Citation: K. Hagiwara *et al.* (Particle Data Group), Phys. Rev. D **66**, 010001 (2002) and 2003 partial update for edition 2004 (URL: http://pdg.lbl.gov)

$D^{\pm}$

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

$D^{\pm}$ 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 NEW UNCHECKED FIT Error includes scale factor of 1.1. [1869.3 ± 0.5 MeV OUR 2002 FIT Scale factor = 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 NEW AVERAGE [(1051 ± 13) × 10^{-15} s OUR 2002 AVERAGE]					
1039.4± 4.3± 7.0	110k	LINK	02F	FOCS	γ nucleus, $\approx$ 180 GeV
$1033.6 \pm 22.1 \,^{+\ 9.9}_{-\ 12.7}$	3777	BONVICINI	99	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		(24.2 ± 2.8) %	S=1.4
Γ_3	$\overline{K}^0$ anything + K^0 anything		(59 ± 7) %	
Γ_4	K^+ anything		(5.8 ± 1.4) %	
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]	(6.7 ± 0.8) %	
Γ_{11}	$\overline{K}^0 e^+ \nu_e$		(6.5 ± 0.9) %	
Γ_{12}	$\overline{K}^0 \mu^+ \nu_\mu$		(7.0 $^{+3.0}_{-2.0}$) %	
Γ_{13}	$K^- \pi^+ e^+ \nu_e$		(4.4 $^{+0.9}_{-0.7}$) %	
Γ_{14}	$\overline{K}^*(892)^0 e^+ \nu_e$ × B($\overline{K}^{*0} \to K^- \pi^+$)		(3.2 ± 0.33) %	
Γ_{15}	$K^- \pi^+ e^+ \nu_e$ nonresonant		< 7 $\times 10^{-3}$	CL=90%
Γ_{16}	$K^- \pi^+ \mu^+ \nu_\mu$		(3.79± 0.33) %	S=1.1
	In the fit as $\frac{2}{3}\Gamma_{28} + \Gamma_{18}$, where $\frac{2}{3}\Gamma_{28} = \Gamma_{17}$.			
Γ_{17}	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$ × B($\overline{K}^{*0} \to K^- \pi^+$)		(3.0 ± 0.4) %	
Γ_{18}	$K^- \pi^+ \mu^+ \nu_\mu$ nonresonant		(3.1 ± 1.2) $\times 10^{-3}$	
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}	$K^- \pi^+ \pi^0 \mu^+ \nu_\mu$		< 1.6 $\times 10^{-3}$	CL=90%
Γ_{24}	$\pi^0 \ell^+ \nu_\ell$	[c]	(3.1 ± 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]	(4.8 ± 0.4) %	
Γ_{27}	$\overline{K}^*(892)^0 e^+ \nu_e$		(5.3 ± 0.7) %	S=1.5
Γ_{28}	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$		(5.2 ± 0.4) %	S=1.1

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}	$\rho^0\,e^+\,\nu_e$		(2.4 $\pm$ 0.9) $\times 10^{-3}$		
Γ_{33}	$\rho^0\,\mu^+\,\nu_\mu$		(3.2 $\pm$ 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}	$\eta'(958)\,\mu^+\,\nu_\mu$		$<$ 1.0	%	CL=90%

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

Γ_{38}	$\overline{K}^0\,\pi^+$		(2.71 $\pm$ 0.20) %		S=1.1
Γ_{39}	$K^-\,\pi^+\,\pi^+$	[d]	(8.8 $\pm$ 0.6) %		S=1.1
Γ_{40}	$\kappa(800)\,\pi^+$				
Γ_{41}	$\overline{K}^*(892)^0\,\pi^+$		(1.28 $\pm$ 0.13) %		
	$\times$ B($\overline{K}^{*0} \rightarrow K^-\,\pi^+$)				
Γ_{42}	$\overline{K}_0^*(1430)^0\,\pi^+$		(2.3 $\pm$ 0.3) %		
	$\times$ B($\overline{K}_0^*(1430)^0 \rightarrow K^-\,\pi^+$)				
Γ_{43}	$\overline{K}_2^*(1430)^0\,\pi^+$				
	$\times$ B($\overline{K}_2^*(1430)^0 \rightarrow K^-\,\pi^+$)				
Γ_{44}	$\overline{K}^*(1680)^0\,\pi^+$		(3.7 $\pm$ 0.8) $\times 10^{-3}$		
	$\times$ B($\overline{K}^*(1680)^0 \rightarrow K^-\,\pi^+$)				
Γ_{45}	$K^-\,\pi^+\,\pi^+$ nonresonant		(4.9 $\pm$ 2.1) %		
Γ_{46}	$\overline{K}^0\,\pi^+\,\pi^0$	[d]	(9.8 $\pm$ 3.0) %		S=1.1
Γ_{47}	$\overline{K}^0\,\rho^+$		(6.7 $\pm$ 2.5) %		
Γ_{48}	$\overline{K}^*(892)^0\,\pi^+$		(6.4 $\pm$ 0.6) $\times 10^{-3}$		
	$\times$ B($\overline{K}^{*0} \rightarrow \overline{K}^0\,\pi^0$)				
Γ_{49}	$\overline{K}^0\,\pi^+\,\pi^0$ nonresonant		(1.3 $\pm$ 1.1) %		
Γ_{50}	$K^-\,\pi^+\,\pi^+\,\pi^0$	[d]	(6.3 $\pm$ 1.0) %		
Γ_{51}	$\overline{K}^*(892)^0\,\rho^+$ total		(1.4 $\pm$ 0.9) %		
	$\times$ B($\overline{K}^{*0} \rightarrow K^-\,\pi^+$)				
Γ_{52}	$\overline{K}_1(1400)^0\,\pi^+$		(2.1 $\pm$ 0.5) %		
	$\times$ B($\overline{K}_1(1400)^0 \rightarrow K^-\,\pi^+\,\pi^0$)				
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		(4.5 $\pm$ 0.9) %		
	$\times$ B($\overline{K}^{*0} \rightarrow K^-\,\pi^+$)				
Γ_{56}	$\overline{K}^*(892)^0\,\pi^+\,\pi^0$ 3-body		(2.8 $\pm$ 0.9) %		
	$\times$ B($\overline{K}^{*0} \rightarrow K^-\,\pi^+$)				
Γ_{57}	$K^*(892)^-\,\pi^+\,\pi^+$ 3-body		(7 $\pm$ 3) $\times 10^{-3}$		
	$\times$ B($K^{*-} \rightarrow K^-\,\pi^0$)				
Γ_{58}	$K^-\,\pi^+\,\pi^+\,\pi^0$ nonresonant	[e]	(1.2 $\pm$ 0.6) %		
Γ_{59}	$\overline{K}^0\,\pi^+\,\pi^+\,\pi^-$	[d]	(6.9 $\pm$ 0.9) %		

Γ_{60}	$\overline{K}^0 a_1(1260)^+$		(4.0 ± 0.9) %		
	$\times$ B($a_1(1260)^+ \to \pi^+\pi^+\pi^-$)				
Γ_{61}	$\overline{K}_1(1400)^0 \pi^+$		(2.1 ± 0.5) %		
	$\times$ B($\overline{K}_1(1400)^0 \to \overline{K}^0\pi^+\pi^-$)				
Γ_{62}	$K^*(892)^-\pi^+\pi^+$ 3-body		(1.4 ± 0.6) %		
	$\times$ B($K^{*-} \to \overline{K}^0\pi^-$)				
Γ_{63}	$\overline{K}^0\rho^0\pi^+$ total		(4.2 ± 0.9) %		
Γ_{64}	$\overline{K}^0\rho^0\pi^+$ 3-body		(5 ± 5) $\times 10^{-3}$		
Γ_{65}	$\overline{K}^0\pi^+\pi^+\pi^-$ nonresonant		(8 ± 4) $\times 10^{-3}$		
Γ_{66}	$K^-\pi^+\pi^+\pi^+\pi^-$	[d]	(7.1 ± 1.0) $\times 10^{-3}$		
Γ_{67}	$\overline{K}^*(892)^0\pi^+\pi^+\pi^-$		(5.5 ± 2.3) $\times 10^{-3}$		
	$\times$ B($\overline{K}^{*0} \to K^-\pi^+$)				
Γ_{68}	$\overline{K}^*(892)^0\rho^0\pi^+$		($1.9\ ^{+\ 1.1}_{-\ 1.0}$) $\times 10^{-3}$		
	$\times$ B($\overline{K}^{*0} \to K^-\pi^+$)				
Γ_{69}	$\overline{K}^*(892)^0\pi^+\pi^+\pi^-$ no-ρ		(2.9 ± 1.1) $\times 10^{-3}$		
	$\times$ B($\overline{K}^{*0} \to K^-\pi^+$)				
Γ_{70}	$K^-\rho^0\pi^+\pi^+$		(3.0 ± 0.9) $\times 10^{-3}$		
Γ_{71}	$K^-\pi^+\pi^+\pi^+\pi^-$ nonresonant		< 2.3	$\times 10^{-3}$	CL=90%
Γ_{72}	$K^-\pi^+\pi^+\pi^0\pi^0$				
Γ_{73}	$\overline{K}^0\pi^+\pi^+\pi^-\pi^0$				
Γ_{74}	$\overline{K}^0\pi^+\pi^+\pi^+\pi^-\pi^-$				
Γ_{75}	$K^-\pi^+\pi^+\pi^+\pi^-\pi^0$				
Γ_{76}	$\overline{K}^0\overline{K}^0K^+$		(1.8 ± 0.8) %		
Γ_{77}	$K^+K^-\overline{K}^0\pi^+$		(5.3 ± 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}	$\overline{K}^0 a_1(1260)^+$		(8.0 ± 1.7) %		
Γ_{80}	$\overline{K}^0 a_2(1320)^+$		< 3	$\times 10^{-3}$	CL=90%
Γ_{81}	$\kappa(800)\pi^+$		(4.2 ± 1.2) %		
Γ_{82}	$\overline{K}^*(892)^0\pi^+$		(1.79± 0.17) %		S=1.1
Γ_{83}	$\overline{K}^*(892)^0\rho^+$ total	[e]	(2.1 ± 1.3) %		
Γ_{84}	$\overline{K}^*(892)^0\rho^+$ S-wave	[e]	(1.6 ± 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		(9 ± 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}	$\overline{K}_1(1400)^0\pi^+$		(4.9 ± 1.2) %		
Γ_{90}	$\overline{K}^*(1410)^0\pi^+$				
Γ_{91}	$\overline{K}_0^*(1430)^0\pi^+$		(2.3 ± 0.6) %		
Γ_{92}	$\overline{K}_2^*(1430)^0\pi^+$		(1.3 ± 0.6) $\times 10^{-3}$		

