

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

Γ_{78}	$\overline{K}^0\rho^+$		(6.6 ± 2.5) %	
Γ_{79}	$\overline{K}^0 a_1(1260)^+$		(8.2 ± 1.7) %	
Γ_{80}	$\overline{K}^0 a_2(1320)^+$		$< 3 \times 10^{-3}$	CL=90%
Γ_{81}	$K_0^*(800)^0\pi^+$			
Γ_{82}	$\overline{K}^*(892)^0\pi^+$		(1.95 ± 0.19) %	
Γ_{83}	$\overline{K}^*(892)^0\rho^+$ total	[e]	(2.1 ± 1.4) %	
Γ_{84}	$\overline{K}^*(892)^0\rho^+$ S-wave	[e]	(1.7 ± 1.6) %	
Γ_{85}	$\overline{K}^*(892)^0\rho^+$ P-wave		$< 1 \times 10^{-3}$	CL=90%
Γ_{86}	$\overline{K}^*(892)^0\rho^+$ D-wave		$(10 \pm 7) \times 10^{-3}$	
Γ_{87}	$\overline{K}^*(892)^0\rho^+$ D-wave longitudinal		$< 7 \times 10^{-3}$	CL=90%
Γ_{88}	$\overline{K}_1(1270)^0\pi^+$		$< 7 \times 10^{-3}$	CL=90%
Γ_{89}	$\overline{K}_1(1400)^0\pi^+$		(5.0 ± 1.3) %	
Γ_{90}	$\overline{K}^*(1410)^0\pi^+$			
Γ_{91}	$\overline{K}_0^*(1430)^0\pi^+$		(3.8 ± 0.4) %	
Γ_{92}	$\overline{K}_2^*(1430)^0\pi^+$			
Γ_{93}	$\overline{K}^*(1680)^0\pi^+$		(1.47 ± 0.31) %	

Γ_{94}	$\overline{K}^*(892)^0 \pi^+ \pi^0$ total		$(\ 6.8\ \pm\ 1.4\ )\ \%$	
Γ_{95}	$\quad \overline{K}^*(892)^0 \pi^+ \pi^0$ 3-body	[e]	$(\ 4.3\ \pm\ 1.4\ )\ \%$	
Γ_{96}	$K^*(892)^- \pi^+ \pi^+$ total		—	
Γ_{97}	$\quad K^*(892)^- \pi^+ \pi^+$ 3-body		$(\ 2.1\ \pm\ 0.9\ )\ \%$	
Γ_{98}	$K^- \rho^+ \pi^+$ total		$(\ 3.1\ \pm\ 1.1\ )\ \%$	
Γ_{99}	$\quad K^- \rho^+ \pi^+$ 3-body		$(\ 1.1\ \pm\ 0.4\ )\ \%$	
Γ_{100}	$\overline{K}^0 \rho^0 \pi^+$ total		$(\ 4.3\ \pm\ 0.9\ )\ \%$	CL=90%
Γ_{101}	$\quad \overline{K}^0 \rho^0 \pi^+$ 3-body		$(\ 5\ \pm\ 5\ ) \times 10^{-3}$	
Γ_{102}	$\overline{K}^0 f_0(980) \pi^+$			
Γ_{103}	$\overline{K}^*(892)^0 \pi^+ \pi^+ \pi^-$		$(\ 3.2\ \pm\ 1.2\ ) \times 10^{-3}$	S=2.0
Γ_{104}	$\quad \overline{K}^*(892)^0 \rho^0 \pi^+$		$(\ 3.0\ \pm\ 0.7\ ) \times 10^{-3}$	S=1.3
Γ_{105}	$\quad \overline{K}^*(892)^0 \pi^+ \pi^+ \pi^-$ no-ρ		$(\ 4.4\ \pm\ 1.7\ ) \times 10^{-3}$	
Γ_{106}	$K^- \rho^0 \pi^+ \pi^+$		$(\ 1.94 \pm\ 0.35) \times 10^{-3}$	
Γ_{107}	$\quad \overline{K}^*(892)^0 a_1(1260)^+$		$(\ 9.1\ \pm\ 1.9\ ) \times 10^{-3}$	

Pionic modes

Γ_{108}	$\pi^+ \pi^0$		$(\ 2.6\ \pm\ 0.7\ ) \times 10^{-3}$	
Γ_{109}	$\pi^+ \pi^+ \pi^-$		$(\ 3.1\ \pm\ 0.4\ ) \times 10^{-3}$	
Γ_{110}	$\quad \sigma \pi^+$		$(\ 2.2\ \pm\ 0.5\ ) \times 10^{-3}$	
Γ_{111}	$\quad \rho^0 \pi^+$		$(\ 1.05 \pm\ 0.18) \times 10^{-3}$	
Γ_{112}	$\quad f_0(980) \pi^+ \times$ B$(f_0 \to \pi^+ \pi^-)$	[f]	$(\ 1.9\ \pm\ 0.5\ ) \times 10^{-4}$	
Γ_{113}	$\quad f_2(1270) \pi^+ \times$ B$(f_2 \to \pi^+ \pi^-)$		$(\ 6.1\ \pm\ 1.1\ ) \times 10^{-4}$	
Γ_{114}	$\quad f_0(1370) \pi^+ \times$ B$(f_0(1370) \to \pi^+ \pi^-)$			
Γ_{115}	$\quad \rho(1450)^0 \pi^+ \times$ B$(\rho(1450)^0 \to \pi^+ \pi^-)$			
Γ_{116}	$\quad \pi^+ \pi^+ \pi^-$ nonresonant		$(\ 2.4\ \pm\ 2.1\ ) \times 10^{-4}$	
Γ_{117}	$\pi^+ \pi^+ \pi^- \pi^0$		—	
Γ_{118}	$\quad \eta \pi^+ \times$ B$(\eta \to \pi^+ \pi^- \pi^0)$		$(\ 6.8\ \pm\ 1.4\ ) \times 10^{-4}$	
Γ_{119}	$\quad \omega \pi^+ \times$ B$(\omega \to \pi^+ \pi^- \pi^0)$		$< 6 \times 10^{-3}$	CL=90%
Γ_{120}	$3\pi^+ 2\pi^-$		$(\ 1.82 \pm\ 0.25) \times 10^{-3}$	S=1.2
Γ_{121}	$3\pi^+ 2\pi^- \pi^0$			

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

Γ_{122}	$\eta \pi^+$		$(\ 3.0\ \pm\ 0.6\ ) \times 10^{-3}$	
Γ_{123}	$\rho^0 \pi^+$		$(\ 1.05 \pm\ 0.18) \times 10^{-3}$	
Γ_{124}	$\omega \pi^+$		$< 7 \times 10^{-3}$	CL=90%
Γ_{125}	$\eta \rho^+$		$< 7 \times 10^{-3}$	CL=90%
Γ_{126}	$\eta'(958) \pi^+$		$(\ 5.1\ \pm\ 1.0\ ) \times 10^{-3}$	
Γ_{127}	$\eta'(958) \rho^+$		$< 5 \times 10^{-3}$	CL=90%
Γ_{128}	$f_2(1270) \pi^+$		$(\ 1.08 \pm\ 0.20) \times 10^{-3}$	

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

Γ_{129}	$K^+\overline{K}^0$		$(5.9 \pm 0.6) \times 10^{-3}$	S=1.2
Γ_{130}	$K^+K^-\pi^+$	[d]	$(8.9 \pm 0.8) \times 10^{-3}$	
Γ_{131}	$\phi\pi^+ \times$ B$(\phi \to K^+K^-)$		$(3.1 \pm 0.3) \times 10^{-3}$	
Γ_{132}	$K^+\overline{K}^*(892)^0 \times$ B$(\overline{K}^{*0} \to K^-\pi^+)$		$(2.9 \pm 0.4) \times 10^{-3}$	
Γ_{133}	$K^+K^-\pi^+$ nonresonant		$(4.6 \pm 0.9) \times 10^{-3}$	
Γ_{134}	$K^0\overline{K}^0\pi^+$		—	
Γ_{135}	$K^*(892)^+\overline{K}^0 \times$ B$(K^{*+} \to K^0\pi^+)$		(2.1 ± 0.9) %	
Γ_{136}	$K^+K^-\pi^+\pi^0$		—	
Γ_{137}	$\phi\pi^+\pi^0 \times$ B$(\phi \to K^+K^-)$		(1.1 ± 0.5) %	
Γ_{138}	$\phi\rho^+ \times$ B$(\phi \to K^+K^-)$		$< 7 \times 10^{-3}$	CL=90%
Γ_{139}	$K^+K^-\pi^+\pi^0$ non-ϕ		$(1.5 {}^{+0.7}_{-0.6})$ %	
Γ_{140}	$K^+\overline{K}^0\pi^+\pi^-$		$(4.0 \pm 0.7) \times 10^{-3}$	
Γ_{141}	$K^0K^-\pi^+\pi^+$		$(5.5 \pm 0.8) \times 10^{-3}$	
Γ_{142}	$K^*(892)^+\overline{K}^*(892)^0 \times$ B$^2(K^*(892)^+ \to K^0\pi^+)$		(1.2 ± 0.5) %	
Γ_{143}	$K^0K^-\pi^+\pi^+$(non-$K^{*+}\overline{K}^{*0}$)		$< 7.9 \times 10^{-3}$	CL=90%
Γ_{144}	$K^+K^-\pi^+\pi^+\pi^-$		$(2.5 \pm 1.3) \times 10^{-4}$	
Γ_{145}	$K^+K^-\pi^+\pi^+\pi^-$ nonresonant			

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

Γ_{146}	$\phi\pi^+$	$(6.2 \pm 0.6) \times 10^{-3}$	
Γ_{147}	$\phi\pi^+\pi^0$	(2.3 ± 1.0) %	
Γ_{148}	$\phi\rho^+$	< 1.5 %	CL=90%
Γ_{149}	$\phi\pi^+\pi^+\pi^-$		
Γ_{150}	$K^+\overline{K}^*(892)^0$	$(4.3 \pm 0.6) \times 10^{-3}$	
Γ_{151}	$K^*(892)^+\overline{K}^0$	(3.1 ± 1.4) %	
Γ_{152}	$K^*(892)^+\overline{K}^*(892)^0$	(2.6 ± 1.1) %	

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

Γ_{153}	$K^+\pi^+\pi^-$	*DC*		$(7.0 \pm 1.5) \times 10^{-4}$	
Γ_{154}	$K^+\rho^0$	*DC*		$(2.6 \pm 1.2) \times 10^{-4}$	
Γ_{155}	$K^*(892)^0\pi^+$	*DC*	[g]	$(3.7 \pm 1.7) \times 10^{-4}$	
Γ_{156}	$K^+\pi^+\pi^-$ nonresonant	*DC*		$(2.5 \pm 1.2) \times 10^{-4}$	
Γ_{157}	$K^+K^+K^-$	*DC*		$(8.7 \pm 2.1) \times 10^{-5}$	
Γ_{158}	ϕK^+	*DC*	[g]	$< 1.3 \times 10^{-4}$	CL=90%
Γ_{159}	$\pi^+e^+e^-$	*C1*		$< 5.2 \times 10^{-5}$	CL=90%
Γ_{160}	$\pi^+\mu^+\mu^-$	*C1*		$< 8.8 \times 10^{-6}$	CL=90%
Γ_{161}	$\rho^+\mu^+\mu^-$	*C1*		$< 5.6 \times 10^{-4}$	CL=90%

Γ_{162}	$K^+ e^+ e^-$		[h] $<$	2.0	$\times 10^{-4}$	CL=90%
Γ_{163}	$K^+ \mu^+ \mu^-$		[h] $<$	9.2	$\times 10^{-6}$	CL=90%
Γ_{164}	$\pi^+ e^\pm \mu^\mp$	LF	[i] $<$	3.4	$\times 10^{-5}$	CL=90%
Γ_{165}	$\pi^+ e^+ \mu^-$					
Γ_{166}	$\pi^+ e^- \mu^+$					
Γ_{167}	$K^+ e^\pm \mu^\mp$	LF	[i] $<$	6.8	$\times 10^{-5}$	CL=90%
Γ_{168}	$K^+ e^+ \mu^-$					
Γ_{169}	$K^+ e^- \mu^+$					
Γ_{170}	$\pi^- e^+ e^+$	L	$<$	9.6	$\times 10^{-5}$	CL=90%
Γ_{171}	$\pi^- \mu^+ \mu^+$	L	$<$	4.8	$\times 10^{-6}$	CL=90%
Γ_{172}	$\pi^- e^+ \mu^+$	L	$<$	5.0	$\times 10^{-5}$	CL=90%
Γ_{173}	$\rho^- \mu^+ \mu^+$	L	$<$	5.6	$\times 10^{-4}$	CL=90%
Γ_{174}	$K^- e^+ e^+$	L	$<$	1.2	$\times 10^{-4}$	CL=90%
Γ_{175}	$K^- \mu^+ \mu^+$	L	$<$	1.3	$\times 10^{-5}$	CL=90%
Γ_{176}	$K^- e^+ \mu^+$	L	$<$	1.3	$\times 10^{-4}$	CL=90%
Γ_{177}	$K^*(892)^- \mu^+ \mu^+$	L	$<$	8.5	$\times 10^{-4}$	CL=90%

Γ_{178} A dummy mode used by the fit. (31 ± 5) %

[a] This is a weighted average of $D^\pm$ (44%) and D^0 (56%) branching fractions. See "D^+ and $D^0 \rightarrow$ (η anything) / (total D^+ and D^0)" under "D^+ Branching Ratios" in these Particle Listings.

[b] This value averages the e^+ and μ^+ branching fractions, after making a small phase-space adjustment to the μ^+ fraction to be able to use it as an e^+ fraction; hence our ℓ^+ here is really an e^+.

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

[d] 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.

[e] The two experiments measuring this fraction are in serious disagreement. See the Particle Listings.

[f] This value includes only $\pi^+\pi^-$ decays of the intermediate resonance, because branching fractions of this resonance are not known.

[g] Unseen decay modes of the resonance are included.

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

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

CONSTRAINED FIT INFORMATION

An overall fit to 33 branching ratios uses 58 measurements and one constraint to determine 20 parameters. The overall fit has a $\chi^2 = 47.9$ for 39 degrees of freedom.

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

	x_{11}	x_{13}	x_{18}	x_{27}	x_{28}	x_{38}	x_{39}	x_{46}	x_{50}	x_{59}
x_{13}	6									
x_{18}	6	2								
x_{27}	17	33	7							
x_{28}	33	13	19	39						
x_{38}	38	14	16	42	85					
x_{39}	38	15	17	44	88	96				
x_{46}	0	0	0	0	0	0	0			
x_{50}	9	3	4	10	20	22	23	0		
x_{59}	11	4	5	13	27	29	30	0	18	
x_{66}	19	8	9	22	45	49	51	0	12	15
x_{70}	13	5	6	15	31	34	35	0	8	11
x_{82}	25	10	11	29	58	63	66	0	15	20
x_{89}	6	2	3	7	14	15	16	0	31	37
x_{97}	3	1	1	4	8	8	9	0	29	13
x_{103}	7	3	3	8	16	18	19	0	4	6
x_{104}	9	4	4	11	22	24	25	0	6	8
x_{120}	18	7	8	21	42	46	48	0	11	14
x_{129}	23	9	10	27	54	60	62	0	14	19
x_{178}	−37	−30	−12	−42	−53	−56	−58	−57	−46	−46

	x_{66}	x_{70}	x_{82}	x_{89}	x_{97}	x_{103}	x_{104}	x_{120}	x_{129}
x_{70}	68								
x_{82}	34	23							
x_{89}	8	5	10						
x_{97}	4	3	6	12					
x_{103}	28	19	12	3	2				
x_{104}	34	23	16	4	2	56			
x_{120}	88	60	31	7	4	25	30		
x_{129}	31	21	40	10	5	11	15	29	
x_{178}	−32	−22	−40	−46	−32	−14	−17	−30	−36

D^+ BRANCHING RATIOS

See the "Note on D Mesons" above. Some now-obsolete measurements have been omitted from these Listings.