Γ_{93}	$\overline{K}^*(1680)^0\,\pi^+$		(1.13± 0.26) %	
Γ_{94}	$\overline{K}^*(892)^0\,\pi^+\,\pi^0$ total		(6.6 ± 1.4) %	
Γ_{95}	$\overline{K}^*(892)^0\,\pi^+\,\pi^0$ 3-body	[e]	(4.2 ± 1.4) %	
Γ_{96}	$K^*(892)^-\,\pi^+\,\pi^+$ total			
Γ_{97}	$K^*(892)^-\,\pi^+\,\pi^+$ 3-body		(2.0 ± 0.9) %	
Γ_{98}	$K^-\,\rho^+\,\pi^+$ total		(3.0 ± 1.1) %	
Γ_{99}	$K^-\,\rho^+\,\pi^+$ 3-body		(1.1 ± 0.4) %	
Γ_{100}	$\overline{K}^0\,\rho^0\,\pi^+$ total		(4.2 ± 0.9) %	CL=90%
Γ_{101}	$\overline{K}^0\,\rho^0\,\pi^+$ 3-body		(5 ± 5) $\times 10^{-3}$	
Γ_{102}	$\overline{K}^0\,f_0(980)\,\pi^+$			
Γ_{103}	$\overline{K}^*(892)^0\,\pi^+\,\pi^+\,\pi^-$		(8.0 ± 3.4) $\times 10^{-3}$	S=1.7
Γ_{104}	$\overline{K}^*(892)^0\,\rho^0\,\pi^+$		(2.8 $^{+\ 1.7}_{-\ 1.5}$) $\times 10^{-3}$	S=1.8
Γ_{105}	$\overline{K}^*(892)^0\,\pi^+\,\pi^+\,\pi^-$ no-ρ		(4.2 ± 1.7) $\times 10^{-3}$	
Γ_{106}	$K^-\,\rho^0\,\pi^+\,\pi^+$		(3.1 ± 1.0) $\times 10^{-3}$	

Pionic modes

Γ_{107}	$\pi^+\,\pi^0$		(2.5 ± 0.7) $\times 10^{-3}$	
Γ_{108}	$\pi^+\,\pi^+\,\pi^-$		(3.0 $^{+\ 0.4}_{-\ 0.5}$) $\times 10^{-3}$	S=1.6
Γ_{109}	$\sigma\,\pi^+$		(2.1 ± 0.5) $\times 10^{-3}$	
Γ_{110}	$\rho^0\,\pi^+$		(1.01± 0.19) $\times 10^{-3}$	
Γ_{111}	$f_0(980)\,\pi^+ \times$ B($f_0 \to \pi^+\,\pi^-$)	[f]	(1.9 ± 0.5) $\times 10^{-4}$	
Γ_{112}	$f_2(1270)\,\pi^+$ $\times$ B($f_2 \to \pi^+\,\pi^-$)		(6.0 ± 1.1) $\times 10^{-4}$	
Γ_{113}	$f_0(1370)\,\pi^+$			
Γ_{114}	$\rho(1450)^0\,\pi^+$			
Γ_{115}	$\pi^+\,\pi^+\,\pi^-$ nonresonant		(2.4 ± 2.0) $\times 10^{-4}$	
Γ_{116}	$\pi^+\,\pi^+\,\pi^-\,\pi^0$		—	
Γ_{117}	$\eta\,\pi^+ \times$ B($\eta \to \pi^+\,\pi^-\,\pi^0$)		(6.9 ± 1.4) $\times 10^{-4}$	
Γ_{118}	$\omega\,\pi^+ \times$ B($\omega \to \pi^+\,\pi^-\,\pi^0$)		< 6 $\times 10^{-3}$	CL=90%
Γ_{119}	$\pi^+\,\pi^+\,\pi^+\,\pi^-\,\pi^-$		(2.0 ± 0.4) $\times 10^{-3}$	
Γ_{120}	$\pi^+\,\pi^+\,\pi^+\,\pi^-\,\pi^-\,\pi^0$			

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

Γ_{121}	$\eta\,\pi^+$		(2.9 ± 0.6) $\times 10^{-3}$	
Γ_{122}	$\rho^0\,\pi^+$		(1.04± 0.18) $\times 10^{-3}$	
Γ_{123}	$\omega\,\pi^+$		< 7 $\times 10^{-3}$	CL=90%
Γ_{124}	$\eta\,\rho^+$		< 7 $\times 10^{-3}$	CL=90%
Γ_{125}	$\eta'(958)\,\pi^+$		(4.9 ± 1.0) $\times 10^{-3}$	
Γ_{126}	$\eta'(958)\,\rho^+$		< 5 $\times 10^{-3}$	CL=90%
Γ_{127}	$f_2(1270)\,\pi^+$		(1.03± 0.20) $\times 10^{-3}$	

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

Γ_{128}	$K^+\overline{K}^0$		$(\ 5.7 \pm 0.6\ ) \times 10^{-3}$		S=1.2
Γ_{129}	$K^+K^-\pi^+$	[d]	$(\ 8.6 \pm 0.8\ ) \times 10^{-3}$		
Γ_{130}	$\phi\pi^+ \times$ B($\phi \to K^+K^-$)		$(\ 3.0 \pm 0.3\ ) \times 10^{-3}$		
Γ_{131}	$K^+\overline{K}^*(892)^0$ $\times$ B($\overline{K}^{*0} \to K^-\pi^+$)		$(\ 2.8 \pm 0.4\ ) \times 10^{-3}$		
Γ_{132}	$K^+K^-\pi^+$ nonresonant		$(\ 4.4 \pm 0.9\ ) \times 10^{-3}$		
Γ_{133}	$K^0\overline{K}^0\pi^+$		—		
Γ_{134}	$K^*(892)^+\overline{K}^0$ $\times$ B($K^{*+} \to K^0\pi^+$)		$(\ 2.1 \pm 0.9\ )$ %		
Γ_{135}	$K^+K^-\pi^+\pi^0$		—		
Γ_{136}	$\phi\pi^+\pi^0 \times$ B($\phi \to K^+K^-$)		$(\ 1.1 \pm 0.5\ )$ %		
Γ_{137}	$\phi\rho^+ \times$ B($\phi \to K^+K^-$)		< 7	$\times 10^{-3}$	CL=90%
Γ_{138}	$K^+K^-\pi^+\pi^0$ non-ϕ		$(\ 1.5\ ^{+\ 0.7}_{-\ 0.6}\ )$ %		
Γ_{139}	$K^+\overline{K}^0\pi^+\pi^-$		$(\ 3.9 \pm 0.7\ ) \times 10^{-3}$		
Γ_{140}	$K^0K^-\pi^+\pi^+$		$(\ 5.3 \pm 0.8\ ) \times 10^{-3}$		
Γ_{141}	$K^*(892)^+\overline{K}^*(892)^0$ $\times$ B^2($K^{*+} \to K^0\pi^+$)		$(\ 1.2 \pm 0.5\ )$ %		
Γ_{142}	$K^0K^-\pi^+\pi^+$ non-$K^{*+}\overline{K}^{*0}$		< 7.9	$\times 10^{-3}$	CL=90%
Γ_{143}	$K^+K^-\pi^+\pi^+\pi^-$		—		
Γ_{144}	$\phi\pi^+\pi^+\pi^-$ $\times$ B($\phi \to K^+K^-$)		< 1	$\times 10^{-3}$	CL=90%
Γ_{145}	$K^+K^-\pi^+\pi^+\pi^-$ nonresonant		< 3	%	CL=90%

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

Γ_{146}	$\phi\pi^+$		$(\ 6.0 \pm 0.6\ ) \times 10^{-3}$		
Γ_{147}	$\phi\pi^+\pi^0$		$(\ 2.3 \pm 1.0\ )$ %		
Γ_{148}	$\phi\rho^+$		< 1.4	%	CL=90%
Γ_{149}	$\phi\pi^+\pi^+\pi^-$		< 2	$\times 10^{-3}$	CL=90%
Γ_{150}	$K^+\overline{K}^*(892)^0$		$(\ 4.1 \pm 0.5\ ) \times 10^{-3}$		
Γ_{151}	$K^*(892)^+\overline{K}^0$		$(\ 3.0 \pm 1.4\ )$ %		
Γ_{152}	$K^*(892)^+\overline{K}^*(892)^0$		$(\ 2.6 \pm 1.1\ )$ %		

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	$(\ 6.7 \pm 1.5\ ) \times 10^{-4}$		
Γ_{154}	$K^+\rho^0$	DC	$(\ 2.5 \pm 1.2\ ) \times 10^{-4}$		
Γ_{155}	$K^*(892)^0\pi^+$	DC	$(\ 3.5 \pm 1.6\ ) \times 10^{-4}$		
Γ_{156}	$K^+\pi^+\pi^-$ nonresonant	DC	$(\ 2.4 \pm 1.2\ ) \times 10^{-4}$		
Γ_{157}	$K^+K^+K^-$	DC	$(\ 8.4 \pm 2.0\ ) \times 10^{-5}$		
Γ_{158}	ϕK^+	DC	< 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*		$<$	1.5	$\times 10^{-5}$	CL=90%
Γ_{161}	$\rho^+ \mu^+ \mu^-$	*C1*		$<$	5.6	$\times 10^{-4}$	CL=90%
Γ_{162}	$K^+ e^+ e^-$		[*g*]	$<$	2.0	$\times 10^{-4}$	CL=90%
Γ_{163}	$K^+ \mu^+ \mu^-$		[*g*]	$<$	4.4	$\times 10^{-5}$	CL=90%
Γ_{164}	$\pi^+ e^\pm \mu^\mp$	*LF*	[*h*]	$<$	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*	[*h*]	$<$	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*		$<$	1.7	$\times 10^{-5}$	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*		$<$	1.2	$\times 10^{-4}$	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.	(32 $\pm$ 5) %	S=1.1

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

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

CONSTRAINED FIT INFORMATION

An overall fit to 30 branching ratios uses 56 measurements and one constraint to determine 19 parameters. The overall fit has a $\chi^2 = 41.6$ for 38 degrees of freedom.

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

x_{13}	7									
x_{18}	7	3								
x_{27}	19	37	8							
x_{28}	36	15	20	40						
x_{38}	41	16	17	45	85					
x_{39}	41	17	18	46	88	97				
x_{46}	0	0	0	0	0	0	0			
x_{50}	10	4	4	12	22	24	25	0		
x_{59}	13	6	6	15	29	32	33	0	19	
x_{66}	21	9	9	24	46	51	52	0	13	17
x_{82}	31	13	13	34	66	73	75	0	19	25
x_{89}	7	3	3	8	15	17	17	0	32	38
x_{97}	4	2	2	4	9	9	10	0	29	14
x_{103}	7	3	3	8	15	16	17	0	4	5
x_{104}	5	2	2	5	10	11	12	0	3	4
x_{108}	21	9	9	24	46	51	52	0	13	17
x_{128}	26	11	12	30	56	63	64	0	16	21
x_{178}	−39	−30	−13	−43	−55	−59	−61	−56	−46	−47
	x_{11}	x_{13}	x_{18}	x_{27}	x_{28}	x_{38}	x_{39}	x_{46}	x_{50}	x_{59}

x_{82}	39							
x_{89}	9	13						
x_{97}	5	7	12					
x_{103}	30	12	3	2				
x_{104}	9	9	2	1	16			
x_{108}	27	39	9	5	9	6		
x_{128}	34	48	11	6	11	8	34	
x_{178}	−34	−47	−46	−32	−17	−11	−32	−40
	x_{66}	x_{82}	x_{89}	x_{97}	x_{103}	x_{104}	x_{108}	x_{128}

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 below.

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

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

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.088 ± 0.005 OUR NEW AVERAGE		[0.087 ± 0.006 OUR 2002 AVERAGE]			
$0.093 \pm 0.009 \pm 0.009$	88	KAYIS-TOPAK.02		CHRS	ν_μ emulsion
$0.095 \pm 0.007 {}^{+0.014}_{-0.013}$	2829	ASTIER	00D	NOMD	$\nu_\mu \text{Fe} \to \mu^-\mu^+\text{X}$
$0.090 \pm 0.007 {}^{+0.007}_{-0.006}$	476	[4] ABBIENDI	99K	OPAL	$Z^0 \to c\overline{c}$
$0.086 \pm 0.017 {}^{+0.008}_{-0.007}$	69	[5] ALBRECHT	92F	ARG	$e^+e^- \approx 10$ GeV
$0.078 \pm 0.009 \pm 0.012$		ONG	88	MRK2	e^+e^- 29 GeV
$0.078 \pm 0.015 \pm 0.02$		BARTEL	87	JADE	e^+e^- 34.6 GeV
$0.082 \pm 0.012 {}^{+0.02}_{-0.01}$		ALTHOFF	84G	TASS	e^+e^- 34.5 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.089 \pm 0.018 \pm 0.025$		BARTEL	85J	JADE	See BARTEL 87

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

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

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

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

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

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

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.255±0.015±0.008	2371	[8] ABREU	000	DLPH	$Z^0 \to c\overline{c}$

[8] ABREU 000 uses slow pions opposite fully reconstructed $D^*(2010)^+$, D^+, or D^0 mesons as a signal of $D^*(2010)^-$ production.

Inclusive modes

$\Gamma(e^+ \text{anything})/\Gamma_{\text{total}}$ 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, pp 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 $D^0 \to (e^+ \text{anything})$ / (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 experiments at $E_{\text{cm}} = 3.77$ GeV are included in the average here. We don't put this result in the Meson 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.

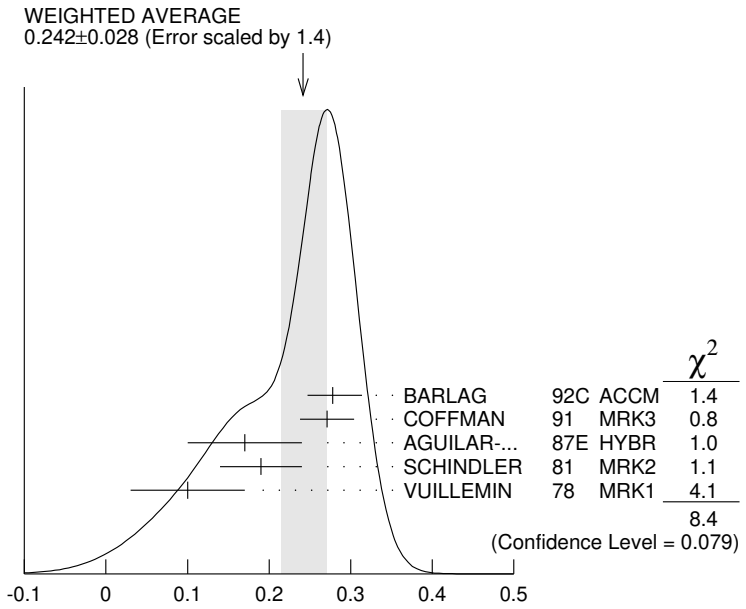
[13] Average BR for charm $\to e^+X$. Unlike at $E_{\text{cm}} = 3.77$ GeV, the admixture of charmed mesons is unknown.

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.242±0.028 OUR AVERAGE		Error includes scale factor of 1.4. See the ideogram below.			
$0.278^{+0.036}_{-0.031}$		[15] BARLAG	92C	ACCM	π^- Cu 230 GeV
0.271±0.023±0.024		COFFMAN	91	MRK3	e^+e^- 3.77 GeV
0.17 ±0.07		AGUILAR-...	87E	HYBR	πp, pp 360, 400 GeV
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
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.16^{+0.08}_{-0.07}$		AGUILAR-...	86B	HYBR	See AGUILAR-BENITEZ 87E

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



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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.59 ±0.07 OUR AVERAGE					
0.612±0.065±0.043		COFFMAN	91	MRK3	e^+e^- 3.77 GeV
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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.058±0.014 OUR AVERAGE					
0.055±0.013±0.009		COFFMAN	91	MRK3	e^+e^- 3.77 GeV
$0.08\ ^{+0.06}_{-0.05}$		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 $E_{\text{cm}} = 3.77$ 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 $E_{\text{cm}} = 4.03$ GeV. PARTRIDGE 81 observes a substantially higher η cross section at 4.03 GeV.

$\Gamma(\phi \text{ anything})/\Gamma_{\text{total}}$ 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)%.

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

$\Gamma(\mu^+\nu_\mu)/\Gamma_{\text{total}}$ 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
$\mathbf{0.0008\ ^{+0.0016+0.0005}_{-0.0005-0.0002}}$		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 $f_D = (300\ ^{+180+80}_{-150-40})$ 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.

$\Gamma(\overline{K}^0 \ell^+ \nu_\ell)/\Gamma_{\text{total}}$ 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
0.067±0.008 OUR AVERAGE			
0.066±0.009	PDG	02	Our $\Gamma(\overline{K}^0 e^+ \nu_e)/\Gamma_{\text{total}}$
$0.072^{+0.031}_{-0.020}$	PDG	02	1.03 × our $\Gamma(\overline{K}^0 \mu^+ \nu_\mu)/\Gamma_{\text{total}}$

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.065±0.009 OUR NEW UNCHECKED FIT [0.066 ± 0.009 OUR 2002 FIT]					
$\mathbf{0.06\ ^{+0.022}_{-0.013}\pm 0.007}$	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
2.39±0.31 OUR NEW UNCHECKED FIT [2.38 ± 0.31 OUR 2002 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
0.73±0.09 OUR FIT				
0.66±0.09±0.14	ANJOS	91C	E691	γ Be 80–240 GeV

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.07\ ^{+0.028}_{-0.016}\pm 0.012}$	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
$\mathbf{0.044^{+0.009}_{-0.007}}$ **OUR NEW UNCHECKED FIT** [$0.041^{+0.009}_{-0.007}$ OUR 2002 FIT]						
$\mathbf{0.035^{+0.012}_{-0.007}\pm 0.004}$		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.

$\Gamma(\overline{K}^*(892)^0\,\ell^+\nu_\ell)/\Gamma_{\rm total}$ 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
0.048±0.004 OUR AVERAGE			
0.048±0.005	PDG	02	Our $\Gamma(\overline{K}^{*0}\,e^+\nu_e)/\Gamma_{\rm total}$
0.047±0.006	PDG	02	1.05 × our $\Gamma(\overline{K}^{*0}\,\mu^+\nu_\mu)/\Gamma_{\rm total}$

$\Gamma(\overline{K}^*(892)^0\,e^+\nu_e)/\Gamma(K^-\pi^+e^+\nu_e)$ 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.

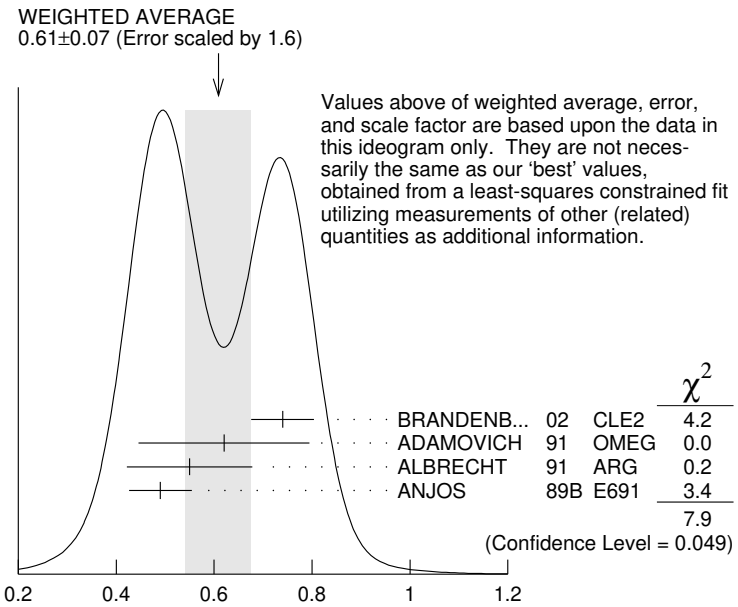
VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$1.21^{+0.21}_{-0.24}$ OUR NEW UNCHECKED FIT		[$1.16^{+0.20}_{-0.24}$ OUR 2002 FIT]			
1.0 ±0.3	35	ADAMOVICH	91	OMEG	π^- 340 GeV

$\Gamma(\overline{K}^*(892)^0\,e^+\nu_e)/\Gamma(K^-\pi^+\pi^+)$ 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 NEW UNCHECKED FIT Error includes scale factor of 1.7. [0.53 ± 0.05 OUR 2002 FIT]					
0.61±0.07 OUR NEW AVERAGE Error includes scale factor of 1.6. See the ideogram below. [0.54 ± 0.05 OUR 2002 AVERAGE]					
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.