—— c-quark decays ——

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

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

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

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

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.088±0.005 OUR AVERAGE					
0.093±0.009±0.009	88	KAYIS-TOPAK...	02	CHRS	ν_μ emulsion
$0.095 \pm 0.007^{+0.014}_{-0.013}$	2829	ASTIER	00D	NOMD	$\nu_\mu \text{Fe} \to \mu^- \mu^+ X$
$0.090 \pm 0.007^{+0.007}_{-0.006}$	476	[4] ABBIENDI	99K	OPAL	$Z^0 \to c\overline{c}$
$0.086 \pm 0.017^{+0.008}_{-0.007}$	69	[5] ALBRECHT	92F	ARG	$e^+e^- \approx$ 10 GeV
0.078±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
$0.082 \pm 0.012^{+0.02}_{-0.01}$		ALTHOFF	84G	TASS	e^+e^- 34.5 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.089±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 $D^*(2010)^+ \to D^0\pi^+$ decays in $Z^0 \to c\overline{c}$.

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

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

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

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

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

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

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

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

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

Inclusive modes

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.172±0.019 OUR AVERAGE					
$0.20\ ^{+0.09}_{-0.07}$		AGUILAR-...	87E	HYBR	πp, $p p$ 360, 400 GeV
0.170±0.019±0.007	158	BALTRUSAIT...	85B	MRK3	$e^+ e^-$ 3.77 GeV
0.168±0.064	23	SCHINDLER	81	MRK2	$e^+ e^-$ 3.771 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.220\ ^{+0.044}_{-0.022}$		BACINO	80	DLCO	$e^+ e^-$ 3.77 GeV

D^+ and $D^0 \to (e^+ \text{anything}) / (\text{total } D^+ \text{ and } D^0)$

If measured at the $\psi(3770)$, this quantity is a weighted average of D^+ (44%) and D^0 (56%) branching fractions. Only experiments at $E_{\text{cm}} = 3.77$ GeV are included in the average here. We don't put this result in the Summary Table.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.110±0.011 OUR AVERAGE	Error includes scale factor of 1.1.				
0.117±0.011	295	BALTRUSAIT...	85B	MRK3	$e^+ e^-$ 3.77 GeV
0.10 ±0.032		[9] SCHINDLER	81	MRK2	$e^+ e^-$ 3.771 GeV
0.072±0.028		FELLER	78	MRK1	$e^+ e^-$ 3.772 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.096±0.004±0.011	2207	[10] ALBRECHT	96C	ARG	$e^+ e^- \approx$ 10 GeV
0.134±0.015±0.010		[11] ABE	93E	VNS	$e^+ e^-$ 58 GeV
$0.098\pm0.009\ ^{+0.006}_{-0.005}$	240	[12] ALBRECHT	92F	ARG	$e^+ e^- \approx$ 10 GeV
0.096±0.007±0.015		[13] ONG	88	MRK2	$e^+ e^-$ 29 GeV
$0.116\ ^{+0.011}_{-0.009}$		[13] PAL	86	DLCO	$e^+ e^-$ 29 GeV
0.091±0.009±0.013		[13] AIHARA	85	TPC	$e^+ e^-$ 29 GeV
0.092±0.022±0.040		[13] ALTHOFF	84J	TASS	$e^+ e^-$ 34.6 GeV
0.091±0.013		[13] KOOP	84	DLCO	See PAL 86
0.08 ±0.015		[14] BACINO	79	DLCO	$e^+ e^-$ 3.772 GeV

[9] Isolates D^+ and $D^0 \to e^+ X$ and weights for relative production (44%–56%).

[10] ALBRECHT 96C uses e^- in the hemisphere opposite to $D^{*+} \to D^0 \pi^+$ events.

[11] ABE 93E also measures forward-backward asymmetries and fragmentation functions for c and b quarks.

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

[13] Average BR for charm $\to e^+ X$. Unlike at $E_{\text{cm}} = 3.77$ GeV, the admixture of charmed mesons is unknown.

[14] Not independent of BACINO 80 measurements of $\Gamma(e^+ \text{anything})/\Gamma_{\text{total}}$ for the D^+ and D^0 separately.

$\Gamma(K^- \text{anything})/\Gamma_{total}$ — Γ_2/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.275±0.024 OUR AVERAGE					
$0.278^{+0.036}_{-0.031}$		[15] BARLAG	92C	ACCM	π^- Cu 230 GeV
0.271±0.023±0.024		COFFMAN	91	MRK3	e^+e^- 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.17 ±0.07		AGUILAR-...	87E	HYBR	πp, pp 360, 400 GeV
$0.16^{+0.08}_{-0.07}$		AGUILAR-...	86B	HYBR	See AGUILAR-BENITEZ 87E
0.19 ±0.05	26	SCHINDLER	81	MRK2	e^+e^- 3.771 GeV
0.10 ±0.07	3	VUILLEMIN	78	MRK1	e^+e^- 3.772 GeV

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

$[\Gamma(\overline{K}^0 \text{anything}) + \Gamma(K^0 \text{anything})]/\Gamma_{total}$ — Γ_3/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.612±0.065±0.043		COFFMAN	91	MRK3	e^+e^- 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.52 ±0.18	15	SCHINDLER	81	MRK2	e^+e^- 3.771 GeV
0.39 ±0.29	3	VUILLEMIN	78	MRK1	e^+e^- 3.772 GeV

$\Gamma(K^+ \text{anything})/\Gamma_{total}$ — Γ_4/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.055±0.013±0.009		COFFMAN	91	MRK3	e^+e^- 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.08^{+0.06}_{-0.05}$		AGUILAR-...	87E	HYBR	πp, pp 360, 400 GeV
0.06 ±0.04	12	SCHINDLER	81	MRK2	e^+e^- 3.771 GeV
0.06 ±0.06	2	VUILLEMIN	78	MRK1	e^+e^- 3.772 GeV

D^+ and $D^0 \to$ (η anything) / (total D^+ and D^0)

If measured at the $\psi(3770)$, this quantity is a weighted average of D^+ (44%) and D^0 (56%) branching fractions. Only the experiment at E_{cm} = 3.77 GeV is used.

VALUE	DOCUMENT ID		TECN	COMMENT
<0.13	PARTRIDGE	81	CBAL	e^+e^- 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.02	[16] BRANDELIK	79	DASP	e^+e^- 4.03 GeV

[16] The BRANDELIK 79 result is based on the absence of an η signal at E_{cm} = 4.03 GeV. PARTRIDGE 81 observes a substantially higher η cross section at 4.03 GeV.

$\Gamma(\phi \text{ anything})/\Gamma_{total}$ — Γ_6/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.018	90	[17] BAI	00C	BES	$e^+e^- \to D\overline{D}^*$, $D^*\overline{D}^*$

[17] BAI 00C finds the average (ϕ anything) branching fraction for the 4.03-GeV mix of D^+ and D^0 mesons to be (1.34 ± 0.52 ± 0.12)%.

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.016	90	BAI	00C	BES	$e^+e^- \to D\overline{D}^*$, $D^*\overline{D}^*$

Leptonic and semileptonic modes

$\Gamma(\mu^+\nu_\mu)/\Gamma_{total}$ — Γ_9/Γ

See the "Note on Pseudoscalar-Meson Decay Constants" in the Listings for the $\pi^\pm$.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$0.0008\ ^{+0.0016}_{-0.0005}\ ^{+0.0005}_{-0.0002}$		1	[18] BAI	98B	BES	$e^+e^- \to D^{*+}D^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.00072	90		ADLER	88B	MRK3	e^+e^- 3.77 GeV
<0.02	90	0	[19] AUBERT	83	SPEC	μ^+ Fe, 250 GeV

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

[19] AUBERT 83 obtains an upper limit 0.014 assuming the final state contains equal amounts of (D^+,D^-), $(D^+,\overline{D}^0)$, (D^-,D^0), and $(D^0,\overline{D}^0)$. We quote the limit they get under more general assumptions.

$\Gamma(\overline{K}^0\ell^+\nu_\ell)/\Gamma_{total}$ — Γ_{10}/Γ

We average our $\overline{K}^0 e^+\nu_e$ and $\overline{K}^0\mu^+\nu_\mu$ branching fractions, after multiplying the latter by a phase-space factor of 1.03 to be able to use it with the $\overline{K}^0 e^+\nu_e$ fraction. Hence our ℓ^+ here is really an e^+.

VALUE	DOCUMENT ID		COMMENT
0.068±0.008 OUR AVERAGE			
0.067 ± 0.009	PDG	04	Our $\Gamma(\overline{K}^0 e^+\nu_e)/\Gamma_{total}$
$0.072^{+0.031}_{-0.021}$	PDG	04	$1.03\times$ our $\Gamma(\overline{K}^0\mu^+\nu_\mu)/\Gamma_{total}$

$\Gamma(\overline{K}^0 e^+\nu_e)/\Gamma_{total}$ — Γ_{11}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.067±0.009 OUR FIT					
$0.06\ ^{+0.022}_{-0.013}\pm0.007$	13	BAI	91	MRK3	$e^+e^- \approx 3.77$ GeV

$\Gamma(\overline{K}^0 e^+\nu_e)/\Gamma(\overline{K}^0\pi^+)$ — Γ_{11}/Γ_{38}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
2.37±0.31 OUR FIT					
2.60±0.35±0.26	186	[20] BEAN	93C	CLE2	$e^+e^- \approx \Upsilon(4S)$

[20] BEAN 93C uses $\overline{K}^0\mu^+\nu_\mu$ as well as $\overline{K}^0 e^+\nu_e$ events and makes a small phase-space adjustment to the number of the μ^+ events to use them as e^+ events.

$\Gamma(\overline{K}^0 e^+\nu_e)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{11}/Γ_{39}

VALUE	DOCUMENT ID		TECN	COMMENT
0.72±0.09 OUR FIT				
0.66±0.09±0.14	ANJOS	91C	E691	γ Be 80–240 GeV

$\Gamma(\overline{K}^0\mu^+\nu_\mu)/\Gamma_{total}$ — Γ_{12}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.07\ ^{+0.028}_{-0.016}\pm0.012$	14	BAI	91	MRK3	$e^+e^- \approx 3.77$ GeV

$\Gamma(\overline{K}^0 \mu^+ \nu_\mu)/\Gamma(\mu^+ \text{anything})$ — Γ_{12}/Γ_8

VALUE	EVTS	DOCUMENT ID		COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.76±0.06	84	[21] AOKI	88	π^- emulsion

[21] From topological branching ratios in emulsion with an identified muon.

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$0.045^{+0.010}_{-0.008}$ OUR FIT Error includes scale factor of 1.1.						
$0.035^{+0.012}_{-0.007}\pm0.004$		14	[22] BAI	91	MRK3	$e^+e^- \approx$ 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.057	90		[23] AGUILAR-...	87F	HYBR	πp, pp 360, 400 GeV

[22] BAI 91 finds that a fraction $0.79^{+0.15}_{-0.17}{}^{+0.09}_{-0.03}$ of combined D^+ and D^0 decays to $\overline{K}\pi e^+\nu_e$ (24 events) are $\overline{K}^*(892) e^+ \nu_e$.

[23] AGUILAR-BENITEZ 87F computes the branching fraction using topological normalization.

$\Gamma(\overline{K}^*(892)^0 \ell^+ \nu_\ell)/\Gamma_{\text{total}}$ — Γ_{26}/Γ

We average our $\overline{K}^{*0} e^+ \nu_e$ and $\overline{K}^{*0} \mu^+ \nu_\mu$ branching fractions, after multiplying the latter by a phase-space factor of 1.05 to be able to use it with the $\overline{K}^{*0} e^+ \nu_e$ fraction. Hence our ℓ^+ here is really an e^+.

VALUE	DOCUMENT ID		COMMENT
0.0573±0.0035 OUR AVERAGE			
0.055 ±0.007	PDG	04	Our $\Gamma(\overline{K}^{*0} e^+ \nu_e)/\Gamma_{\text{total}}$
0.058 ±0.004	PDG	04	1.05 × our $\Gamma(\overline{K}^{*0} \mu^+ \nu_\mu)/\Gamma_{\text{total}}$

$\Gamma(\overline{K}^*(892)^0 e^+ \nu_e)/\Gamma(K^- \pi^+ e^+ \nu_e)$ — Γ_{27}/Γ_{13}

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

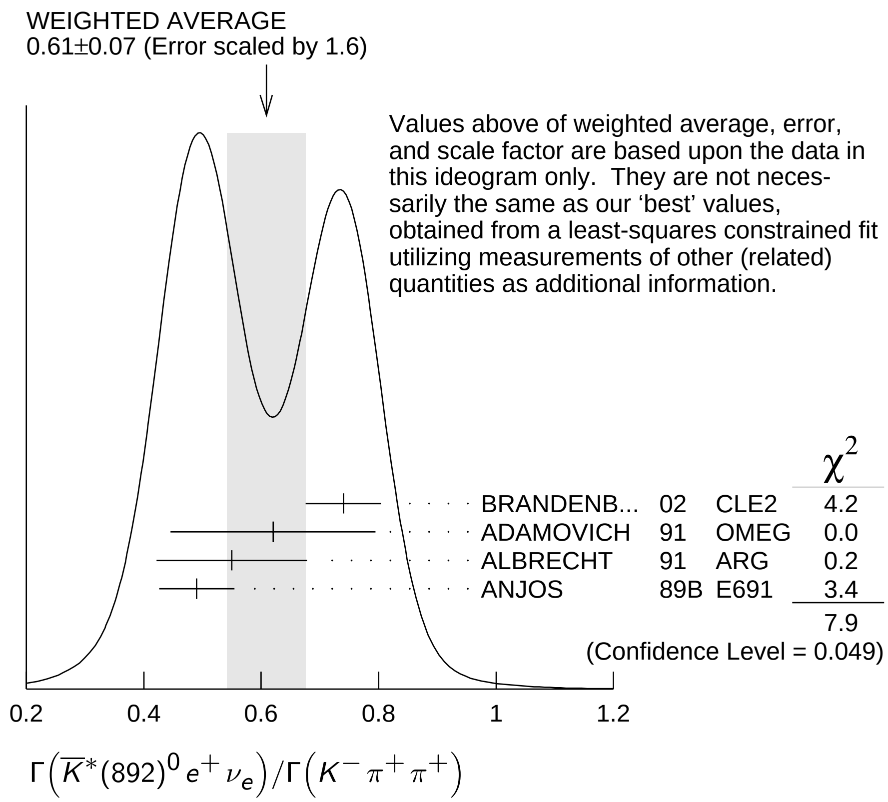
VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$1.23^{+0.23}_{-0.26}$ OUR FIT Error includes scale factor of 1.1.					
1.0 ±0.3	35	ADAMOVICH	91	OMEG	π^- 340 GeV

$\Gamma(\overline{K}^*(892)^0 e^+ \nu_e)/\Gamma(K^- \pi^+ \pi^+)$ — Γ_{27}/Γ_{39}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.60±0.07 OUR FIT Error includes scale factor of 1.8.					
0.61±0.07 OUR AVERAGE Error includes scale factor of 1.6. See the ideogram below.					
0.74±0.04±0.05		BRANDENB...	02	CLE2	$e^+e^- \approx \Upsilon(4S)$
0.62±0.15±0.09	35	ADAMOVICH	91	OMEG	π^- 340 GeV
0.55±0.08±0.10	880	ALBRECHT	91	ARG	$e^+e^- \approx$ 10.4 GeV
0.49±0.04±0.05		ANJOS	89B	E691	Photoproduction
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.67±0.09±0.07	710	[24] BEAN	93C	CLE2	See BRANDENBURG 02

[24] BEAN 93C uses $\overline{K}^{*0}\mu^+\nu_\mu$ as well as $\overline{K}^{*0}e^+\nu_e$ events and makes a small phase-space adjustment to the number of the μ^+ events to use them as e^+ events.