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

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

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

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

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

VALUE	DOCUMENT ID
0.0379±0.0033 OUR NEW UNCHECKED FIT Error includes scale factor of 1.1.	
[0.032 ± 0.004 OUR 2002 FIT Scale factor = 1.1]	

$\Gamma\left(\overline{K}^*(892)^0\,\mu^+\,\nu_\mu\right)/\Gamma_{\text{total}}$ 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
0.052 ±0.004 OUR NEW UNCHECKED FIT Error includes scale factor of 1.1.					
[0.045 ± 0.006 OUR 2002 FIT Scale factor = 1.1]					
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 $\Gamma(D^0 \to K^-\,\mu^+\,\nu_\mu) = (7.0 \pm 0.7) \times 10^{10}\,\text{s}^{-1}$ 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
0.590 ± 0.023 OUR NEW UNCHECKED FIT Error includes scale factor of 1.1. [0.49 ± 0.06 OUR 2002 FIT]					
0.597 ± 0.022 OUR NEW AVERAGE [0.53 ± 0.06 OUR 2002 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 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. • • •					
$0.022^{+0.047}_{-0.006} \pm 0.004$	1	[29] AGUILAR-...	87F	HYBR	πp, pp 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. • • •					
$0.044^{+0.052}_{-0.013} \pm 0.007$	2	[30] AGUILAR-...	87F	HYBR	πp, pp 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: $|V_{cd}/V_{cs}|^2 \cdot |f_+^\pi(0)/f_+^K(0)|^2 = 0.085 \pm 0.027 \pm 0.014$.

$\Gamma(\pi^+\pi^-e^+\nu_e)/\Gamma_{total}$ 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.

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

$\Gamma(\rho^0e^+\nu_e)/\Gamma(\overline{K}^*(892)^0e^+\nu_e)$ 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 $D^+ \to \eta' e^+\nu_e$ and other backgrounds to get this result.

$\Gamma(\rho^0\mu^+\nu_\mu)/\Gamma(\overline{K}^*(892)^0\mu^+\nu_\mu)$ Γ_{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 $D^+ \to \eta'\mu^+\nu_\mu$ and other backgrounds to get this result.

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

[37] This KODAMA 93C result is based on a final signal of $4.0^{+2.8}_{-2.3}\pm1.3$ 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
0.0271±0.0020 OUR NEW UNCHECKED FIT Error includes scale factor of 1.1. [0.0277 ± 0.0018 OUR 2002 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 $\sigma(e^+e^- \to \psi(3770)) \times$ 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 $\sigma(e^+e^- \to \psi(3770)) \times$ 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 $D^+ \to \overline{K}^0\pi^+$ 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
0.306 ±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 $D^+ \to \overline{K}\pi$ amplitudes.

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.088±0.006 OUR NEW UNCHECKED FIT Error includes scale factor of 1.1. [0.091 ± 0.006 OUR 2002 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 $D^+ \to K^-\pi^+\pi^+$ and $D^0 \to K^-\pi^+$ branching fractions to be 2.35 ± 0.16 ± 0.16 and uses their absolute measurement of the $D^0 \to K^-\pi^+$ fraction (AKERIB 93).

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

[43] PERUZZI 77 (MARK-1) measures $\sigma(e^+e^- \to \psi(3770)) \times$ 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.

$\Gamma(\kappa(800)\pi^+)/\Gamma(K^-\pi^+\pi^+)$ Γ_{81}/Γ_{39}

The $\kappa(800)$ is a broad scalar resonance. AITALA 02 finds that including such a resonance in the fit to the $D^+ \to K^-\pi^+\pi^+$ Dalitz plot greatly improves the fit.

2003 Web-edition note: The results of AITALA 02 for the $D^+ \to K^-\pi^+\pi^+$ Dalitz plot analysis so disagree with earlier analyses that we shall have to make a choice for the "official" 2004 edition. Averaging the results makes no sense.

VALUE	DOCUMENT ID		TECN	COMMENT
0.478±0.121±0.053	AITALA	02	E791	π^- nucleus, 500 GeV

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

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

2003 Web-edition note: The results of AITALA 02 for the $D^+ \to K^-\pi^+\pi^+$ Dalitz plot analysis so disagree with earlier analyses that we shall have to make a choice for the "official" 2004 edition. Averaging the results makes no sense.

VALUE	DOCUMENT ID		TECN	COMMENT
0.202±0.013 OUR NEW UNCHECKED FIT [0.212 ± 0.016 OUR 2002 FIT]				
0.201±0.012 OUR NEW AVERAGE [0.210 ± 0.015 OUR 2002 AVERAGE]				
0.185±0.015±0.014	[45] AITALA	02	E791	π^- nucleus, 500 GeV
0.206±0.009±0.014	FRABETTI	94G	E687	γ Be, $\overline{E}_\gamma \approx 220$ GeV
0.255±0.014±0.050	ANJOS	93	E691	γ Be 90–260 GeV
0.21 ±0.06 ±0.06	ALVAREZ	91B	NA14	Photoproduction
0.20 ±0.02 ±0.11	ADLER	87	MRK3	e^+e^- 3.77 GeV

[45] AITALA 02 includes a broad scalar $\kappa(800)$ in the fit to the $D^+ \to K^-\pi^+\pi^+$ Dalitz plot. This (a) greatly improves the fit, and (b) gives results in other channels that greatly disagree with previous analyses.

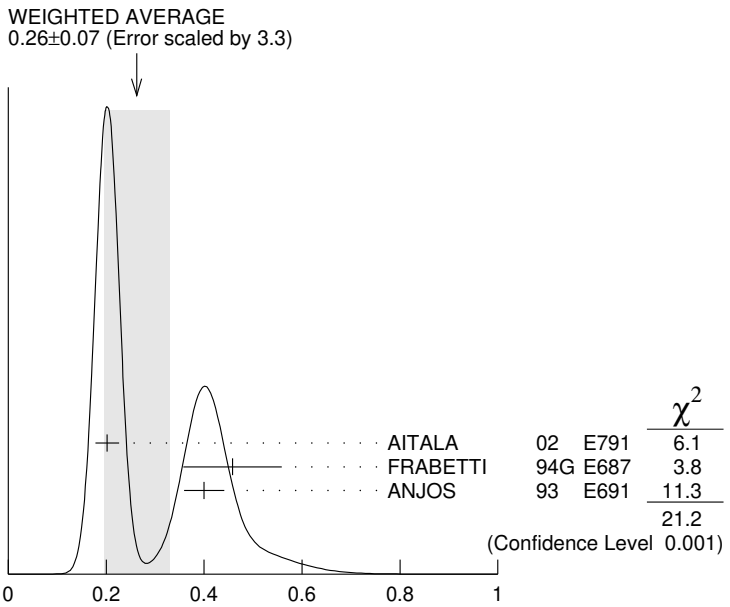
$\Gamma(\overline{K}_0^*(1430)^0\pi^+)/\Gamma(K^-\pi^+\pi^+)$ Γ_{91}/Γ_{39}

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

2003 Web-edition note: The results of AITALA 02 for the $D^+ \to K^-\pi^+\pi^+$ Dalitz plot analysis so disagree with earlier analyses that we shall have to make a choice for the "official" 2004 edition. Averaging the results makes no sense.

VALUE	DOCUMENT ID		TECN	COMMENT
0.26 ±0.07 OUR NEW AVERAGE Error includes scale factor of 3.3. See the ideogram below. [0.41 ± 0.04 OUR 2002 AVERAGE]				
0.202±0.023±0.008	[46] AITALA	02	E791	π^- nucleus, 500 GeV
0.458±0.035±0.094	FRABETTI	94G	E687	γ Be, $\overline{E}_\gamma \approx 220$ GeV
0.400±0.031±0.027	ANJOS	93	E691	γ Be 90–260 GeV

[46] AITALA 02 includes a broad scalar $\kappa(800)$ in the fit to the $D^+ \to K^-\pi^+\pi^+$ Dalitz plot. This (a) greatly improves the fit, and (b) gives results in other channels that greatly disagree with previous analyses.



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

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

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

2003 Web-edition note: The results of AITALA 02 for the $D^+ \to K^-\,\pi^+\,\pi^+$ Dalitz plot analysis so disagree with earlier analyses that we shall have to make a choice for the "official" 2004 edition. Averaging the results makes no sense.

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
0.015±0.003±0.006	AITALA	02	E791	π^- nucleus, 500 GeV

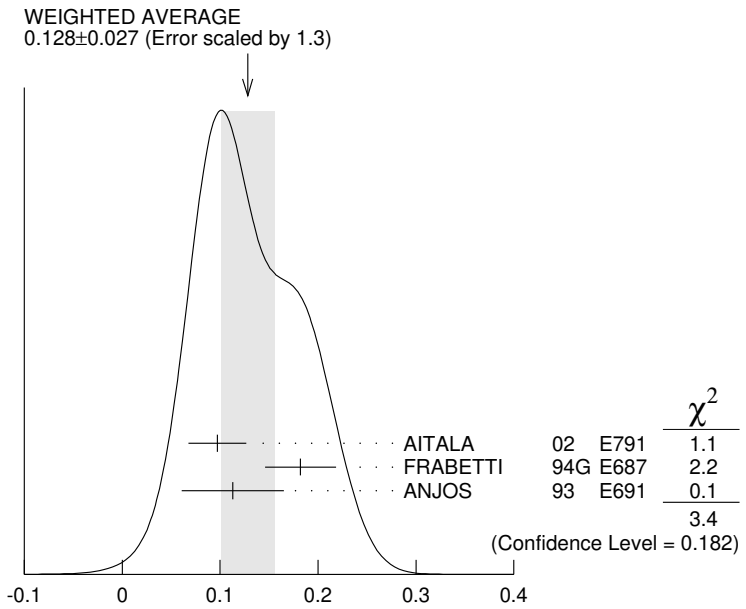
$\Gamma\left(\overline{K}^*(1680)^0\,\pi^+\right)/\Gamma\left(K^-\,\pi^+\,\pi^+\right)$ Γ_{93}/Γ_{39}

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

2003 Web-edition note: The results of AITALA 02 for the $D^+ \to K^-\,\pi^+\,\pi^+$ Dalitz plot analysis so disagree with earlier analyses that we shall have to make a choice for the "official" 2004 edition. Averaging the results makes no sense.

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
0.128±0.027 OUR NEW AVERAGE Error includes scale factor of 1.3. See the ideogram below. [0.160 ± 0.032 OUR 2002 AVERAGE Scale factor = 1.1]				
0.097±0.027±0.012	[47] AITALA	02	E791	π^- nucleus, 500 GeV
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

[47] AITALA 02 includes a broad scalar $\kappa(800)$ in the fit to the $D^+ \to K^-\pi^+\pi^+$ Dalitz plot. This (a) greatly improves the fit, and (b) gives results in other channels that greatly disagree with previous analyses.



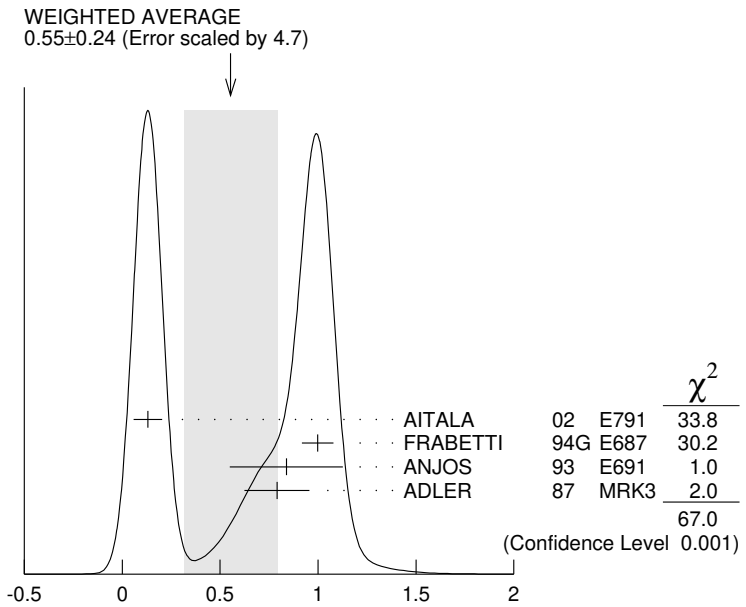
$\Gamma\left(\overline{K}^*(1680)^0\pi^+\right)/\Gamma\left(K^-\pi^+\pi^+\right)$ Γ_{93}/Γ_{39}

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

2003 Web-edition note: The results of AITALA 02 for the $D^+ \to K^-\pi^+\pi^+$ Dalitz plot analysis so disagree with earlier analyses that we shall have to make a choice for the "official" 2004 edition. Averaging the results makes no sense.

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
0.55 ±0.24 OUR NEW AVERAGE Error includes scale factor of 4.7. See the ideogram below. [0.95 ± 0.07 OUR 2002 AVERAGE]				
0.130±0.058±0.044	[48] AITALA	02	E791	π^- nucleus, 500 GeV
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

[48] AITALA 02 includes a broad scalar $\kappa(800)$ in the fit to the $D^+ \to K^-\pi^+\pi^+$ Dalitz plot. This (a) greatly improves the fit, and (b) gives results in other channels that greatly disagree with previous analyses.



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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.098±0.030 OUR NEW UNCHECKED FIT Error includes scale factor of 1.1. [0.097 ± 0.030 OUR 2002 FIT Scale factor = 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	[49] SCHINDLER	81	MRK2	e^+e^- 3.771 GeV

[49] SCHINDLER 81 (MARK-2) measures $\sigma(e^+e^- \to \psi(3770)) \times$ 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.

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

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

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

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.18±0.05 OUR NEW UNCHECKED FIT [0.20 ± 0.06 OUR 2002 FIT]				
0.57±0.18±0.18	ADLER	87	MRK3	e^+e^- 3.77 GeV

$\Gamma\left(\overline{K}^0\pi^+\pi^0\text{ nonresonant}\right)/\Gamma\left(\overline{K}^0\pi^+\pi^0\right)$ **Γ_{49}/Γ_{46}**

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.063±0.010 OUR NEW UNCHECKED FIT [0.064 ± 0.011 OUR 2002 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. • • •					
$0.034^{+0.056}_{-0.070}$		[50] BARLAG	92C	ACCM	π^- Cu 230 GeV
$0.022^{+0.047}_{-0.006}\pm0.004$	1	[50] AGUILAR-...	87F	HYBR	πp, pp 360, 400 GeV
$0.063^{+0.014}_{-0.013}\pm0.012$	175	BALTRUSAIT...	86E	MRK3	See COFFMAN 92B

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.71±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

$\Gamma(\overline{K}^*(892)^0\rho^+\text{ total})/\Gamma(K^-\pi^+\pi^+\pi^0)$ 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	[51] ANJOS	92C	E691	γ Be 90–260 GeV

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

$\Gamma(\overline{K}^*(892)^0\rho^+ S\text{-wave})/\Gamma(K^-\pi^+\pi^+\pi^0)$ 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	γ Be 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	γ Be 90–260 GeV

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

$\Gamma(K^-\rho^+\pi^+$ 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	γ Be 90–260 GeV

$\Gamma(K^-\rho^+\pi^+$ 3-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	γ Be 90–260 GeV
0.159±0.065±0.060	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma(\overline{K}^*(892)^0\,\pi^+\pi^0$ 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	γ Be 90–260 GeV

$\Gamma(\overline{K}^*(892)^0\,\pi^+\pi^0$ 3-body$)/\Gamma_{\text{total}}$ 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	[52] COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

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

$\Gamma(\overline{K}^*(892)^0\,\pi^+\pi^0$ 3-body$)/\Gamma(K^-\pi^+\pi^+\pi^0)$ 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

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

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.32±0.13 OUR NEW UNCHECKED FIT Error includes scale factor of 1.1. [0.32 ± 0.14 OUR 2002 FIT Scale factor = 1.1]				
0.24±0.12±0.09	ANJOS	92C	E691	γ Be 90–260 GeV

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.002	90	[53] ANJOS		92C	E691 γ Be 90–260 GeV

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

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

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.069±0.009 OUR NEW UNCHECKED FIT [0.070 ± 0.009 OUR 2002 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	[54] SCHINDLER	81	MRK2	e^+e^- 3.771 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.042^{+0.019}_{-0.017}$		[55] BARLAG		92C	ACCM π^- Cu 230 GeV
$0.243^{+0.064}_{-0.041}\pm0.041$	11	[55] AGUILAR-...		87F	HYBR πp, pp 360, 400 GeV

[54] SCHINDLER 81 (MARK-2) measures $\sigma(e^+e^- \to \psi(3770)) \times$ 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.

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.78±0.10 OUR FIT					
0.77±0.07±0.11	229	ANJOS		92C	E691 γ Be 90–260 GeV

$\Gamma(\overline{K}^0 a_1(1260)^+)/\Gamma(\overline{K}^0\pi^+\pi^+\pi^-)$ 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 γ Be 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	γ Be 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	[56] ANJOS	92C	E691	γ Be 90–260 GeV

[56] 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
0.020±0.009 OUR NEW UNCHECKED FIT [0.021 ± 0.009 OUR 2002 FIT]					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.013	90	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

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

$\Gamma(\overline{K}^0\rho^0\pi^+\text{total})/\Gamma(\overline{K}^0\pi^+\pi^+\pi^-)$ 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

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

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

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

$\Gamma(\overline{K}^0 f_0(980)\pi^+)/\Gamma_{\text{total}}$ 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

$\Gamma(\overline{K}^0\pi^+\pi^+\pi^-\text{ nonresonant})/\Gamma(\overline{K}^0\pi^+\pi^+\pi^-)$ 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

$\Gamma(K^-\pi^+\pi^+\pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_{66}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.0037^{+0.0012}_{-0.0010}$	[57] BARLAG	92C	ACCM	π^- Cu 230 GeV

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.080±0.009 OUR FIT					
0.083±0.009 OUR AVERAGE					
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

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

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

VALUE	DOCUMENT ID		TECN	COMMENT
1.1 ±0.4 OUR FIT Error includes scale factor of 1.8.				
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
$0.032^{+0.019}_{-0.017}$ **OUR FIT** Error includes scale factor of 1.8.			
$0.023\pm0.010\pm0.006$	FRABETTI 97C	E687	γ Be, $\overline{E}_\gamma \approx$ 200 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
$0.36^{+0.24}_{-0.20}$ **OUR FIT** Error includes scale factor of 1.8.			
$0.75\pm0.17\pm0.19$	ANJOS 90D	E691	Photoproduction

$\Gamma(\overline{K}^*(892)^0\pi^+\pi^+\pi^-$ 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
$0.048\pm0.015\pm0.011$	FRABETTI 97C	E687	γ Be, $\overline{E}_\gamma \approx$ 200 GeV

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

VALUE	DOCUMENT ID	TECN	COMMENT
$0.034\pm0.009\pm0.005$	FRABETTI 97C	E687	γ Be, $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma(K^-\pi^+\pi^+\pi^+\pi^-$ nonresonant$)/\Gamma(K^-\pi^+\pi^+)$ Γ_{71}/Γ_{39}

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.026	90	FRABETTI 97C	E687	γ Be, $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma(K^-\pi^+\pi^+\pi^0\pi^0)/\Gamma_{total}$ 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, pp 360, 400 GeV

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

$\Gamma(\overline{K}^0\pi^+\pi^+\pi^-\pi^0)/\Gamma_{total}$ 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, pp 360, 400 GeV

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

$\Gamma(\overline{K}^0\pi^+\pi^+\pi^+\pi^-\pi^-)/\Gamma_{total}$ 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.