$\Gamma(K^-\pi^+e^+\nu_e$ nonresonant$)/\Gamma_{total}$ — Γ_{15}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.007	90	[25] ANJOS	89B	E691	Photoproduction

[25] ANJOS 89B assumes a $\Gamma(D^+ \to K^-\pi^+\pi^+)/\Gamma_{total} = 9.1 \pm 1.3 \pm 0.4\%$.

$\Gamma(K^-\pi^+\mu^+\nu_\mu)/\Gamma_{total}$ — $\Gamma_{16}/\Gamma = (\Gamma_{18}+\frac{2}{3}\Gamma_{28})/\Gamma$

The value here is calculated from $\frac{2}{3}$B($\overline{K}^*(892)^0\mu^+\nu_\mu$) + B($K^-\pi^+\mu^+\nu_\mu$ nonresonant).

VALUE	DOCUMENT ID
0.0400±0.0032 OUR FIT	

$\Gamma(\overline{K}^*(892)^0\mu^+\nu_\mu)/\Gamma_{total}$ — Γ_{28}/Γ

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0325±0.0071±0.0075	224	[26] KODAMA	92C	E653	π^- emulsion 600 GeV

[26] KODAMA 92C measures $\Gamma(D^+ \to \overline{K}^{*0}\mu^+\nu_\mu)/\Gamma(D^0 \to K^-\mu^+\nu_\mu) = 0.43 \pm 0.09 \pm 0.09$ and then uses $\Gamma(D^0 \to K^-\mu^+\nu_\mu) = (7.0 \pm 0.7) \times 10^{10}\ \mathrm{s}^{-1}$ to get the quoted branching fraction. See also the footnote to KODAMA 92C in the next data block.

$\Gamma(\overline{K}^*(892)^0 \mu^+ \nu_\mu)/\Gamma(K^- \pi^+ \pi^+)$ — Γ_{28}/Γ_{39}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.597±0.021 OUR FIT					
0.597±0.022 OUR AVERAGE					
0.72 ±0.10 ±0.05		BRANDENB...	02	CLE2	$e^+ e^- \approx \Upsilon(4S)$
0.602±0.010±0.021	12k	[27] LINK	02J	FOCS	γ nucleus, $\approx$ 180 GeV
0.56 ±0.04 ±0.06	875	FRABETTI	93E	E687	γ Be $\overline{E}_\gamma \approx$ 200 GeV
0.46 ±0.07 ±0.08	224	[28] KODAMA	92C	E653	π^- emulsion 600 GeV

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

[28] KODAMA 92C also uses the same $\overline{K}^{*0} \mu^+ \nu_\mu$ events normalizing instead with $D^0 \to K^- \mu^+ \nu_\mu$ events, as reported in the preceding data block.

$\Gamma(K^- \pi^+ \mu^+ \nu_\mu \text{ nonresonant})/\Gamma(K^- \pi^+ \mu^+ \nu_\mu)$ — $\Gamma_{18}/\Gamma_{16} = \Gamma_{18}/(\Gamma_{18}+\frac{2}{3}\Gamma_{28})$

VALUE	DOCUMENT ID		TECN	COMMENT
0.083±0.029 OUR FIT				
0.083±0.029	FRABETTI	93E	E687	< 0.12 (90% CL)

$\Gamma(\overline{K}^0 \pi^+ \pi^- e^+ \nu_e)/\Gamma_{\text{total}}$ — Γ_{19}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.022^{+0.047}_{-0.006}\pm0.004$	1	[29] AGUILAR-...	87F	HYBR	πp, $p p$ 360, 400 GeV

[29] AGUILAR-BENITEZ 87F computes the branching fraction using topological normalization.

$\Gamma(K^- \pi^+ \pi^0 e^+ \nu_e)/\Gamma_{\text{total}}$ — Γ_{20}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.044^{+0.052}_{-0.013}\pm0.007$	2	[30] AGUILAR-...	87F	HYBR	πp, $p p$ 360, 400 GeV

[30] AGUILAR-BENITEZ 87F computes the branching fraction using topological normalization.

$\Gamma((\overline{K}^*(892)\pi)^0 e^+ \nu_e)/\Gamma_{\text{total}}$ — Γ_{21}/Γ

Unseen decay modes of the $\overline{K}^*(892)$ are included.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.012	90	ANJOS	92	E691	Photoproduction

$\Gamma((\overline{K}\pi\pi)^0 e^+ \nu_e \text{ non-}\overline{K}^*(892))/\Gamma_{\text{total}}$ — Γ_{22}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.009	90	ANJOS	92	E691	Photoproduction

$\Gamma(K^- \pi^+ \pi^0 \mu^+ \nu_\mu)/\Gamma(K^- \pi^+ \mu^+ \nu_\mu)$ — $\Gamma_{23}/\Gamma_{16} = \Gamma_{23}/(\Gamma_{18}+\frac{2}{3}\Gamma_{28})$

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

$\Gamma(\overline{K}_1(1270)^0 \mu^+ \nu_\mu)/\Gamma(\overline{K}^*(892)^0 \mu^+ \nu_\mu)$ — Γ_{29}/Γ_{28}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.78	95	ABE	99P	CDF	$\overline{p}p$ 1.8 TeV

$\Gamma(\overline{K}^*(1410)^0 \mu^+ \nu_\mu)/\Gamma(\overline{K}^*(892)^0 \mu^+ \nu_\mu)$ — Γ_{30}/Γ_{28}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.60	95	ABE	99P	CDF	$\overline{p}p$ 1.8 TeV

$\Gamma(\overline{K}_2^*(1430)^0 \mu^+ \nu_\mu)/\Gamma(\overline{K}^*(892)^0 \mu^+ \nu_\mu)$ — Γ_{31}/Γ_{28}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.19	95	ABE	99P	CDF	$\overline{p}p$ 1.8 TeV

$\Gamma(\pi^0 \ell^+ \nu_\ell)/\Gamma(\overline{K}^0 \ell^+ \nu_\ell)$ — Γ_{24}/Γ_{10}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.046±0.014±0.017	100	[31] BARTELT	97	CLE2	$e^+e^- \approx \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.085±0.027±0.014	53	[32] ALAM	93	CLE2	See BARTELT 97

[31] BARTELT 97 thus directly measures the product of ratios squared of CKM matrix elements and form factors at q^2=0: $|V_{cd}/V_{cs}|^2 \cdot |f_+^\pi(0)/f_+^K(0)|^2 = 0.046 \pm 0.014 \pm 0.017$.

[32] ALAM 93 thus directly measures the product of ratios squared of CKM matrix elements and form factors at q^2=0: $|V_{cd}/V_{cs}|^2 \cdot |f_+^\pi(0)/f_+^K(0)|^2 = 0.085 \pm 0.027 \pm 0.014$.

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.057	90	[33] AGUILAR-...	87F	HYBR	πp, pp 360, 400 GeV

[33] AGUILAR-BENITEZ 87F computes the branching fraction using topological normalization.

$\Gamma(\rho^0 e^+ \nu_e)/\Gamma_{\text{total}}$ — Γ_{32}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0037	90	BAI	91	MRK3	$e^+e^- \approx$ 3.77 GeV

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.045±0.014±0.009	49	[34] AITALA	97	E791	π^- nucleus, 500 GeV

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.061±0.014 OUR AVERAGE					
0.051±0.015±0.009	54	[35] AITALA	97	E791	π^- nucleus, 500 GeV
0.079±0.019±0.013	39	[36] FRABETTI	97	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.044^{+0.031}_{-0.025}\pm0.014$	4	[37] KODAMA	93C	E653	π^- emulsion 600 GeV

[35] AITALA 97 explicitly subtracts $D^+ \rightarrow \eta' \mu^+ \nu_\mu$ and other backgrounds to get this result.
[36] 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.
[37] This KODAMA 93C result is based on a final signal of $4.0^{+2.8}_{-2.3} \pm 1.3$ events; the estimates of backgrounds that affect this number are somewhat model dependent.

$\Gamma(\phi e^+ \nu_e)/\Gamma_{total}$ — Γ_{34}/Γ

Decay modes of the ϕ not included in the search are corrected for.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0209	90	BAI	91	MRK3	$e^+ e^- \approx$ 3.77 GeV

$\Gamma(\phi \mu^+ \nu_\mu)/\Gamma_{total}$ — Γ_{35}/Γ

Decay modes of the ϕ not included in the search are corrected for.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0372	90	BAI	91	MRK3	$e^+ e^- \approx$ 3.77 GeV

$\Gamma(\eta \ell^+ \nu_\ell)/\Gamma(\pi^0 \ell^+ \nu_\ell)$ — Γ_{36}/Γ_{24}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.5	90	BARTELT	97	CLE2	$e^+ e^- \approx \Upsilon(4S)$

$\Gamma(\eta'(958) \mu^+ \nu_\mu)/\Gamma(\overline{K}^*(892)^0 \mu^+ \nu_\mu)$ — Γ_{37}/Γ_{28}

Decay modes of the $\eta'(958)$ not included in the search are corrected for.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.20	90	KODAMA	93B	E653	π^- emulsion 600 GeV

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

$\Gamma(\overline{K}^0 \pi^+)/\Gamma_{total}$ — Γ_{38}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0282±0.0019 OUR FIT					
0.032 ±0.004 OUR AVERAGE					
0.032 ±0.005 ±0.002	161	ADLER	88C	MRK3	$e^+ e^-$ 3.77 GeV
0.033 ±0.009	36	[38] SCHINDLER	81	MRK2	$e^+ e^-$ 3.771 GeV
0.033 ±0.013	17	[39] PERUZZI	77	MRK1	$e^+ e^-$ 3.77 GeV

[38] SCHINDLER 81 (MARK-2) measures $\sigma(e^+ e^- \rightarrow \psi(3770)) \times$ branching fraction to be 0.14 ± 0.03 nb. We use the MARK-3 (ADLER 88C) value of $\sigma = 4.2 \pm 0.6 \pm 0.3$ nb.
[39] PERUZZI 77 (MARK-1) measures $\sigma(e^+ e^- \rightarrow \psi(3770)) \times$ branching fraction to be 0.14 ± 0.05 nb. We use the MARK-3 (ADLER 88C) value of $\sigma = 4.2 \pm 0.6 \pm 0.3$ nb.

$\Gamma(\overline{K}^0 \pi^+)/\Gamma(K^- \pi^+ \pi^+)$ — Γ_{38}/Γ_{39}

It is generally assumed for modes such as $D^+ \rightarrow \overline{K}^0 \pi^+$ that

$$\Gamma(D^+ \rightarrow \overline{K}^0 \pi^+) = 2\Gamma(D^+ \rightarrow K^0_S \pi^+);$$

it is the latter Γ that is actually measured. BIGI 95 points out that interference between Cabibbo-allowed and doubly Cabibbo-suppressed amplitudes, where both occur, could invalidate this assumption by a few percent.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.306 ±0.006 OUR FIT					
0.307 ±0.005 OUR AVERAGE					
0.3060±0.0046±0.0032	10.6k	LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV
0.348 ±0.024 ±0.022	473	[40] BISHAI	97	CLE2	$e^+ e^- \approx \Upsilon(4S)$
0.274 ±0.030 ±0.031	264	ANJOS	90C	E691	Photoproduction

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.092±0.006 OUR FIT					
0.091±0.007 OUR AVERAGE					
0.093±0.006±0.008	1502	[41] BALEST	94	CLE2	$e^+e^- \approx \Upsilon(4S)$
0.091±0.013±0.004	1164	ADLER	88C	MRK3	e^+e^- 3.77 GeV
0.091±0.019	239	[42] SCHINDLER	81	MRK2	e^+e^- 3.771 GeV
0.086±0.020	85	[43] PERUZZI	77	MRK1	e^+e^- 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.064^{+0.015}_{-0.014}$		[44] BARLAG	92C	ACCM	π^- Cu 230 GeV
$0.063^{+0.028}_{-0.014}\pm0.011$	8	[44] AGUILAR-...	87F	HYBR	πp, pp 360, 400 GeV

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

[42] 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.

[43] PERUZZI 77 (MARK-1) measures $\sigma(e^+e^- \rightarrow \psi(3770)) \times$ branching fraction to be 0.36 ± 0.06 nb. We use the MARK-3 (ADLER 88C) value of $\sigma = 4.2 \pm 0.6 \pm 0.3$ nb.

[44] AGUILAR-BENITEZ 87F and BARLAG 92C compute the branching fraction by topological normalization.

REVIEW OF CHARM DALITZ-PLOT ANALYSES

Written November 2003 by D. Asner (University of Pittsburgh)

Weak nonleptonic decays of charm mesons are expected to proceed dominantly through resonant two-body decays in several theoretical models [1]. The Dalitz-plot analysis technique [2,3] has been applied to the decays $D \rightarrow rc$, $r \rightarrow ab$ where the decay products a, b, and c are K or π and the intermediate state r is a scalar, vector, or tensor meson. Table 1 lists published analyses of $D \rightarrow \overline{K}\pi\pi$, $\rightarrow \pi\pi\pi$, $\rightarrow \overline{K}K\pi$, and $\rightarrow \overline{K}K\overline{K}$ decays. The analyses include studies of doubly Cabibbo-suppressed decays [4,5], searches for CP violation [5–8], properties of established light mesons [9–11], and properties of $\pi\pi$ [4,11,12] and $K\pi$ [13] S-wave states. Future studies could improve sensitivity to D^0–$\overline{D}^0$ mixing [14].

The amplitude of the process, $D \rightarrow rc, r \rightarrow ab$, is given by the product of three factors: the angular distributions [15,16] of final-state particles, the barrier form factors [17,18] for the production of rc and ab, respectively, and the dynamical function describing the resonance r. Usually r is modeled with a Breit-Wigner, and the nonresonant contribution is parameterized as an S-wave with no variation in magnitude or phase across the Dalitz plot. Some more recent analyses have used the K-matrix formalism [19] with the P-vector approximation [20] to describe the $\pi\pi$ S-wave.

In the following, we discuss a number of subjects of current interest.

Table 1: Reported Dalitz Plot Analyses.

Decay	Experiment(s)
$D^0 \to K^0_S \pi^+ \pi^-$	Mark II [21], Mark III [22], E691 [24], E687 [23,26], ARGUS [25], CLEO [4]
$D^0 \to K^- \pi^+ \pi^0$	Mark III [22], E687 [26], E691 [24], CLEO [6]
$D^0 \to \overline{K}^0 K^+ \pi^-$	BABAR [27]
$D^0 \to K^0 K^- \pi^+$	BABAR [27]
$D^0 \to \pi^+ \pi^- \pi^0$	CLEO [8]
$D^0 \to K^0_S K^+ K^-$	BABAR [27]
$D^+ \to K^- \pi^+ \pi^+$	Mark III [22], E687 [26], E691 [24], E791 [13]
$D^+ \to \overline{K}^0 \pi^+ \pi^0$	Mark III [22]
$D^+ \to \pi^+ \pi^+ \pi^-$	E687 [9], E791 [12], FOCUS [11]
$D^+ \to K^+ K^- \pi^+$	FOCUS [29], E687 [30]
$D^+_s \to K^+ K^- \pi^+$	E687 [30], FOCUS [29]
$D^+_s \to \pi^+ \pi^+ \pi^-$	E687 [9], E791 [10], FOCUS [11]

$D^0 \to K^0_S\pi^+\pi^-$ — Several experiments have analyzed the decay $D^0 \to K^0_S\pi^+\pi^-$. The earliest analyses, by Mark II [21], Mark III [22], and E687 [23], assumed only two intermediate resonances, $K^0_S\rho^0$, $K^*(892)^-\pi^+$, and a significant nonresonant component. Additional resonances were considered by E691 [24] but were not found to be statistically significant. ARGUS [25] and E687 [26], with more events, fit the Dalitz plot with six intermediate resonances: $K^*(892)^-\pi^+$, $K^*_0(1430)^-\pi^+$, $K^0_S\rho^0$, $K^0_Sf_0(975)$, $K^0_Sf_2(1270)$, and $K^0_Sf_0(1400)$. The nonresonant contribution was negligible. The early and later E687 results [23, 26] were consistent under similar assumptions. The most precise results are from CLEO [4], which includes three additional resonances: $K^0_S\omega, K^*(1680)^-\pi^+$ and the doubly Cabibbo-suppressed $K^*(892)^+\pi^-$. They find a much smaller nonresonant contribution than did the earliest experiments.

It is not straightforward to compare or combine results using different descriptions of the angular distributions, barrier factors, resonant parametrizations, and different sets of resonances. Some of the earlier results [22–24], did not include barrier factors [17, 18]. Most of the earlier results [22–24, 26] used the Zemach formalism [15] to describe the angular shape of the decay pattern, while the more recent results [25, 4] use the helicity formalism [16].

The significance of the nonresonant component in the smaller data samples has been attributed to the presence of the broad scalar resonances $K^*_0(1430)^-$ and $f_0(1370)$ that were later observed in the larger data samples. The observation of a small but significant nonresonant component in the largest data samples suggests the presence of additional broad scalar resonances, the $\kappa(800)$ and $\sigma(500)$. The CLEO analysis could accomodate the $\sigma(500)$ in lieu of the nonresonant component, but found no evidence for the $\kappa(800)$.

$D^0 \to \pi^+\pi^-\pi^0$ and $D^0 \to \overline{K}^0 K^+ K^-$ — The only significant contribution to the resonant substructure of $D^0 \to \pi^+\pi^-\pi^0$ is in the $\rho\pi$ channels. A small nonresonant component is observed but all other $\pi\pi$ resonances, including the $\sigma(500)$, yielded fit fractions consistent with zero. The CLEO [8] results for $D^0 \to \pi^+\pi^-\pi^0$ are given in Table 2.

Table 2: Dalitz fit results of $D^0 \to \pi^+\pi^-\pi^0$.

Resonance	Amplitude	Phase(°)	Fit fraction(%)
ρ^+	1. (fixed)	0. (fixed)	$76.5 \pm 1.8 \pm 4.8$
ρ^0	$0.56 \pm 0.02 \pm 0.07$	$10 \pm 3 \pm 3$	$23.9 \pm 1.8 \pm 4.6$
ρ^-	$0.65 \pm 0.03 \pm 0.04$	$-4 \pm 3 \pm 4$	$32.3 \pm 2.1 \pm 2.2$
nonresonant	$1.03 \pm 0.17 \pm 0.31$	$77 \pm 8 \pm 11$	$2.7 \pm 0.9 \pm 1.7$

The BABAR [27] results for $D^0 \to \overline{K}^0 K^+ K^-$ are given in Table 3. The non-ϕ resonant substructure in K^+K^- is significant. Resonant contributions from $a_0(980)^0$, $a_0(980)^+$, and $f_0(980)$ are observed. The nonresonant and the doubly Cabibbo-suppressed contributions are consistent with zero.

Table 3: Dalitz fit results of $D^0 \to \overline{K}^0 K^+ K^-$.

Resonance	Phase(°)	Fit fraction(%)
$\overline{K}^0 \phi$	0. (fixed)	$45.4 \pm 1.6 \pm 1.0$
$\overline{K}^0 a_0(980)$	109 ± 5	$60.9 \pm 7.5 \pm 13.3$
$\overline{K}^0 f_0(980)$	-161 ± 14	$12.2 \pm 3.1 \pm 8.6$
$a_0(980)^+ K^-$	-53 ± 4	$34.3 \pm 3.2 \pm 6.8$
$a_0(980)^- K^+$	-13 ± 15	$3.2 \pm 1.9 \pm 0.5$
nonresonant	40 ± 44	$0.4 \pm 0.3 \pm 0.8$

Charm Dalitz-plot analyses might be useful for calibrating tools used in B decays: specifically, to extract α from $B^0 \to \pi^+\pi^-\pi^0$, β from $B^0 \to \overline{K}^0 K^+K^-$, and γ from $B^\pm \to DK^\pm$ followed by $D \to \overline{K}^0 K^+K^-$ or $D \to \overline{K}^0\pi^+\pi^-$ [28].

$D^+ \to \pi^+\pi^+\pi^-$: a $\sigma(500)$ or $f_0(600)$ — The decay $D^+ \to \pi^+\pi^+\pi^-$ has been studied by the E687 [9], E791 [12] and FOCUS [11] experiments. The E687 experiment considered the $\rho(770)^0\pi^+$, $f_0(980)\pi^+$, $f_2(1270)\pi^+$, and a nonresonant component. The E791 experiment included in addition $f_0(1370)\pi^+$ and $\rho(1450)^0\pi^+$. Both analyses found a very large fraction ($\sim$ 50%) for the nonresonant contribution, perhaps indicating a broad scalar contribution. E791 found the nonresonant amplitude to be consistent with zero if a broad scalar resonance was included in the fit. FOCUS analyzed its data sample using both the Breit-Wigner formalism and the K-matrix formalism. The Breit-Wigner analysis included $\rho(770), f_0(980), f_2(1270), f_0(1500), \sigma(500)$, and a nonresonant contribution. Applying the K-matrix formalism to the S wave and parameterizing the $\rho(770)$ and $f_2(1270)$ with the Breit-Wigner functions also described the FOCUS data well.

None of these analyses has modeled the dynamics of the $\pi^+\pi^+$ interaction. Consideration of the $I = 2$ S-wave and D-wave phase shifts, also measured in $\pi^+p \to \pi^+\pi^+n$ [31], could affect the $\pi^+\pi^-$ S-wave result.

E791 finds additional evidence that the low mass $\pi\pi$ feature is resonant by examining the phase of the $\pi\pi$ amplitude in the vicinity of the reported $\sigma(500)$ mass. A phase variation with invariant $\pi\pi$ mass is consistent with a resonant contribution [32].

Table 4: Parameters of the $\sigma(500)$ resonance. The amplitude and phase are relative to the $\rho(770)$.

Experiment	E791 [12]	CLEO [4]	FOCUS [11]
Decay Mode	$D^+ \to \pi^+\pi^+\pi^-$	$D^0 \to K^0_S\pi^+\pi^-$	$D^+ \to \pi^+\pi^+\pi^-$
Amplitude	$1.17 \pm 0.13 \pm 0.06$	0.57 ± 0.13	—
Phase(°)	$205.7 \pm 8.0 \pm 5.2$	214 ± 11	200 ± 31
$m(\text{MeV}/c^2)$	$478^{+24}_{-23} \pm 17$	513 ± 32	443 ± 27
$\Gamma(\text{MeV}/c^2)$	$324^{+42}_{-40} \pm 21$	335 ± 67	443 ± 80

Table 4 gives the parameters of the $\sigma(500)$ determined in charm Dalitz plot analyses. A consistent relative phase between the $\sigma(500)$ and $\rho(770)$ resonances is observed.

$D^+ \to K^-\pi^+\pi^+$: a $\kappa(800)$? — Indication of a broad $K\pi$ scalar intermediate resonance has been reported by E791 in the decay $D^+ \to K^-\pi^+\pi^+$ [13]. Fitting the Dalitz plot with $\overline{K}^*(892)^0\pi^+$, $\overline{K}^*_0(1430)^0\pi^+$, $\overline{K}^*_2(1430)^0\pi^+$, and $\overline{K}^*(1680)^0\pi^+$, plus a constant nonresonant component, E791 finds results consistent with earlier results from E691 and E687 with a nonresonant fit fraction of over 90%. Having reconstructed more events than the other experiments, E791 was led to include an extra low-mass S-wave $\overline{K}\pi$ resonance to account for the poor fit already seen by earlier experiments: A $\kappa(800)$ with $m = 797 \pm 19 \pm 43$ MeV/c^2 and $\Gamma = 410 \pm 43 \pm 87$ MeV/c^2 much improved the fits. The $\kappa(800)$ is now the dominant resonance and the nonresonant fit fraction is reduced from $90.9 \pm 2.6\%$ to $13.0 \pm 5.8 \pm 4.4\%$. As discussed with the $\sigma(500)$, the $K^-\pi^+$ S-wave result could be affected by modeling the dynamics of the $I = 2$ $\pi^+\pi^+$ interaction.

E791 also modeled the $K\pi$ S-wave phase variation as a function of $K\pi$ mass with the $K^*_0(1430)$ resonance only and a nonresonant component following the parameterization of LASS [33]. It was necessary to relax the unitarity constraint to describe the E791 data [34]. The $K\pi$ S-wave phase behavior in this model is consistent with the model that includes the κ resonance.

CLEO allowed scalar $K\pi$ resonances in the fit to $D^0 \to K^-\pi^+\pi^0$ [6] and $D^0 \to K^0_S\pi^+\pi^-$ [4] and observed a significant contribution for only $K^*_0(1430)$ [35]. BABAR has analyzed the decay $D^0 \to K^0K^-\pi^+$ and $D^0 \to \overline{K}^0K^+\pi^-$ [27]. They fit the former Dalitz plot with both positively charged and neutral $\overline{K}^*(892)$, $\overline{K}^*_0(1430)$, $\overline{K}^*_2(1430)$, $\overline{K}^*(1680)$ and $a_0(980)^-$, $a_0(1450)^-$, $a_2(1310)^-$ resonances, and a nonresonant component. The second Dalitz plot is fit with the identical resonances except for the $a_2(1310)^-$. A good fit is obtained in both cases without including the κ.

***f*₀(980), *f*₀(1370) and *f*₀(1500)** — The proximity of the $K\overline{K}$ threshold requires a coupled-channel or Flatte parametrization [36] of the $f_0(980)$ in charm Dalitz-plot analyses. The width of the $f_0(980)$ is poorly known. E791 used a coupled-channel Breit-Wigner function, following the parametrization of Ref. [37], to describe the $f_0(980)$ in $D^+_s \to \pi^+\pi^+\pi^-$ [10], and measured $m_r = 977 \pm 3 \pm 2$ MeV/c^2, $g_{\pi\pi} = 0.09 \pm 0.01 \pm 0.01$, and $g_{KK} = 0.02 \pm 0.04 \pm 0.03$. Results similar to these are desirable for input to the analysis of the $D^+_s \to K^+K^-\pi^+$ [29], which includes the $f_0(980)$ and $a_0(980)$.

The quark content of the $f_0(1370)$ and $f_0(1500)$ can perhaps be inferred from how they populate various Dalitz plots. The E791 analysis of $D^+ \to \pi^+\pi^+\pi^-$ [12] finds a contribution from the $f_0(1370)$ but not the $f_0(1500)$. The FOCUS analysis [11] of this decay does not find a significant contribution from the $f_0(1370)$. For the $D^+_s \to \pi^+\pi^+\pi^-$, E687 [9] and FOCUS [11] do not see the $f_0(1370)$ but do see a resonance with parameters similar to the $f_0(1500)$, while E791 [10] observes a $\pi\pi$ resonance ($m = 1434 \pm 18 \pm 9$ MeV/c^2 and $\Gamma = 172 \pm 32 \pm 6$ MeV/c^2) that is not consistent with either meson. BABAR has found no evidence for either the $f_0(1370)$ or the $f_0(1500)$ in $D^0 \to \overline{K}^0 K^+ K^-$ [27], while CLEO has observed the $f_0(1370)$ in $D^0 \to K_S^0 \pi^+ \pi^-$ [4]. Future analyses will present a clearer picture only if the same resonances and model of decay amplitudes are applied to all Dalitz-plot fits.

Doubly Cabibbo-Suppressed Decays — There are two classes of multibody doubly Cabibbo-suppressed (DCS) decays of charm mesons. The first consists of those in which the DCS and corresponding Cabbibo-favored (CF) decays populate distinct Dalitz plots: the pairs $D^0 \to K^+\pi^-\pi^0$ and $D^0 \to K^-\pi^+\pi^0$, or $D^+ \to K^+\pi^+\pi^-$ and $D^+ \to K^-\pi^+\pi^+$, are examples. CLEO [5] has reported $\dfrac{\mathcal{B}(D^0 \to K^+\pi^-\pi^0)}{\mathcal{B}(D^0 \to K^-\pi^+\pi^0)} = (0.43^{+0.11}_{-0.10} \pm 0.07)\%$.

The second class consists of decays where the DCS and CF modes populate the same Dalitz plot: for example, $D^0 \to K^{*-}\pi^+$ and $D^0 \to K^{*+}\pi^-$ both contribute to $D^0 \to K_S^0\pi^+\pi^-$. In this case, the potential for interference of DCS and CF amplitudes increases the sensitivity to the DCS amplitude. CLEO [4] has reported the relative amplitudes and phases to be $(7.1 \pm 1.3^{+2.6}_{-0.6}{}^{+2.6}_{-0.6})\%$ and $(189 \pm 10 \pm 3^{+15}_{-5})^\circ$, respectively, corresponding to $\dfrac{\mathcal{B}(D^0 \to K^*(892)^+\pi^-)}{\mathcal{B}(D^0 \to K^*(892)^-\pi^+)} = (0.5 \pm 0.2^{+0.5}_{-0.1}{}^{+0.4}_{-0.1})\%$.

CP Violation — In the limit of CP conservation, charge conjugate decays will have the same Dalitz-plot distribution. The $D^{*\pm}$ tag enables the discrimination between D^0 and $\overline{D}^0$.

The integrated CP violation across the Dalitz plot is determined from

$$\mathcal{A}_{CP} = \int \frac{|\mathcal{M}|^2 - |\overline{\mathcal{M}}|^2}{|\mathcal{M}|^2 + |\overline{\mathcal{M}}|^2}\, dm^2_{ab}\, dm^2_{bc} \;\Big/ \int dm^2_{ab}\, dm^2_{bc}\,,$$

where $\mathcal{M}$ and $\overline{\mathcal{M}}$ are the D^0 and $\overline{D}^0$ Dalitz-plot amplitudes. This expression is less sensitive to CP violation than the individual resonant submodes reported in Ref. [7]. Table 5 reports the results for CP violation. No evidence of CP violation has been observed.

Table 5: Dalitz-plot-integrated CP violation.

Experiment	Decay mode	$\mathcal{A}_{CP}(\%)$
CLEO [6]	$D^0 \to K^-\pi^+\pi^0$	-3.1 ± 8.6
CLEO [5]	$D^0 \to K^+\pi^-\pi^0$	$+9^{+22}_{-25}$
CLEO [7]	$D^0 \to K^0_S\pi^+\pi^-$	$-0.9 \pm 2.1^{+1.0+1.3}_{-4.3-3.7}$
CLEO [8]	$D^0 \to \pi^+\pi^-\pi^0$	$+1^{+9}_{-7} \pm 9$

The possibility of interference between CP–conserving and CP–violating amplitudes provides a more sensitive probe of CP violation. The constraints on the square of the CP–violating amplitude obtained in the resonant submodes of $D^0 \to K^0_S\pi^+\pi^-$ range from (3.5 to 28.4)$\times 10^{-4}$ at 95% confidence level [7].