$\Gamma(K^-\pi^+\pi^+\pi^+\pi^-\pi^0)/\Gamma_{total}$ 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.

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.20 ± 0.09 OUR AVERAGE Error includes scale factor of 2.4.				
$0.14\pm0.04\pm0.02$	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
$0.0077\pm0.0015\pm0.0009$	35	LINK	01C FOCS	γ nucleus, $\overline{E}_\gamma\approx$ 180 GeV

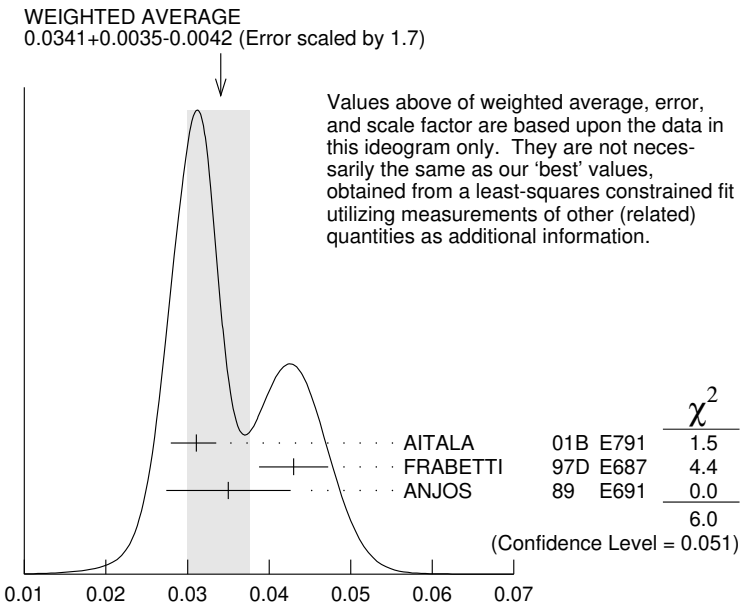
Pionic modes

$\Gamma(\pi^+\pi^0)/\Gamma(K^-\pi^+\pi^+)$ Γ_{107}/Γ_{39}

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
$0.028\pm0.006\pm0.005$	34	SELEN	93 CLE2	$e^+e^-\approx\ \Upsilon(4S)$

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
$0.034\ \pm0.004$ OUR FIT Error includes scale factor of 2.0.				
$0.0341^{+0.0035}_{-0.0042}$ 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
$0.043\ \pm0.003\ \pm0.003$	236	FRABETTI	97D E687	γ Be $\approx$ 200 GeV
$0.035\ \pm0.007\ \pm0.003$	83	ANJOS	89 E691	Photoproduction
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.032\ \pm0.011\ \pm0.003$	20	ADAMOVICH	93 WA82	π^- 340 GeV
$0.042\ \pm0.016\ \pm0.010$	57	BALTRUSAIT...	85E MRK3	e^+e^- 3.77 GeV



$\Gamma\left(\pi^+\,\pi^+\,\pi^-\right)/\Gamma\left(K^-\,\pi^+\,\pi^+\right)$

$\Gamma(\sigma\pi^+)/\Gamma(\pi^+\pi^+\pi^-)$ $\Gamma_{109}/\Gamma_{108}$

Unseen decay modes of the σ are included.

VALUE	DOCUMENT ID		TECN	COMMENT
$0.695\pm0.135\pm0.032$	[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.

$\Gamma(\rho^0\pi^+)/\Gamma(\pi^+\pi^+\pi^-)$ $\Gamma_{110}/\Gamma_{108}$

VALUE	DOCUMENT ID		TECN	COMMENT
$0.336\pm0.032\pm0.022$	AITALA	01B	E791	π^- nucleus, 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.289\pm0.055\pm0.058$	[63] FRABETTI	97D	E687	γ Be $\approx$ 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_{110}/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

$\Gamma(f_0(980)\pi^+ \times B(f_0 \to \pi^+\pi^-))/\Gamma(\pi^+\pi^+\pi^-)$ $\Gamma_{111}/\Gamma_{108}$

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.

$\Gamma(f_2(1270)\pi^+)/\Gamma(\pi^+\pi^+\pi^-)$ $\Gamma_{127}/\Gamma_{108}$

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.

$\Gamma(f_0(1370)\pi^+)/\Gamma(\pi^+\pi^+\pi^-)$ $\Gamma_{113}/\Gamma_{108}$

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.

$\Gamma(\rho(1450)^0\pi^+)/\Gamma(\pi^+\pi^+\pi^-)$ $\Gamma_{114}/\Gamma_{108}$

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$)/\Gamma(\pi^+\pi^+\pi^-)$ $\Gamma_{115}/\Gamma_{108}$

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_{115}/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_{116}/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_{116}/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

$\Gamma(\eta\pi^+)/\Gamma(\phi\pi^+)$ $\Gamma_{121}/\Gamma_{146}$

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_{121}/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. • • •					
$0.083\pm0.023\pm0.014$		99	DAOUDI	92 CLE2	See JESSOP 98
<0.12	90		ANJOS	89E E691	Photoproduction

$\Gamma(\omega\pi^+)/\Gamma(K^-\pi^+\pi^+)$ Γ_{123}/Γ_{39}

Unseen decay modes of the ω are included.

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

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

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.0010^{+0.0008}_{-0.0007}$	[71] BARLAG	92C	ACCM π^- Cu 230 GeV

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

$\Gamma(\pi^+\pi^+\pi^+\pi^-\pi^-)/\Gamma(K^-\pi^+\pi^+)$ Γ_{119}/Γ_{39}

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
0.023±0.004±0.002		58	FRABETTI	97C E687	γ Be, $\overline{E}_\gamma \approx 200$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.019	90		ANJOS	89 E691	Photoproduction

$\Gamma(\eta\rho^+)/\Gamma(\phi\pi^+)$ $\Gamma_{124}/\Gamma_{146}$

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_{124}/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

$\Gamma(\pi^+\pi^+\pi^+\pi^-\pi^-\pi^0)/\Gamma_{total}$ Γ_{120}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.0029^{+0.0029}_{-0.0020}$	[72] BARLAG	92C	ACCM	π^- Cu 230 GeV

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

$\Gamma(\eta'(958)\pi^+)/\Gamma(\phi\pi^+)$ $\Gamma_{125}/\Gamma_{146}$

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_{125}/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	γ Be, $\overline{E}_\gamma \approx$ 145 GeV

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

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_{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. • • •					
<0.17	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_{128}/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	γ Be $\overline{E}_\gamma \approx$ 200 GeV
0.271 ±0.065 ±0.039	69	ANJOS	90C	E691	γ Be
0.317 ±0.086 ±0.048	31	BALTRUSAIT...	85E	MRK3	e^+e^- 3.77 GeV
0.25 ±0.15	6	SCHINDLER	81	MRK2	e^+e^- 3.771 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.1996±0.0119±0.0096	949	[73] LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV
0.222 ±0.041 ±0.029	70	[74] BISHAI	97	CLE2	$e^+e^- \approx \Upsilon(4S)$

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

$\Gamma(K^+\overline{K}^0)/\Gamma(K^-\pi^+\pi^+)$ Γ_{128}/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	[75] BISHAI	97	CLE2	$e^+e^- \approx \Upsilon(4S)$

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

$\Gamma(K^+K^-\pi^+)/\Gamma(K^-\pi^+\pi^+)$ Γ_{129}/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		[76] 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

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

$\Gamma(K^+K^-\pi^+$ **nonresonant**$)/\Gamma(K^-\pi^+\pi^+)$ Γ_{132}/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	γ Be $\overline{E}_\gamma \approx 200$ GeV

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

Unseen decay modes of the ϕ are included.

VALUE	DOCUMENT ID		TECN	COMMENT
0.023±0.010	[77] BARLAG	92C	ACCM	π^- Cu 230 GeV

[77] 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

$\Gamma(K^+K^-\pi^+\pi^0$ **non-ϕ**$)/\Gamma_{\text{total}}$ Γ_{138}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.015^{+0.007}_{-0.006}}$	[78] BARLAG	92C	ACCM	π^- Cu 230 GeV

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

$\Gamma(K^+K^-\pi^+\pi^0$ **non-ϕ**$)/\Gamma(K^-\pi^+\pi^+)$ Γ_{138}/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_{139}/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_{139}/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_{140}/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_{140}/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	[79] BARLAG	92C	ACCM	π^- Cu 230 GeV

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

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

$\Gamma(K^0K^-\pi^+\pi^+$ non-$K^{*+}\overline{K}^{*0})/\Gamma_{total}$ Γ_{142}/Γ

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

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

Unseen decay modes of the ϕ are included.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.002	90	0	ANJOS	88	E691	Photoproduction

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

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

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

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.03	90	12	ANJOS	88	E691	Photoproduction

Rare or forbidden modes

$\Gamma(K^+\pi^+\pi^-)/\Gamma(K^-\pi^+\pi^+)$ 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

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

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	γ Be, $\overline{E}_\gamma$= 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	γ Be, $\overline{E}_\gamma$= 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
9.5 ± 2.2 OUR NEW AVERAGE			[0.057 ± 0.021 OUR 1994 AVERAGE]			
9.49± 2.17± 0.22		65	[80] LINK	02I	FOCS	γ nucleus, $\approx$ 180 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 16	90		[81] FRABETTI	95F	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
570 ±200 ±70		13	ADAMOVICH	93	WA82	π^- 340 GeV

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

[81] 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	γ Be, $\overline{E}_\gamma \approx$ 220 GeV

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

$0.058^{+0.032}_{-0.026}\pm0.007$	4	[82]	ANJOS	92D	E691	γ Be, $\overline{E}_\gamma = 145$ GeV

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

$\Gamma(\pi^+ e^+ e^-)/\Gamma_{\text{total}}$ 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
$<5.2\times10^{-5}$	90		AITALA	99G	E791	π^- N 500 GeV