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$\Gamma\big(K_0^*(800)^0\pi^+\big)/\Gamma\big(K^-\pi^+\pi^+\big)$ — Γ_{81}/Γ_{39}

The $K_0^*(800)$ is a broad scalar resonance that may not exist and is not included in the Summary Tables. AITALA 02 finds that including such a resonance in the fit to the $D^+ \rightarrow K^-\pi^+\pi^+$ Dalitz plot greatly improves the fit. However, the results of AITALA 02 for the $D^+ \rightarrow K^-\pi^+\pi^+$ Dalitz plot analysis so disagree with earlier analyses that averaging the results makes no sense. For now, we exclude AITALA 02 from the average.

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.478 \pm 0.121 \pm 0.053$	AITALA	02	E791	π^- nucleus, 500 GeV

$\Gamma\big(\overline{K}^*(892)^0\pi^+\big)/\Gamma\big(K^-\pi^+\pi^+\big)$ — Γ_{82}/Γ_{39}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.212 ± 0.016 OUR FIT				
0.210 ± 0.015 OUR AVERAGE				
$0.206 \pm 0.009 \pm 0.014$	FRABETTI	94G	E687	γ Be, $\overline{E}_\gamma \approx 220$ GeV
$0.255 \pm 0.014 \pm 0.050$	ANJOS	93	E691	γ Be 90–260 GeV
$0.21 \pm 0.06 \pm 0.06$	ALVAREZ	91B	NA14	Photoproduction
$0.20 \pm 0.02 \pm 0.11$	ADLER	87	MRK3	e^+e^- 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.185 \pm 0.015 \pm 0.014$	[45] AITALA	02	E791	π^- nucleus, 500 GeV

[45] AITALA 02 includes a broad scalar $K_0^*(800)$ in the fit to the $D^+ \rightarrow K^-\pi^+\pi^+$ Dalitz plot. This (a) greatly improves the fit, and (b) gives results in other channels that greatly disagree with previous analyses. The disagreement is so large that it makes no sense to average the results with those of earlier experiments. For now, we exclude AITALA 02 from the average.

$\Gamma\big(\overline{K}_0^*(1430)^0\pi^+\big)/\Gamma\big(K^-\pi^+\pi^+\big)$ — Γ_{91}/Γ_{39}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.41 ± 0.04 OUR AVERAGE				
$0.458 \pm 0.035 \pm 0.094$	FRABETTI	94G	E687	γ Be, $\overline{E}_\gamma \approx 220$ GeV
$0.400 \pm 0.031 \pm 0.027$	ANJOS	93	E691	γ Be 90–260 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.202 \pm 0.023 \pm 0.008$	[46] AITALA	02	E791	π^- nucleus, 500 GeV

[46] AITALA 02 includes a broad scalar $K_0^*(800)$ in the fit to the $D^+ \rightarrow K^-\pi^+\pi^+$ Dalitz plot. This (a) greatly improves the fit, and (b) gives results in other channels that greatly disagree with previous analyses. The disagreement is so large that it makes no sense to average the results with those of earlier experiments. For now, we exclude AITALA 02 from the average.

$\Gamma\big(\overline{K}_2^*(1430)^0\pi^+\big)/\Gamma\big(K^-\pi^+\pi^+\big)$ — Γ_{92}/Γ_{39}

Unseen decay modes of the $\overline{K}_2^*(1430)^0$ are included.

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.015 \pm 0.003 \pm 0.006$	[47] AITALA	02	E791	π^- nucleus, 500 GeV

[47] AITALA 02 includes a broad scalar $K_0^*(800)$ in the fit to the $D^+ \rightarrow K^- \pi^+ \pi^+$ Dalitz plot. This (a) greatly improves the fit, and (b) gives results in other channels that greatly disagree with previous analyses. The disagreement is so large that it makes no sense to average the results with those of earlier experiments. For now, we exclude AITALA 02 from the average.

$\Gamma(\overline{K}^*(1680)^0 \pi^+)/\Gamma(K^- \pi^+ \pi^+)$ Γ_{93}/Γ_{39}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.160±0.032 OUR AVERAGE Error includes scale factor of 1.1.				
0.182±0.023±0.028	FRABETTI	94G	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
0.113±0.015±0.050	ANJOS	93	E691	γ Be 90–260 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.097±0.027±0.012	[48] AITALA	02	E791	π^- nucleus, 500 GeV

[48] AITALA 02 includes a broad scalar $K_0^*(800)$ in the fit to the $D^+ \rightarrow K^- \pi^+ \pi^+$ Dalitz plot. This (a) greatly improves the fit, and (b) gives results in other channels that greatly disagree with previous analyses. The disagreement is so large that it makes no sense to average the results with those of earlier experiments. For now, we exclude AITALA 02 from the average.

$\Gamma(K^- \pi^+ \pi^+ \text{ nonresonant})/\Gamma(K^- \pi^+ \pi^+)$ Γ_{45}/Γ_{39}

VALUE	DOCUMENT ID		TECN	COMMENT
0.95 ±0.07 OUR AVERAGE				
0.998±0.037±0.072	FRABETTI	94G	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
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
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.130±0.058±0.044	[49] AITALA	02	E791	π^- nucleus, 500 GeV

[49] AITALA 02 includes a broad scalar $K_0^*(800)$ in the fit to the $D^+ \rightarrow K^- \pi^+ \pi^+$ Dalitz plot. This (a) greatly improves the fit, and (b) gives results in other channels that greatly disagree with previous analyses. The disagreement is so large that it makes no sense to average the results with those of earlier experiments. For now, we exclude AITALA 02 from the average.

$\Gamma(\overline{K}^0 \pi^+ \pi^0)/\Gamma_{\text{total}}$ Γ_{46}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.097±0.030 OUR FIT Error includes scale factor of 1.1.					
0.107±0.029 OUR AVERAGE					
0.102±0.025±0.016	159	ADLER	88C	MRK3	$e^+ e^-$ 3.77 GeV
0.19 ±0.12	10	[50] SCHINDLER	81	MRK2	$e^+ e^-$ 3.771 GeV

[50] SCHINDLER 81 (MARK-2) measures $\sigma(e^+ e^- \rightarrow \psi(3770)) \times$ branching fraction to be 0.78 ± 0.48 nb. We use the MARK-3 (ADLER 88C) value of σ = 4.2 ± 0.6 ± 0.3 nb.

$\Gamma(\overline{K}^0 \rho^+)/\Gamma(\overline{K}^0 \pi^+ \pi^0)$ Γ_{47}/Γ_{46}

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

$\Gamma\big(\overline{K}^*(892)^0\pi^+\big)/\Gamma\big(\overline{K}^0\pi^+\pi^0\big)$ — Γ_{82}/Γ_{46}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.20±0.06 OUR FIT				
0.57±0.18±0.18	ADLER	87	MRK3	e^+e^- 3.77 GeV

$\Gamma\big(\overline{K}^0\pi^+\pi^0$ nonresonant$\big)/\Gamma\big(\overline{K}^0\pi^+\pi^0\big)$ — Γ_{49}/Γ_{46}

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

$\Gamma\big(K^-\pi^+\pi^+\pi^0\big)/\Gamma_{\text{total}}$ — Γ_{50}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.065±0.011 OUR FIT					
0.058±0.012±0.012	142	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.034^{+0.056}_{-0.070}$		[51] BARLAG	92C	ACCM	π^- Cu 230 GeV
$0.022^{+0.047}_{-0.006}\pm0.004$	1	[51] AGUILAR-...	87F	HYBR	πp, $p p$ 360, 400 GeV
$0.063^{+0.014}_{-0.013}\pm0.012$	175	BALTRUSAIT...	86E	MRK3	See COFFMAN 92B

[51] AGUILAR-BENITEZ 87F and BARLAG 92C compute the branching fraction by topological normalization.

$\Gamma\big(K^-\pi^+\pi^+\pi^0\big)/\Gamma\big(K^-\pi^+\pi^+\big)$ — Γ_{50}/Γ_{39}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.70±0.12 OUR FIT					
0.76±0.11±0.12	91	ANJOS	92C	E691	γ Be 90–260 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.69±0.10±0.16		ANJOS	89E	E691	See ANJOS 92C
$0.57^{+0.65}_{-0.17}$	1	AGUILAR-...	83B	HYBR	$\pi^- p$, 360 GeV

$\Gamma\big(\overline{K}^*(892)^0\rho^+$ total$\big)/\Gamma\big(K^-\pi^+\pi^+\pi^0\big)$ — Γ_{83}/Γ_{50}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.33±0.165±0.12	[52] ANJOS	92C	E691	γ Be 90–260 GeV

[52] See, however, the next entry, where the two experiments disagree completely.

$\Gamma\big(\overline{K}^*(892)^0\rho^+$ S-wave$\big)/\Gamma\big(K^-\pi^+\pi^+\pi^0\big)$ — Γ_{84}/Γ_{50}

Unseen decay modes of the $\overline{K}^*(892)^0$ are included. The two experiments here disagree completely.

VALUE	DOCUMENT ID		TECN	COMMENT
0.26 ±0.25 OUR AVERAGE Error includes scale factor of 3.1.				
0.15 ±0.075±0.045	ANJOS	92C	E691	γ Be 90–260 GeV
0.833±0.116±0.165	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma(\overline{K}^*(892)^0 \rho^+ \ P\text{-wave})/\Gamma_{total}$ — Γ_{85}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.001	90	ANJOS	92C	E691	γBe 90–260 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.005	90	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma(\overline{K}^*(892)^0 \rho^+ \ D\text{-wave})/\Gamma(K^- \pi^+ \pi^+ \pi^0)$ — Γ_{86}/Γ_{50}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.15±0.09±0.045	ANJOS	92C	E691	γBe 90–260 GeV

$\Gamma(\overline{K}^*(892)^0 \rho^+ \ D\text{-wave longitudinal})/\Gamma_{total}$ — Γ_{87}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.007	90	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma(\overline{K}_1(1400)^0 \pi^+)/\Gamma(K^- \pi^+ \pi^+ \pi^0)$ — Γ_{89}/Γ_{50}

Unseen decay modes of the $\overline{K}_1(1400)^0$ are included.

VALUE	DOCUMENT ID		TECN	COMMENT
0.77 ±0.20 OUR FIT				
0.907±0.218±0.180	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^- \rho^+ \pi^+ \ \text{total})/\Gamma(K^- \pi^+ \pi^+ \pi^0)$ — Γ_{98}/Γ_{50}

This includes $\overline{K}^*(892)^0 \rho^+$, *etc.* The next entry gives the specifically 3-body fraction.

VALUE	DOCUMENT ID		TECN	COMMENT
0.48±0.13±0.09	ANJOS	92C	E691	γBe 90–260 GeV

$\Gamma(K^- \rho^+ \pi^+ \ 3\text{-body})/\Gamma(K^- \pi^+ \pi^+ \pi^0)$ — Γ_{99}/Γ_{50}

VALUE	DOCUMENT ID		TECN	COMMENT
0.17 ±0.06 OUR AVERAGE				
0.18 ±0.08 ±0.04	ANJOS	92C	E691	γBe 90–260 GeV
0.159±0.065±0.060	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma(\overline{K}^*(892)^0 \pi^+ \pi^0 \ \text{total})/\Gamma(K^- \pi^+ \pi^+ \pi^0)$ — Γ_{94}/Γ_{50}

This includes $\overline{K}^*(892)^0 \rho^+$, *etc.* The next two entries give the specifically 3-body fraction. Unseen decay modes of the $\overline{K}^*(892)^0$ are included.

VALUE	DOCUMENT ID		TECN	COMMENT
1.05±0.11±0.08	ANJOS	92C	E691	γBe 90–260 GeV

$\Gamma(\overline{K}^*(892)^0 \pi^+ \pi^0 \ 3\text{-body})/\Gamma_{total}$ — Γ_{95}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.008	90	[53] COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

[53] See, however, the next entry: ANJOS 92C sees a large signal in this channel.

$\Gamma\big(\overline{K}^*(892)^0\pi^+\pi^0\,\text{3-body}\big)/\Gamma\big(K^-\pi^+\pi^+\pi^0\big)$ — Γ_{95}/Γ_{50}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.66±0.09±0.17	ANJOS	92C	E691	γ Be 90–260 GeV

$\Gamma\big(K^*(892)^-\pi^+\pi^+\,\text{3-body}\big)/\Gamma\big(K^-\pi^+\pi^+\pi^0\big)$ — Γ_{97}/Γ_{50}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.32±0.14 OUR FIT Error includes scale factor of 1.1.				
0.24±0.12±0.09	ANJOS	92C	E691	γ Be 90–260 GeV

$\Gamma\big(K^-\pi^+\pi^+\pi^0\,\text{nonresonant}\big)/\Gamma_{\text{total}}$ — Γ_{58}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.002	90	[54] ANJOS	92C	E691	γ Be 90–260 GeV

[54] Whereas ANJOS 92C finds no signal here, COFFMAN 92B finds a fairly large one; see the next entry.

$\Gamma\big(K^-\pi^+\pi^+\pi^0\,\text{nonresonant}\big)/\Gamma\big(K^-\pi^+\pi^+\pi^0\big)$ — Γ_{58}/Γ_{50}

VALUE	DOCUMENT ID		TECN	COMMENT
0.184±0.070±0.050	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma\big(\overline{K}^0\pi^+\pi^+\pi^-\big)/\Gamma_{\text{total}}$ — Γ_{59}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.071^{+0.010}_{-0.009}}$ **OUR FIT**					
0.071±0.016 OUR AVERAGE					
0.066±0.015±0.005	168	ADLER	88C	MRK3	e^+e^- 3.77 GeV
0.12 ±0.05	21	[55] SCHINDLER	81	MRK2	e^+e^- 3.771 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.042^{+0.019}_{-0.017}$		[56] BARLAG	92C	ACCM	π^- Cu 230 GeV
$0.243^{+0.064}_{-0.041}\pm0.041$	11	[56] AGUILAR-...	87F	HYBR	πp, pp 360, 400 GeV

[55] SCHINDLER 81 (MARK-2) measures $\sigma(e^+e^- \rightarrow \psi(3770)) \times$ branching fraction to be 0.51 ± 0.08 nb. We use the MARK-3 (ADLER 88C) value of $\sigma = 4.2 \pm 0.6 \pm 0.3$ nb.

[56] AGUILAR-BENITEZ 87F and BARLAG 92C compute the branching fraction by topological normalization.

$\Gamma\big(\overline{K}^0\pi^+\pi^+\pi^-\big)/\Gamma\big(K^-\pi^+\pi^+\big)$ — Γ_{59}/Γ_{39}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.77±0.10 OUR FIT					
0.77±0.07±0.11	229	ANJOS	92C	E691	γ Be 90–260 GeV

$\Gamma\big(\overline{K}^0 a_1(1260)^+\big)/\Gamma\big(\overline{K}^0\pi^+\pi^+\pi^-\big)$ — Γ_{79}/Γ_{59}

Unseen decay modes of the $a_1(1260)^+$ are included, assuming that the $a_1(1260)^+$ decays entirely to $\rho\pi$ [or at least to $(\pi\pi)_{I=1}\,\pi$].

VALUE	DOCUMENT ID		TECN	COMMENT
1.15 ±0.19 OUR AVERAGE Error includes scale factor of 1.1.				
1.66 ±0.28 ±0.40	ANJOS	92C	E691	γ Be 90–260 GeV
1.078±0.114±0.140	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma(\overline{K}^0 a_2(1320)^+)/\Gamma_{total}$ — Γ_{80}/Γ

Unseen decay modes of the $a_2(1320)^+$ are included.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.003	90	ANJOS	92C	E691	γBe 90–260 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.008	90	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma(\overline{K}_1(1270)^0\pi^+)/\Gamma_{total}$ — Γ_{88}/Γ

Unseen decay modes of the $\overline{K}_1(1270)^0$ are included.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.007	90	ANJOS	92C	E691	γBe 90–260 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.011	90	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma(\overline{K}_1(1400)^0\pi^+)/\Gamma_{total}$ — Γ_{89}/Γ

Unseen decay modes of the $\overline{K}_1(1400)^0$ are included.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.009	90	[57] ANJOS	92C	E691	γBe 90–260 GeV

[57] ANJOS 92C sees no evidence for $\overline{K}_1(1400)^0\pi^+$ in either the $\overline{K}^0\pi^+\pi^+\pi^-$ or $K^-\pi^+\pi^+\pi^0$ channels, whereas COFFMAN 92B finds the $\overline{K}_1(1400)^0\pi^+$ branching fraction to be large; see the next entry.

$\Gamma(\overline{K}_1(1400)^0\pi^+)/\Gamma(\overline{K}^0\pi^+\pi^+\pi^-)$ — Γ_{89}/Γ_{59}

Unseen decay modes of the $\overline{K}_1(1400)^0$ are included.

VALUE	DOCUMENT ID		TECN	COMMENT
0.70 ±0.17 OUR FIT				
0.623±0.106±0.180	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma(\overline{K}^*(1410)^0\pi^+)/\Gamma_{total}$ — Γ_{90}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.007	90	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^*(892)^-\pi^+\pi^+\text{total})/\Gamma(\overline{K}^0\pi^+\pi^+\pi^-)$ — Γ_{96}/Γ_{59}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.41±0.14	14	ALEEV	94	BIS2	nN 20–70 GeV

$\Gamma(K^*(892)^-\pi^+\pi^+\text{3-body})/\Gamma_{total}$ — Γ_{97}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
0.021±0.009 OUR FIT					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.013	90	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma\big(K^*(892)^-\pi^+\pi^+\text{3-body}\big)/\Gamma\big(\overline{K}^0\pi^+\pi^+\pi^-\big)$ — Γ_{97}/Γ_{59}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.29±0.13 OUR FIT Error includes scale factor of 1.1.				
0.50±0.09±0.21	ANJOS	92C	E691	γ Be 90–260 GeV

$\Gamma\big(\overline{K}^0\rho^0\pi^+\text{total}\big)/\Gamma\big(\overline{K}^0\pi^+\pi^+\pi^-\big)$ — Γ_{100}/Γ_{59}

This includes $\overline{K}^0 a_1(1260)^+$. The next two entries give the specifically 3-body reaction.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
0.60±0.10±0.17	90	ANJOS	92C	E691	γ Be 90–260 GeV

$\Gamma\big(\overline{K}^0\rho^0\pi^+\text{3-body}\big)/\Gamma_{\text{total}}$ — Γ_{101}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.004	90	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma\big(\overline{K}^0\rho^0\pi^+\text{3-body}\big)/\Gamma\big(\overline{K}^0\pi^+\pi^+\pi^-\big)$ — Γ_{101}/Γ_{59}

VALUE	DOCUMENT ID		TECN	COMMENT
0.07±0.04±0.06	ANJOS	92C	E691	γ Be 90–260 GeV

$\Gamma\big(\overline{K}^0 f_0(980)\pi^+\big)/\Gamma_{\text{total}}$ — Γ_{102}/Γ

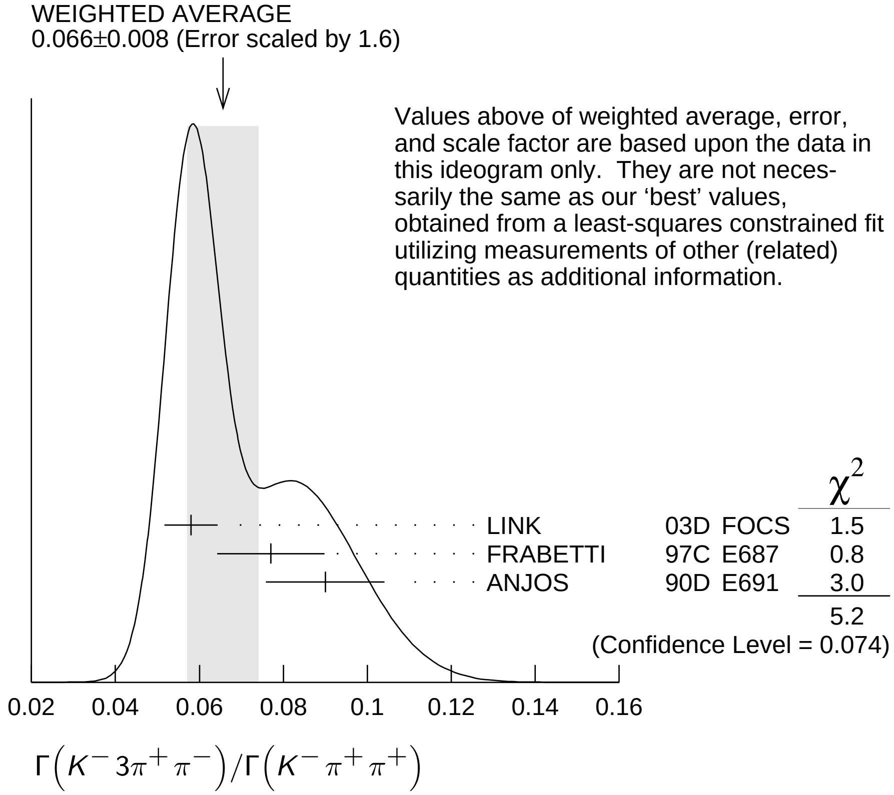
VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.005	90	ANJOS	92C	E691	γ Be 90–260 GeV

$\Gamma\big(\overline{K}^0\pi^+\pi^+\pi^-\text{ nonresonant}\big)/\Gamma\big(\overline{K}^0\pi^+\pi^+\pi^-\big)$ — Γ_{65}/Γ_{59}

VALUE	DOCUMENT ID		TECN	COMMENT
0.12±0.06 OUR AVERAGE				
0.10±0.04 ±0.06	ANJOS	92C	E691	γ Be 90–260 GeV
0.17±0.056±0.100	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma\big(K^-3\pi^+\pi^-\big)/\Gamma\big(K^-\pi^+\pi^+\big)$ — Γ_{66}/Γ_{39}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.067±0.007 OUR FIT Error includes scale factor of 1.5.					
0.066±0.008 OUR AVERAGE Error includes scale factor of 1.6. See the ideogram below.					
0.058±0.002±0.006	2923	LINK	03D	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV
0.077±0.008±0.010	239	FRABETTI	97C	E687	γ Be, $\overline{E}_\gamma \approx$ 200 GeV
0.09 ±0.01 ±0.01	113	ANJOS	90D	E691	Photoproduction



$\Gamma(\overline{K}^*(892)^0 \pi^+ \pi^+ \pi^-)/\Gamma(K^- 3\pi^+ \pi^-)$ — Γ_{103}/Γ_{66}

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

VALUE	DOCUMENT ID	TECN	COMMENT
0.51±0.19 OUR FIT Error includes scale factor of 2.2.			
0.46±0.33 OUR AVERAGE Error includes scale factor of 3.3.			
0.32±0.06±0.09	LINK 03D	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV
1.25±0.12±0.23	ANJOS 90D	E691	Photoproduction

$\Gamma(\overline{K}^*(892)^0 \rho^0 \pi^+)/\Gamma(K^- \pi^+ \pi^+)$ — Γ_{104}/Γ_{39}

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

VALUE	DOCUMENT ID	TECN	COMMENT
0.033±0.008 OUR FIT Error includes scale factor of 1.4.			
0.023±0.010±0.006	FRABETTI 97C	E687	γBe, $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma(\overline{K}^*(892)^0 \rho^0 \pi^+)/\Gamma(K^- 3\pi^+ \pi^-)$ — Γ_{104}/Γ_{66}

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

VALUE	DOCUMENT ID	TECN	COMMENT
0.49±0.11 OUR FIT Error includes scale factor of 1.5.			
0.60±0.05±0.09	LINK 03D	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(\overline{K}^*(892)^0 \rho^0 \pi^+)/\Gamma(\overline{K}^*(892)^0 \pi^+ \pi^+ \pi^-)$ — $\Gamma_{104}/\Gamma_{103}$

VALUE	DOCUMENT ID	TECN	COMMENT
0.95±0.24 OUR FIT Error includes scale factor of 1.4.			
0.75±0.17±0.19	ANJOS 90D	E691	Photoproduction

$\Gamma(\overline{K}^*(892)^0\pi^+\pi^+\pi^-\text{ no-}\rho)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{105}/Γ_{39}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.048±0.015±0.011	FRABETTI	97C	E687	γBe, $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma(K^-\rho^0\pi^+\pi^+)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{70}/Γ_{39}

VALUE	DOCUMENT ID		TECN	COMMENT
0.021±0.004 OUR FIT Error includes scale factor of 1.2.				
0.034±0.009±0.005	FRABETTI	97C	E687	γBe, $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma(K^-\rho^0\pi^+\pi^+)/\Gamma(K^-3\pi^+\pi^-)$ — Γ_{70}/Γ_{66}

VALUE	DOCUMENT ID		TECN	COMMENT
0.31±0.04 OUR FIT				
0.30±0.04±0.01	LINK	03D	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(\overline{K}^*(892)^0 a_1(1260)^+)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{107}/Γ_{39}

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

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

$\Gamma(K^-3\pi^+\pi^-\text{ nonresonant})/\Gamma(K^-3\pi^+\pi^-)$ — Γ_{71}/Γ_{66}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
0.07 ±0.05±0.01		LINK	03D	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.026	90	FRABETTI	97C	E687	γBe, $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma(K^-2\pi^+2\pi^0)/\Gamma_{\text{total}}$ — Γ_{72}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.015		[58] BARLAG	92C	ACCM	π^- Cu 230 GeV
$0.022^{+0.047}_{-0.008}\pm0.004$	1	[58] AGUILAR-...	87F	HYBR	πp, $p p$ 360, 400 GeV

[58] AGUILAR-BENITEZ 87F and BARLAG 92C compute the branching fraction by topological normalization.

$\Gamma(\overline{K}^0 2\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$ — Γ_{73}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.099^{+0.036}_{-0.070}$		[59] BARLAG	92C	ACCM	π^- Cu 230 GeV
$0.044^{+0.052}_{-0.013}\pm0.007$	2	[59] AGUILAR-...	87F	HYBR	πp, $p p$ 360, 400 GeV

[59] AGUILAR-BENITEZ 87F and BARLAG 92C compute the branching fraction by topological normalization.

$\Gamma(\overline{K}^0 3\pi^+ 2\pi^-)/\Gamma_{total}$ — Γ_{74}/Γ

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.0008±0.0007	[60] BARLAG	92C	ACCM	π^- Cu 230 GeV

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

$\Gamma(K^- 3\pi^+ \pi^- \pi^0)/\Gamma_{total}$ — Γ_{75}/Γ

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.0020±0.0018	[61] BARLAG	92C	ACCM	π^- Cu 230 GeV

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

$\Gamma(\overline{K}^0 \overline{K}^0 K^+)/\Gamma(K^- \pi^+ \pi^+)$ — Γ_{76}/Γ_{39}

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.20±0.09 OUR AVERAGE Error includes scale factor of 2.4.					
0.14±0.04±0.02	39	ALBRECHT	94I	ARG	$e^+ e^- \approx$ 10 GeV
0.34±0.07	70	AMMAR	91	CLEO	$e^+ e^- \approx$ 10.5 GeV

$\Gamma(K^+ K^- \overline{K}^0 \pi^+)/\Gamma(\overline{K}^0 \pi^+ \pi^+ \pi^-)$ — Γ_{77}/Γ_{59}

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.0077±0.0015±0.0009	35	LINK	01C	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

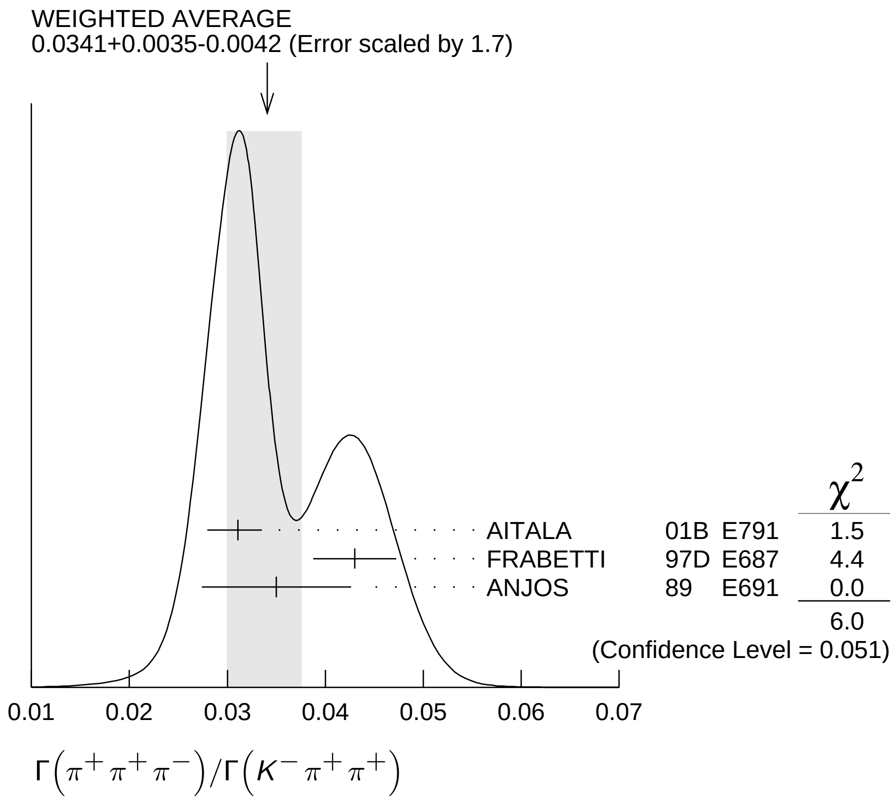
Pionic modes

$\Gamma(\pi^+ \pi^0)/\Gamma(K^- \pi^+ \pi^+)$ — Γ_{108}/Γ_{39}

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.028±0.006±0.005	34	SELEN	93	CLE2	$e^+ e^- \approx \Upsilon(4S)$

$\Gamma(\pi^+ \pi^+ \pi^-)/\Gamma(K^- \pi^+ \pi^+)$ — Γ_{109}/Γ_{39}

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
$0.0341^{+0.0035}_{-0.0042}$ OUR AVERAGE Error includes scale factor of 1.7. See the ideogram below.					
$0.0311\pm0.0018^{+0.0016}_{-0.0026}$	1172	AITALA	01B	E791	π^- nucleus, 500 GeV
0.043 ±0.003 ±0.003	236	FRABETTI	97D	E687	γ Be $\approx$ 200 GeV
0.035 ±0.007 ±0.003	83	ANJOS	89	E691	Photoproduction
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.032 ±0.011 ±0.003	20	ADAMOVICH	93	WA82	π^- 340 GeV
0.042 ±0.016 ±0.010	57	BALTRUSAIT...	85E	MRK3	$e^+ e^-$ 3.77 GeV



$\Gamma(\sigma\pi^+)/\Gamma(\pi^+\pi^+\pi^-)$ $\Gamma_{110}/\Gamma_{109}$

Unseen decay modes of the σ are included.

VALUE	DOCUMENT ID		TECN	COMMENT
0.695±0.135±0.032	[62] AITALA	01B	E791	π^- nucleus, 500 GeV

[62] See AITALA 01B for the magnitude and phase of this amplitude relative to the $\rho^0\pi^+$ amplitude. The branching ratio given here is 3/2 the paper's value, to allow for $\pi^0\pi^0$ decays.