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

$<1.1\times10^{-4}$	90		FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<6.6\times10^{-5}$	90		AITALA	96	E791	π^- N 500 GeV
$<2.5\times10^{-3}$	90		WEIR	90B	MRK2	e^+e^- 29 GeV
$<2.6\times10^{-3}$	90	39	HAAS	88	CLEO	e^+e^- 10 GeV

$\Gamma(\pi^+ \mu^+ \mu^-)/\Gamma_{\text{total}}$ 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
$<1.5\times10^{-5}$	90		AITALA	99G	E791	π^- N 500 GeV

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

$<8.9\times10^{-5}$	90		FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<1.8\times10^{-5}$	90		AITALA	96	E791	π^- N 500 GeV
$<2.2\times10^{-4}$	90	0	KODAMA	95	E653	π^- emulsion 600 GeV
$<5.9\times10^{-3}$	90		WEIR	90B	MRK2	e^+e^- 29 GeV
$<2.9\times10^{-3}$	90	36	HAAS	88	CLEO	e^+e^- 10 GeV

$\Gamma(\rho^+ \mu^+ \mu^-)/\Gamma_{\text{total}}$ 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
$<5.6\times10^{-4}$	90	0	KODAMA	95	E653	π^- emulsion 600 GeV

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.0\times10^{-4}$	90	AITALA	99G	E791	π^- N 500 GeV
$<2.0\times10^{-4}$	90	FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV

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

$<4.8\times10^{-3}$	90	WEIR	90B	MRK2	e^+e^- 29 GeV

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<4.4 \times 10^{-5}$	90		AITALA	99G	E791	π^- N 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<9.7 \times 10^{-5}$	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
$<3.4 \times 10^{-5}$	90	AITALA	99G	E791	π^- 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	π^- 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	π^- N 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.1 \times 10^{-4}$	90	FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<4.8 \times 10^{-3}$	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
$<1.7 \times 10^{-5}$	90		AITALA	99G	E791	π^- N 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<8.7 \times 10^{-5}$	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	π^- N 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.1 \times 10^{-4}$	90	FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
$<3.7 \times 10^{-3}$	90	WEIR	90B	MRK2	$e^+ e^-$ 29 GeV

$\Gamma(\rho^- \mu^+ \mu^+)/\Gamma_{total}$ 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
$<1.2 \times 10^{-4}$	90		FRABETTI	97B	E687	γ Be, $\overline{E}_\gamma \approx$ 220 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<3.2 \times 10^{-4}$	90	0	KODAMA	95	E653	π^- emulsion 600 GeV
$<4.3 \times 10^{-3}$	90		WEIR	90B	MRK2	$e^+ e^-$ 29 GeV

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

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

A test of lepton-number conservation.

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

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

$A_{CP}(K^0_S \pi^\pm)$ 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
$-0.016 \pm 0.015 \pm 0.009$	10.6k	[83] LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

[83] 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
$+0.071 \pm 0.061 \pm 0.012$	949	[84] LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$+0.069 \pm 0.060 \pm 0.015$	949	[85] LINK	02B	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

[84] 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^-.

[85] 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					
$+0.006 \pm 0.011 \pm 0.005$	14k	[86] LINK	00B	FOCS	
-0.014 ± 0.029		[86] AITALA	97B	E791	$-0.062 < A_{CP} < +0.034$ (90% CL)
-0.031 ± 0.068		[86] FRABETTI	94I	E687	$-0.14 < A_{CP} < +0.081$ (90% CL)

[86] 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	[87] AITALA	97B	E791	$-0.092 < A_{CP} < +0.072$ (90% CL)
-0.12 ± 0.13	[87] FRABETTI	94I	E687	$-0.33 < A_{CP} < +0.094$ (90% CL)

[87] 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	[88] AITALA	97B	E791	$-0.087 < A_{CP} < +0.031$ (90% CL)
$+0.066 \pm 0.086$	[88] FRABETTI	94I	E687	$-0.075 < A_{CP} < +0.21$ (90% CL)

[88] 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	[89] AITALA	97B	E791	$-0.086 < A_{CP} < +0.052$ (90% CL)

[89] 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 $\pm 0.6 \pm 0.3$	[90] ADLER	88C	MRK3	e^+e^- 3.768 GeV
5.5 ± 1.0	[91] PARTRIDGE	84	CBAL	e^+e^- 3.771 GeV
$6.00 \pm 0.72 \pm 1.02$	[92] SCHINDLER	80	MRK2	e^+e^- 3.771 GeV
9.1 ± 2.0	[93] PERUZZI	77	MRK1	e^+e^- 3.774 GeV

[90] 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 $1.36 \pm 0.23 \pm 0.14$. This measurement does not include the decays of the $\psi(3770)$ not associated with charmed particle production.

[91] 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.

[92] 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.

[93] 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.

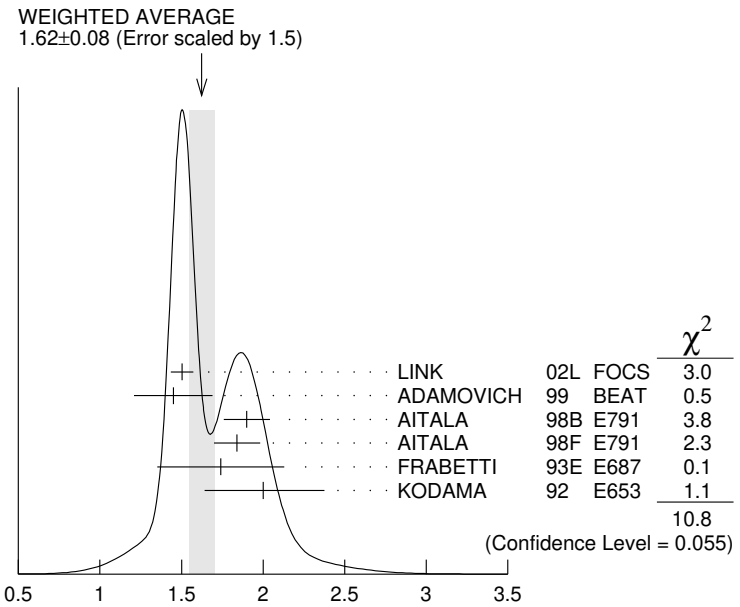
$D^+ \to \overline{K}^*(892)^0 \ell^+ \nu_\ell$ FORM FACTORS

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.62 ±0.08 OUR NEW AVERAGE Error includes scale factor of 1.5. See the ideogram below. [1.82 ± 0.09 OUR 2002 AVERAGE]					
$1.504 \pm 0.057 \pm 0.039$	15k	[94] LINK	02L	FOCS	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$1.45 \pm 0.23 \pm 0.07$	763	ADAMOVICH	99	BEAT	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$1.90 \pm 0.11 \pm 0.09$	3000	[95] AITALA	98B	E791	$\overline{K}^*(892)^0 e^+ \nu_e$
$1.84 \pm 0.11 \pm 0.09$	3034	AITALA	98F	E791	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$1.74 \pm 0.27 \pm 0.28$	874	FRABETTI	93E	E687	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$2.00 \, {}^{+0.34}_{-0.32} \pm 0.16$	305	KODAMA	92	E653	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$2.0 \pm 0.6 \pm 0.3$	183	ANJOS	90E	E691	$\overline{K}^*(892)^0 e^+ \nu_e$

[94] 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.

[95] 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 NEW AVERAGE		[0.78 ± 0.07 OUR 2002 AVERAGE]			
0.875±0.049±0.064	15k	[96] LINK	02L	FOCS	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
1.00 ±0.15 ±0.03	763	ADAMOVICH	99	BEAT	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
0.71 ±0.08 ±0.09	3000	AITALA	98B	E791	$\overline{K}^*(892)^0 e^+ \nu_e$
0.75 ±0.08 ±0.09	3034	AITALA	98F	E791	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
0.78 ±0.18 ±0.10	874	FRABETTI	93E	E687	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
$0.82\ ^{+0.22}_{-0.23}$ ±0.11	305	KODAMA	92	E653	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0 ±0.5 ±0.2	183	ANJOS	90E	E691	$\overline{K}^*(892)^0 e^+ \nu_e$

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

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

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.13±0.08 OUR NEW AVERAGE		[1.14 ± 0.08 OUR 2002 AVERAGE]			
1.09±0.10±0.02	763	ADAMOVICH	99	BEAT	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
1.20±0.13±0.13	874	FRABETTI	93E	E687	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
1.18±0.18±0.08	305	KODAMA	92	E653	$\overline{K}^*(892)^0 \mu^+ \nu_\mu$
• • • We do not use the following data for averages, fits, limits, etc. • • •					

$1.8\ ^{+0.6}_{-0.4}\ \pm 0.3$		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 NEW AVERAGE Error includes scale factor of 1.6. [0.21 ± 0.04 OUR 2002 AVERAGE Scale factor = 1.3]					
0.28±0.05±0.02	763	ADAMOVICH	99	BEAT	$\overline{K}^*(892)^0\, \mu^+\, \nu_\mu$
0.16±0.05±0.02	305	KODAMA	92	E653	$\overline{K}^*(892)^0\, \mu^+\, \nu_\mu$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.15\ ^{+0.07}_{-0.05} \pm 0.03$	183	ANJOS	90E	E691	$\overline{K}^*(892)^0\, e^+\, \nu_e$