$\Gamma(\rho^0\pi^+)/\Gamma(\pi^+\pi^+\pi^-)$ $\Gamma_{111}/\Gamma_{109}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.336±0.032±0.022	AITALA	01B	E791	π^- nucleus, 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.289±0.055±0.058	[63] FRABETTI	97D	E687	γ Be ≈ 200 GeV

[63] FRABETTI 97D also includes $f_2(1270)\pi^+$ and $f_0(980)\pi^+$ modes in the fit, but the resulting decay fractions are not statistically significant.

$\Gamma(\rho^0\pi^+)/\Gamma(K^-\pi^+\pi^+)$ Γ_{111}/Γ_{39}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.015	90	ANJOS	89	E691	Photoproduction

$\Gamma(f_0(980)\pi^+ \times B(f_0 \to \pi^+\pi^-))/\Gamma(\pi^+\pi^+\pi^-)$ — $\Gamma_{112}/\Gamma_{109}$

This includes only the $\pi^+\pi^-$ decays of the $f_0(980)$, because branching fractions of this resonance are not known.

VALUE	DOCUMENT ID		TECN	COMMENT
0.062±0.013±0.004	[64] AITALA	01B	E791	π^- nucleus, 500 GeV

[64] See AITALA 01B for the magnitude and phase of this amplitude relative to the $\rho^0\pi^+$ amplitude.

$\Gamma(f_2(1270)\pi^+)/\Gamma(\pi^+\pi^+\pi^-)$ — $\Gamma_{128}/\Gamma_{109}$

Unseen decay modes of the $f_2(1270)$ are included.

VALUE	DOCUMENT ID		TECN	COMMENT
0.343±0.044±0.007	[65] AITALA	01B	E791	π^- nucleus, 500 GeV

[65] See AITALA 01B for the magnitude and phase of this amplitude relative to the $\rho^0\pi^+$ amplitude.

$\Gamma(f_0(1370)\pi^+ \times B(f_0(1370) \to \pi^+\pi^-))/\Gamma(\pi^+\pi^+\pi^-)$ — $\Gamma_{114}/\Gamma_{109}$

This includes only the $\pi^+\pi^-$ decays of the $f_0(1370)$, because branching fractions of this resonance are not known.

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.023±0.015±0.008	[66] AITALA	01B	E791	π^- nucleus, 500 GeV

[66] This AITALA 01B result does not have enough statistical significance to advance it to the Summary Tables.

$\Gamma(\rho(1450)^0\pi^+ \times B(\rho(1450)^0 \to \pi^+\pi^-))/\Gamma(\pi^+\pi^+\pi^-)$ — $\Gamma_{115}/\Gamma_{109}$

This includes only the $\pi^+\pi^-$ decays of the $\rho(1450)$, because branching fractions of this resonance are not known.

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.007±0.007±0.003	[67] AITALA	01B	E791	π^- nucleus, 500 GeV

[67] This AITALA 01B result does not have enough statistical significance to advance it to the Summary Tables.

$\Gamma(\pi^+\pi^+\pi^-$ nonresonant$)/\Gamma(\pi^+\pi^+\pi^-)$ — $\Gamma_{116}/\Gamma_{109}$

The big difference between the results here of AITALA 01B and FRABETTI 97D is the addition of the $\sigma\pi^+$ channel to the AITALA 01B fit.

VALUE	DOCUMENT ID		TECN	COMMENT
0.078±0.060±0.027	[68] AITALA	01B	E791	π^- nucleus, 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.589±0.105±0.081	[69] FRABETTI	97D	E687	γ Be $\approx$ 200 GeV

[68] See AITALA 01B for the magnitude and phase of this amplitude relative to the $\rho^0\pi^+$ amplitude.

[69] FRABETTI 97D also includes $f_2(1270)\pi^+$ and $f_0(980)\pi^+$ modes in the fit, but the resulting decay fractions are not statistically significant.

$\Gamma(\pi^+\pi^+\pi^-$ nonresonant$)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{116}/Γ_{39}

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.027±0.007±0.002	ANJOS	89	E691	Photoproduction

$\Gamma(\pi^+\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_{117}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.019^{+0.015}_{-0.012}$	[70] BARLAG	92C	ACCM	π^- Cu 230 GeV

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

$\Gamma(\pi^+\pi^+\pi^-\pi^0)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{117}/Γ_{39}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.4	90	ANJOS	89E	E691	Photoproduction

$\Gamma(\eta\pi^+)/\Gamma(\phi\pi^+)$ — $\Gamma_{122}/\Gamma_{146}$

Unseen decay modes of the η are included.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.49±0.08	275	JESSOP	98	CLE2	$e^+e^- \approx \Upsilon(4S)$

$\Gamma(\eta\pi^+)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{122}/Γ_{39}

Unseen decay modes of the η are included.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
0.083±0.023±0.014		99	DAOUDI	92	CLE2	See JESSOP 98
<0.12	90		ANJOS	89E	E691	Photoproduction

$\Gamma(\omega\pi^+)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{124}/Γ_{39}

Unseen decay modes of the ω are included.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.08	90	ANJOS	89E	E691	Photoproduction

$\Gamma(3\pi^+2\pi^-)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{120}/Γ_{39}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0198±0.0024 OUR FIT	Error includes scale factor of 1.3.				
0.023 ±0.004 ±0.002	58	FRABETTI	97C	E687	γ Be, $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma(3\pi^+2\pi^-)/\Gamma(K^-3\pi^+\pi^-)$ — Γ_{120}/Γ_{66}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.294±0.020 OUR FIT					
0.290±0.017±0.011	835	LINK	03D	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(\eta\rho^+)/\Gamma(\phi\pi^+)$ — $\Gamma_{125}/\Gamma_{146}$

Unseen decay modes of the η are included.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.11	90	JESSOP	98	CLE2	$e^+e^- \approx \Upsilon(4S)$

$\Gamma(\eta\rho^+)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{125}/Γ_{39}

Unseen decay modes of the η are included.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.13	90	DAOUDI	92	CLE2	See JESSOP 98

$\Gamma(3\pi^+ 2\pi^- \pi^0)/\Gamma_{total}$ — Γ_{121}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.0029^{+0.0029}_{-0.0020}$	[71] BARLAG	92C	ACCM	π^- Cu 230 GeV

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

$\Gamma(\eta'(958)\pi^+)/\Gamma(\phi\pi^+)$ — $\Gamma_{126}/\Gamma_{146}$

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.82±0.14	126	JESSOP	98	CLE2	$e^+e^- \approx \Upsilon(4S)$

$\Gamma(\eta'(958)\pi^+)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{126}/Γ_{39}

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.1	90	DAOUDI	92	CLE2	See JESSOP 98
<0.1	90	ALVAREZ	91	NA14	Photoproduction
<0.13	90	ANJOS	91B	E691	γBe, $\overline{E}_\gamma \approx$ 145 GeV

$\Gamma(\eta'(958)\rho^+)/\Gamma(\phi\pi^+)$ — $\Gamma_{127}/\Gamma_{146}$

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.86	90	JESSOP	98	CLE2	$e^+e^- \approx \Upsilon(4S)$

$\Gamma(\eta'(958)\rho^+)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{127}/Γ_{39}

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.17	90	DAOUDI	92	CLE2	See JESSOP 98

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

$\Gamma(K^+\overline{K}^0)/\Gamma(\overline{K}^0\pi^+)$ — Γ_{129}/Γ_{38}

It is generally assumed for modes such as $D^+ \to \overline{K}^0\pi^+$ that

$$\Gamma(D^+ \to \overline{K}^0\pi^+) = 2\Gamma(D^+ \to K^0_S\pi^+);$$

it is the latter Γ that is actually measured. BIGI 95 points out that interference between Cabibbo-allowed and doubly Cabibbo-suppressed amplitudes, where both occur, could invalidate this assumption by a few percent.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.211 ±0.018 OUR FIT Error includes scale factor of 1.3.					
0.263 ±0.035 OUR AVERAGE					
0.25 ±0.04 ±0.02	129	FRABETTI	95	E687	γBe $\overline{E}_\gamma \approx$ 200 GeV
0.271 ±0.065 ±0.039	69	ANJOS	90C	E691	γBe
0.317 ±0.086 ±0.048	31	BALTRUSAIT...	85E	MRK3	e^+e^- 3.77 GeV
0.25 ±0.15	6	SCHINDLER	81	MRK2	e^+e^- 3.771 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.1996±0.0119±0.0096	949	[72] LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV
0.222 ±0.041 ±0.029	70	[73] BISHAI	97	CLE2	$e^+e^- \approx \Upsilon(4S)$

[72] This LINK 02B result is redundant with a result in the next datablock.
[73] This BISHAI 97 result is redundant with results elsewhere in the Listings.

$\Gamma(K^+\overline{K}^0)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{129}/Γ_{39}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.064 ±0.005 OUR FIT Error includes scale factor of 1.3.					
0.062 ±0.004 OUR AVERAGE					
0.0604±0.0035±0.0030	949	LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV
0.077 ±0.014 ±0.007	70	[74] BISHAI	97	CLE2	$e^+e^- \approx \Upsilon(4S)$

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

$\Gamma(K^+K^-\pi^+)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{130}/Γ_{39}

VALUE	DOCUMENT ID		TECN	COMMENT
0.097 ±0.006 OUR AVERAGE				
0.093 ±0.010 $^{+0.008}_{-0.006}$	JUN	00	SELX	Σ^- nucleus, 600 GeV
0.0976±0.0042±0.0046	FRABETTI	95B	E687	Dalitz plot analysis

$\Gamma(\phi\pi^+)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{146}/Γ_{39}

Unseen decay modes of the ϕ are included.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.068±0.005 OUR AVERAGE					
0.058±0.006±0.006		FRABETTI	95B	E687	Dalitz plot analysis
0.062±0.017±0.006	19	ADAMOVICH	93	WA82	π^- 340 GeV
0.077±0.011±0.005	128	DAOUDI	92	CLE2	$e^+e^- \approx$ 10.5 GeV
0.098±0.032±0.014	12	ALVAREZ	90C	NA14	Photoproduction
0.071±0.008±0.007	84	ANJOS	88	E691	Photoproduction
0.084±0.021±0.011	21	BALTRUSAIT...	85E	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^+\overline{K}^*(892)^0)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{150}/Γ_{39}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.047±0.005 OUR AVERAGE Error includes scale factor of 1.2.					
0.044±0.003±0.004		[75] FRABETTI	95B	E687	Dalitz plot analysis
0.058±0.009±0.006	73	ANJOS	88	E691	Photoproduction
0.048±0.021±0.011	14	BALTRUSAIT...	85E	MRK3	e^+e^- 3.77 GeV

[75] See FRABETTI 95B for evidence also of $\overline{K}_0^*(1430)^0 K^+$ in the $D^+ \rightarrow K^+K^-\pi^+$ Dalitz plot.

$\Gamma(K^+K^-\pi^+ \text{ nonresonant})/\Gamma(K^-\pi^+\pi^+)$ — Γ_{133}/Γ_{39}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.050±0.009 OUR AVERAGE					
0.049±0.008±0.006	95	ANJOS	88	E691	Photoproduction
0.059±0.026±0.009	37	BALTRUSAIT...	85E	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^*(892)^+\overline{K}^0)/\Gamma(\overline{K}^0\pi^+)$ — Γ_{151}/Γ_{38}

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

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

$\Gamma(\phi\pi^+\pi^0)/\Gamma_{total}$ — Γ_{147}/Γ

Unseen decay modes of the ϕ are included.

VALUE	DOCUMENT ID		TECN	COMMENT
0.023±0.010	[76] BARLAG	92C	ACCM	π^- Cu 230 GeV

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

$\Gamma(\phi\pi^+\pi^0)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{147}/Γ_{39}

Unseen decay modes of the ϕ are included.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.58	90	ALVAREZ	90C	NA14	Photoproduction
<0.28	90	ANJOS	89E	E691	Photoproduction

$\Gamma(\phi\rho^+)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{148}/Γ_{39}

Unseen decay modes of the ϕ are included.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.16	90	DAOUDI	92	CLE2	$e^+e^- \approx$ 10.5 GeV

$\Gamma(K^+K^-\pi^+\pi^0\text{ non-}\phi)/\Gamma_{total}$ — Γ_{139}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.015^{+0.007}_{-0.006}}$	[77] BARLAG	92C	ACCM	π^- Cu 230 GeV

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

$\Gamma(K^+K^-\pi^+\pi^0\text{ non-}\phi)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{139}/Γ_{39}

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

$\Gamma(K^+\overline{K}^0\pi^+\pi^-)/\Gamma(\overline{K}^0\pi^+\pi^+\pi^-)$ — Γ_{140}/Γ_{59}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0562±0.0039±0.0040	469	LINK	01C	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^+\overline{K}^0\pi^+\pi^-)/\Gamma_{total}$ — Γ_{140}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.02	90	ALBRECHT	92B	ARG	$e^+e^- \simeq$ 10.4 GeV

$\Gamma(K^0K^-\pi^+\pi^+)/\Gamma(\overline{K}^0\pi^+\pi^+\pi^-)$ — Γ_{141}/Γ_{59}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0768±0.0041±0.0032	670	LINK	01C	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^0K^-\pi^+\pi^+)/\Gamma_{total}$ — Γ_{141}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.01 ±0.005±0.003	ALBRECHT	92B	ARG	$e^+e^- \simeq$ 10.4 GeV
<0.003	[78] BARLAG	92C	ACCM	π^- Cu 230 GeV

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

$\Gamma\big(K^*(892)^+ \overline{K}^*(892)^0\big)/\Gamma_{\text{total}}$ — Γ_{152}/Γ

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.026±0.008±0.007	ALBRECHT	92B	ARG	$e^+e^- \simeq$ 10.4 GeV

$\Gamma\big(K^0 K^- \pi^+ \pi^+ (\text{non-}K^{*+} \overline{K}^{*0})\big)/\Gamma_{\text{total}}$ — Γ_{143}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0079	90	ALBRECHT	92B	ARG	$e^+e^- \simeq$ 10.4 GeV

$\Gamma\big(K^+ K^- \pi^+ \pi^+ \pi^-\big)/\Gamma\big(K^- 3\pi^+ \pi^-\big)$ — Γ_{144}/Γ_{66}

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

$\Gamma\big(\phi \pi^+ \pi^+ \pi^-\big)/\Gamma_{\text{total}}$ — Γ_{149}/Γ

Unseen decay modes of the ϕ are included.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.002	90	0	ANJOS	88	E691	Photoproduction

$\Gamma\big(\phi \pi^+ \pi^+ \pi^-\big)/\Gamma\big(K^- \pi^+ \pi^+\big)$ — Γ_{149}/Γ_{39}

Unseen decay modes of the ϕ are included.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.031	90	ALVAREZ	90C	NA14	Photoproduction

$\Gamma\big(\phi \pi^+ \pi^+ \pi^-\big)/\Gamma\big(\phi \pi^+\big)$ — $\Gamma_{149}/\Gamma_{146}$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.6	90	FRABETTI	92	E687	γ Be

$\Gamma\big(K^+ K^- \pi^+ \pi^+ \pi^- \text{ nonresonant}\big)/\Gamma_{\text{total}}$ — Γ_{145}/Γ

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.03	90	12	ANJOS	88	E691	Photoproduction

Rare or forbidden modes

$\Gamma\big(K^+ \pi^+ \pi^-\big)/\Gamma\big(K^- \pi^+ \pi^+\big)$ — Γ_{153}/Γ_{39}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0075±0.0016 OUR AVERAGE					
0.0077±0.0017±0.0008	59	AITALA	97C	E791	π^- nucleus, 500 GeV
0.0072±0.0023±0.0017	21	FRABETTI	95E	E687	γ Be, $\overline{E}_\gamma$= 220 GeV

$\Gamma\big(K^+ \rho^0\big)/\Gamma\big(K^+ \pi^+ \pi^-\big)$ — $\Gamma_{154}/\Gamma_{153}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.37±0.14±0.07	AITALA	97C	E791	π^- nucleus, 500 GeV

$\Gamma(K^+\rho^0)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{154}/Γ_{39}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0067	90	FRABETTI	95E	E687	γBe, $\overline{E}_\gamma$= 220 GeV

$\Gamma(K^*(892)^0\pi^+)/\Gamma(K^+\pi^+\pi^-)$ — $\Gamma_{155}/\Gamma_{153}$

Unseen decay modes of the $K^*(892)^0$ are included.

VALUE	DOCUMENT ID		TECN	COMMENT
0.53±0.21±0.02	AITALA	97C	E791	π^- nucleus, 500 GeV

$\Gamma(K^*(892)^0\pi^+)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{155}/Γ_{39}

Unseen decay modes of the $K^*(892)^0$ are included.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0021	90	FRABETTI	95E	E687	γBe, $\overline{E}_\gamma$= 220 GeV

$\Gamma(K^+\pi^+\pi^-$ nonresonant$)/\Gamma(K^+\pi^+\pi^-)$ — $\Gamma_{156}/\Gamma_{153}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.36±0.14±0.07	AITALA	97C	E791	π^- nucleus, 500 GeV

$\Gamma(K^+K^+K^-)/\Gamma(K^-\pi^+\pi^+)$ — Γ_{157}/Γ_{39}

A doubly Cabibbo-suppressed decay with no simple spectator process possible.

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
9.49± 2.17± 0.22		65	[79] LINK	02I	FOCS	γ nucleus, ≈ 180 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 16	90		[80] FRABETTI	95F	E687	γBe, $\overline{E}_\gamma$ ≈ 220 GeV
570 ±200 ±70		13	ADAMOVICH	93	WA82	π^- 340 GeV

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

[80] Using the $\phi\pi^+$ mode to normalize, FRABETTI 95F gets $\Gamma(K^+K^+K^-)/\Gamma(\phi\pi^+)<$ 0.025.

$\Gamma(\phi K^+)/\Gamma(\phi\pi^+)$ — $\Gamma_{158}/\Gamma_{146}$

A doubly Cabibbo-suppressed decay with no simple spectator process possible.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.021	90		FRABETTI	95F	E687	γBe, $\overline{E}_\gamma$ ≈ 220 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$0.058^{+0.032}_{-0.026}\pm0.007$		4	[81] ANJOS	92D	E691	γBe, $\overline{E}_\gamma$ = 145 GeV

[81] The evidence of ANJOS 92D is a small excess of events ($4.5^{+2.4}_{-2.0}$).

$\Gamma(\pi^+ e^+ e^-)/\Gamma_{total}$ — Γ_{159}/Γ

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<5.2 \times 10^{-5}$	90		AITALA	99G	E791	$\pi^- N$ 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<1.1 \times 10^{-4}$	90		FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<6.6 \times 10^{-5}$	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

$\Gamma(\pi^+ \mu^+ \mu^-)/\Gamma_{total}$ — Γ_{160}/Γ

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<8.8 \times 10^{-6}$	90		LINK	03F	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<1.5 \times 10^{-5}$	90		AITALA	99G	E791	$\pi^- N$ 500 GeV
$<8.9 \times 10^{-5}$	90		FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 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

$\Gamma(\rho^+ \mu^+ \mu^-)/\Gamma_{total}$ — Γ_{161}/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

$\Gamma(K^+ e^+ e^-)/\Gamma_{total}$ — Γ_{162}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.0 \times 10^{-4}$	90	AITALA	99G	E791	$\pi^- N$ 500 GeV
$<2.0 \times 10^{-4}$	90	FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<4.8 \times 10^{-3}$	90	WEIR	90B	MRK2	$e^+ e^-$ 29 GeV

$\Gamma(K^+ \mu^+ \mu^-)/\Gamma_{total}$ — Γ_{163}/Γ

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<9.2 \times 10^{-6}$	90		LINK	03F	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<4.4 \times 10^{-5}$	90		AITALA	99G	E791	$\pi^- N$ 500 GeV
$<9.7 \times 10^{-5}$	90		FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<3.2 \times 10^{-4}$	90	0	KODAMA	95	E653	π^- emulsion 600 GeV
$<9.2 \times 10^{-3}$	90		WEIR	90B	MRK2	$e^+ e^-$ 29 GeV

$\Gamma(\pi^+ e^\pm \mu^\mp)/\Gamma_{total}$ — Γ_{164}/Γ

A test of lepton-family-number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.4 × 10⁻⁵	90	AITALA	99G	E791	$\pi^- N$ 500 GeV

$\Gamma(\pi^+ e^+ \mu^-)/\Gamma_{total}$ — Γ_{165}/Γ

A test of lepton-family-number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.1 \times 10^{-4}$	90	FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<3.3 \times 10^{-3}$	90	WEIR	90B	MRK2	$e^+ e^-$ 29 GeV

$\Gamma(\pi^+ e^- \mu^+)/\Gamma_{total}$ — Γ_{166}/Γ

A test of lepton-family-number conservation.

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

$\Gamma(K^+ e^\pm \mu^\mp)/\Gamma_{total}$ — Γ_{167}/Γ

A test of lepton-family-number conservation.

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

$\Gamma(K^+ e^+ \mu^-)/\Gamma_{total}$ — Γ_{168}/Γ

A test of lepton-family-number conservation.

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

$\Gamma(K^+ e^- \mu^+)/\Gamma_{total}$ — Γ_{169}/Γ

A test of lepton-family-number conservation.

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

$\Gamma(\pi^- e^+ e^+)/\Gamma_{total}$ — Γ_{170}/Γ

A test of lepton-number conservation.

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

$\Gamma(\pi^- \mu^+ \mu^+)/\Gamma_{total}$ — Γ_{171}/Γ

A test of lepton-number conservation.

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

$\Gamma(\pi^- e^+ \mu^+)/\Gamma_{total}$ — Γ_{172}/Γ

A test of lepton-number conservation.

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

$\Gamma(\rho^- \mu^+ \mu^+)/\Gamma_{total}$ — Γ_{173}/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

$\Gamma(K^- e^+ e^+)/\Gamma_{total}$ — Γ_{174}/Γ

A test of lepton-number conservation.

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

$\Gamma(K^- \mu^+ \mu^+)/\Gamma_{total}$ — Γ_{175}/Γ

A test of lepton-number conservation.

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

$\Gamma(K^- e^+ \mu^+)/\Gamma_{total}$ — Γ_{176}/Γ

A test of lepton-number conservation.

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

$\Gamma(K^*(892)^-\mu^+\mu^+)/\Gamma_{total}$ Γ_{177}/Γ

A test of lepton-number conservation.

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

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

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
−0.016±0.015±0.009	10.6k	[82] LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

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

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
+0.071±0.061±0.012	949	[83] LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
+0.069±0.060±0.015	949	[84] LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

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

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.002±0.011 OUR AVERAGE					
+0.006±0.011±0.005	14k	[85] LINK	00B	FOCS	
−0.014±0.029		[85] AITALA	97B	E791	$-0.062 < A_{CP} < +0.034$ (90% CL)
−0.031±0.068		[85] FRABETTI	94I	E687	$-0.14 < A_{CP} < +0.081$ (90% CL)

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

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

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

VALUE	DOCUMENT ID		TECN	COMMENT
−0.02 ±0.05 OUR AVERAGE				
−0.010±0.050	[86] AITALA	97B	E791	$-0.092 < A_{CP} < +0.072$ (90% CL)
−0.12 ±0.13	[86] FRABETTI	94I	E687	$-0.33 < A_{CP} < +0.094$ (90% CL)

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

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

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

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
−0.014±0.033 OUR AVERAGE				
−0.028±0.036	[87] AITALA	97B	E791	$-0.087 < A_{CP} < +0.031$ (90% CL)
+0.066±0.086	[87] FRABETTI	94I	E687	$-0.075 < A_{CP} < +0.21$ (90% CL)

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

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

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

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
−0.017±0.042	[88] AITALA	97B	E791	$-0.086 < A_{CP} < +0.052$ (90% CL)

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

$D^{\pm}$ PRODUCTION CROSS SECTION AT $\psi(3770)$

A compilation of the cross sections for the direct production of $D^{\pm}$ mesons at or near the $\psi(3770)$ peak in $e^{+}e^{-}$ production.

VALUE (nanobarns)	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
4.2 ±0.6 ±0.3	[89] ADLER	88C	MRK3	$e^{+}e^{-}$ 3.768 GeV
5.5 ±1.0	[90] PARTRIDGE	84	CBAL	$e^{+}e^{-}$ 3.771 GeV
6.00±0.72±1.02	[91] SCHINDLER	80	MRK2	$e^{+}e^{-}$ 3.771 GeV
9.1 ±2.0	[92] PERUZZI	77	MRK1	$e^{+}e^{-}$ 3.774 GeV

[89] This measurement compares events with one detected D to those with two detected D mesons, to determine the the absolute cross section. ADLER 88C measure the ratio of cross sections (neutral to charged) to be 1.36 ± 0.23 ± 0.14. This measurement does not include the decays of the $\psi(3770)$ not associated with charmed particle production.

[90] This measurement comes from a scan of the $\psi(3770)$ resonance and a fit to the cross section. PARTRIDGE 84 measures 6.4 ± 1.15 nb for the cross section. We take the phase space division of neutral and charged D mesons in $\psi(3770)$ decay to be 1.33, and we assume that the $\psi(3770)$ is an isosinglet to evaluate the cross sections. The noncharm decays (e.g. radiative) of the $\psi(3770)$ are included in this measurement and may amount to a few percent correction.

[91] This measurement comes from a scan of the $\psi(3770)$ resonance and a fit to the cross section. SCHINDLER 80 assume the phase space division of neutral and charged D mesons in $\psi(3770)$ decay to be 1.33, and that the $\psi(3770)$ is an isosinglet. The noncharm decays (e.g. radiative) of the $\psi(3770)$ are included in this measurement and may amount to a few percent correction.

[92] This measurement comes from a scan of the $\psi(3770)$ resonance and a fit to the cross section. The phase space division of neutral and charged D mesons in $\psi(3770)$ decay is taken to be 1.33, and $\psi(3770)$ is assumed to be an isosinglet. The noncharm decays (e.g. radiative) of the $\psi(3770)$ are included in this measurement and may amount to a few percent correction. We exclude this measurement from the average because of uncertainties in the contamination from τ lepton pairs. Also see RAPIDIS 77.

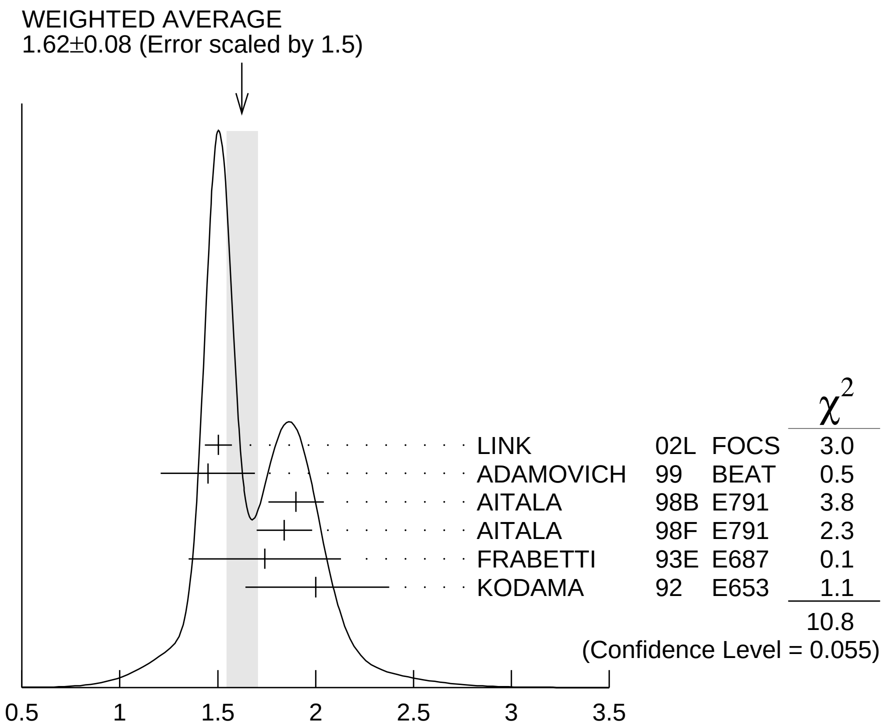
$D^+ \to \overline{K}^*(892)^0 \ell^+ \nu_\ell$ FORM FACTORS

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.62 ±0.08 OUR AVERAGE		Error includes scale factor of 1.5. See the ideogram below.			
1.504±0.057±0.039	15k	[93] LINK	02L	FOCS	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
1.45 ±0.23 ±0.07	763	ADAMOVICH	99	BEAT	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
1.90 ±0.11 ±0.09	3000	[94] AITALA	98B	E791	$\overline{K}^*(892)^0 e^+ \nu_e$
1.84 ±0.11 ±0.09	3034	AITALA	98F	E791	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
1.74 ±0.27 ±0.28	874	FRABETTI	93E	E687	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
2.00 $^{+0.34}_{-0.32}$ ±0.16	305	KODAMA	92	E653	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2.0 ±0.6 ±0.3	183	ANJOS	90E	E691	$\overline{K}^*(892)^0 e^+ \nu_e$

[93] 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.

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



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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.83 ±0.05 OUR AVERAGE					
0.875±0.049±0.064	15k	[95] LINK	02L	FOCS	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
1.00 ±0.15 ±0.03	763	ADAMOVICH	99	BEAT	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
0.71 ±0.08 ±0.09	3000	AITALA	98B	E791	$\overline{K}^*(892)^0 e^+ \nu_e$

$0.75 \pm 0.08 \pm 0.09$	3034	AITALA	98F	E791	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$0.78 \pm 0.18 \pm 0.10$	874	FRABETTI	93E	E687	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$0.82 \ ^{+0.22}_{-0.23} \pm 0.11$	305	KODAMA	92	E653	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.0 \pm 0.5 \pm 0.2$	183	ANJOS	90E	E691	$\overline{K}^*(892)^0 e^+ \nu_e$

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

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

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

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

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

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

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

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AITALA	02	PRL 89 121801	E.M. Aitala *et al.*	(FNAL E791 Collab.)
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LINK	02B	PRL 88 041602	J.M. Link *et al.*	(FNAL FOCUS Collab.)
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LINK	02E	PL B535 43	J.M. Link *et al.*	(FNAL FOCUS Collab.)
LINK	02F	PL B537 192	J.M. Link *et al.*	(FNAL FOCUS Collab.)
LINK	02I	PL B541 227	J.M. Link *et al.*	(FNAL FOCUS Collab.)
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AITALA	01B	PRL 86 770	E.M. Aitala *et al.*	(FNAL E791 Collab.)
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AITALA	99G	PL B462 401	E.M. Aitala *et al.*	(FNAL E791 Collab.)
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AITALA	98B	PRL 80 1393	E.M. Aitala *et al.*	(FNAL E791 Collab.)
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BAI	98B	PL B429 188	J.Z. Bai *et al.*	(BEPC BES Collab.)
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ALBRECHT	94I	ZPHY C64 375	H. Albrecht *et al.*	(ARGUS Collab.)
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TRILLING	81	PRPL 75 57	G.H. Trilling	(LBL, UCB) J
BACINO	80	PRL 45 329	W.J. Bacino *et al.*	(DELCO Collab.)
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