$D^\pm$ REFERENCES

AITALA	02	PRL 89 121801	E.M. Aitala *et al.*	(FNAL E791 Collab.)
BRANDENB...	02	PRL 89 222001	G. Brandenburg *et al.*	(CLEO Collab.)
KAYIS-TOPAK...	02	PL B549 48	A. Kayis-Topaksu *et al.*	(CERN CHORUS Collab.)
LINK	02B	PRL 88 041602	J.M. Link *et al.*	(FNAL FOCUS Collab.)
Also	02D	PRL 88 159903 (erratum)	J.M. Link *et al.*	(FNAL FOCUS Collab.)
LINK	02E	PL B535 43	J.M. Link *et al.*	(FNAL FOCUS Collab.)
LINK	02F	PL B537 192	J.M. Link *et al.*	(FNAL FOCUS Collab.)
LINK	02I	PL B541 227	J.M. Link *et al.*	(FNAL FOCUS Collab.)
LINK	02J	PL B541 243	J.M. Link *et al.*	(FNAL FOCUS Collab.)
LINK	02L	PL B544 89	J.M. Link *et al.*	(FNAL FOCUS Collab.)
PDG	02	PR D66 010001	K. Hagiwara *et al.*	
AITALA	01B	PRL 86 770	E.M. Aitala *et al.*	(FNAL E791 Collab.)
LINK	01C	PRL 87 162001	J.M. Link *et al.*	(FNAL FOCUS Collab.)
ABREU	00O	EPJ C12 209	P. Abreu *et al.*	(DELPHI Collab.)
ASTIER	00D	PL B486 35	P. Astier *et al.*	(CERN NOMAD Collab.)
BAI	00C	PR D62 052001	J.Z. Bai *et al.*	(BEPC BES Collab.)
JUN	00	PRL 84 1857	S.Y. Jun *et al.*	(FNAL SELEX Collab.)
LINK	00B	PL B491 232	J.M. Link *et al.*	(FNAL FOCUS Collab.)
Also	00D	PL B495 443 (errata)	J.M. Link *et al.*	(FNAL FOCUS Collab.)
ABBIENDI	99K	EPJ C8 573	G. Abbiendi *et al.*	(OPAL Collab.)
ABE	99P	PR D60 092005	F. Abe *et al.*	(CDF Collab.)
ADAMOVICH	99	EPJ C6 35	M. Adamovich *et al.*	(CERN BEATRICE Collab.)
AITALA	99G	PL B462 401	E.M. Aitala *et al.*	(FNAL E791 Collab.)
BONVICINI	99	PRL 82 4586	G. Bonvicini *et al.*	(CLEO Collab.)
AITALA	98B	PRL 80 1393	E.M. Aitala *et al.*	(FNAL E791 Collab.)
AITALA	98C	PL B421 405	E.M. Aitala *et al.*	(FNAL E791 Collab.)
AITALA	98F	PL B440 435	E.M. Aitala *et al.*	(FNAL E791 Collab.)
BAI	98B	PL B429 188	J.Z. Bai *et al.*	(BEPC BES Collab.)
JESSOP	98	PR D58 052002	C.P. Jessop *et al.*	(CLEO Collab.)
AITALA	97	PL B397 325	E.M. Aitala *et al.*	(FNAL E791 Collab.)
AITALA	97B	PL B403 377	E.M. Aitala *et al.*	(FNAL E791 Collab.)
AITALA	97C	PL B404 187	E.M. Aitala *et al.*	(FNAL E791 Collab.)
BARTELT	97	PL B405 373	J. Bartelt *et al.*	(CLEO Collab.)
BISHAI	97	PRL 78 3261	M. Bishai *et al.*	(CLEO Collab.)
FRABETTI	97	PL B391 235	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	97B	PL B398 239	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	97C	PL B401 131	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	97D	PL B407 79	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
AITALA	96	PRL 76 364	E.M. Aitala *et al.*	(FNAL E791 Collab.)
ALBRECHT	96C	PL B374 249	H. Albrecht *et al.*	(ARGUS Collab.)
BIGI	95	PL B349 363	I.I. Bigi, H. Yamamoto	(NDAM, HARV)
FRABETTI	95	PL B346 199	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	95B	PL B351 591	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	95E	PL B359 403	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	95F	PL B363 259	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
KODAMA	95	PL B345 85	K. Kodama *et al.*	(FNAL E653 Collab.)
ALBRECHT	94I	ZPHY C64 375	H. Albrecht *et al.*	(ARGUS Collab.)
ALEEV	94	PAN 57 1370	A.N. Aleev *et al.*	(Serpukhov BIS-2 Collab.)

Translated from YF 57 1443.

BALEST	94	PRL 72 2328	R. Balest *et al.*	(CLEO Collab.)
FRABETTI	94D	PL B323 459	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	94G	PL B331 217	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	94I	PR D50 R2953	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
ABE	93E	PL B313 288	K. Abe *et al.*	(VENUS Collab.)
ADAMOVICH	93	PL B305 177	M.I. Adamovich *et al.*	(CERN WA82 Collab.)
AKERIB	93	PRL 71 3070	D.S. Akerib *et al.*	(CLEO Collab.)
ALAM	93	PRL 71 1311	M.S. Alam *et al.*	(CLEO Collab.)
ANJOS	93	PR D48 56	J.C. Anjos *et al.*	(FNAL E691 Collab.)
BEAN	93C	PL B317 647	A. Bean *et al.*	(CLEO Collab.)
FRABETTI	93E	PL B307 262	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
KODAMA	93B	PL B313 260	K. Kodama *et al.*	(FNAL E653 Collab.)
KODAMA	93C	PL B316 455	K. Kodama *et al.*	(FNAL E653 Collab.)
SELEN	93	PRL 71 1973	M.A. Selen *et al.*	(CLEO Collab.)
ALBRECHT	92B	ZPHY C53 361	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	92F	PL B278 202	H. Albrecht *et al.*	(ARGUS Collab.)
ANJOS	92	PR D45 R2177	J.C. Anjos *et al.*	(FNAL E691 Collab.)
ANJOS	92C	PR D46 1941	J.C. Anjos *et al.*	(FNAL E691 Collab.)
ANJOS	92D	PRL 69 2892	J.C. Anjos *et al.*	(FNAL E691 Collab.)
BARLAG	92C	ZPHY C55 383	S. Barlag *et al.*	(ACCMOR Collab.)
Also	90D	ZPHY C48 29	S. Barlag *et al.*	(ACCMOR Collab.)
COFFMAN	92B	PR D45 2196	D.M. Coffman *et al.*	(Mark III Collab.)
DAOUDI	92	PR D45 3965	M. Daoudi *et al.*	(CLEO Collab.)
FRABETTI	92	PL B281 167	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
KODAMA	92	PL B274 246	K. Kodama *et al.*	(FNAL E653 Collab.)
KODAMA	92C	PL B286 187	K. Kodama *et al.*	(FNAL E653 Collab.)
ADAMOVICH	91	PL B268 142	M.I. Adamovich *et al.*	(WA82 Collab.)
ALBRECHT	91	PL B255 634	H. Albrecht *et al.*	(ARGUS Collab.)
ALVAREZ	91	PL B255 639	M.P. Alvarez *et al.*	(CERN NA14/2 Collab.)
ALVAREZ	91B	ZPHY C50 11	M.P. Alvarez *et al.*	(CERN NA14/2 Collab.)
AMMAR	91	PR D44 3383	R. Ammar *et al.*	(CLEO Collab.)
ANJOS	91B	PR D43 R2063	J.C. Anjos *et al.*	(FNAL E691 Collab.)
ANJOS	91C	PRL 67 1507	J.C. Anjos *et al.*	(FNAL-TPS Collab.)
BAI	91	PRL 66 1011	Z. Bai *et al.*	(Mark III Collab.)
COFFMAN	91	PL B263 135	D.M. Coffman *et al.*	(Mark III Collab.)
FRABETTI	91	PL B263 584	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
ALVAREZ	90	ZPHY C47 539	M.P. Alvarez *et al.*	(CERN NA14/2 Collab.)
ALVAREZ	90C	PL B246 261	M.P. Alvarez *et al.*	(CERN NA14/2 Collab.)
ANJOS	90C	PR D41 2705	J.C. Anjos *et al.*	(FNAL E691 Collab.)
ANJOS	90D	PR D42 2414	J.C. Anjos *et al.*	(FNAL E691 Collab.)
ANJOS	90E	PRL 65 2630	J.C. Anjos *et al.*	(FNAL E691 Collab.)
BARLAG	90C	ZPHY C46 563	S. Barlag *et al.*	(ACCMOR Collab.)
WEIR	90B	PR D41 1384	A.J. Weir *et al.*	(Mark II Collab.)
ANJOS	89	PRL 62 125	J.C. Anjos *et al.*	(FNAL E691 Collab.)
ANJOS	89B	PRL 62 722	J.C. Anjos *et al.*	(FNAL E691 Collab.)
ANJOS	89E	PL B223 267	J.C. Anjos *et al.*	(FNAL E691 Collab.)
ADLER	88B	PRL 60 1375	J. Adler *et al.*	(Mark III Collab.)
ADLER	88C	PRL 60 89	J. Adler *et al.*	(Mark III Collab.)
ALBRECHT	88I	PL B210 267	H. Albrecht *et al.*	(ARGUS Collab.)
ANJOS	88	PRL 60 897	J.C. Anjos *et al.*	(FNAL E691 Collab.)
AOKI	88	PL B209 113	S. Aoki *et al.*	(WA75 Collab.)
HAAS	88	PRL 60 1614	P. Haas *et al.*	(CLEO Collab.)
ONG	88	PRL 60 2587	R.A. Ong *et al.*	(Mark II Collab.)
RAAB	88	PR D37 2391	J.R. Raab *et al.*	(FNAL E691 Collab.)
ADAMOVICH	87	EPL 4 887	M.I. Adamovich *et al.*	(Photon Emulsion Collab.)
ADLER	87	PL B196 107	J. Adler *et al.*	(Mark III Collab.)
AGUILAR-...	87E	ZPHY C36 551	M. Aguilar-Benitez *et al.*	(LEBC-EHS Collab.)
Also	88B	ZPHY C40 321	M. Aguilar-Benitez *et al.*	(LEBC-EHS Collab.)
AGUILAR-...	87F	ZPHY C36 559	M. Aguilar-Benitez *et al.*	(LEBC-EHS Collab.)
Also	88	ZPHY C38 520 erratum	M. Aguilar-Benitez *et al.*	(LEBC-EHS Collab.)
BARTEL	87	ZPHY C33 339	W. Bartel *et al.*	(JADE Collab.)
AGUILAR-...	86B	ZPHY C31 491	M. Aguilar-Benitez *et al.*	(LEBC-EHS Collab.)
BALTRUSAIT...	86E	PRL 56 2140	R.M. Baltrusaitis *et al.*	(Mark III Collab.)
PAL	86	PR D33 2708	T. Pal *et al.*	(DELCO Collab.)
AIHARA	85	ZPHY C27 39	H. Aihara *et al.*	(TPC Collab.)
BALTRUSAIT...	85B	PRL 54 1976	R.M. Baltrusaitis *et al.*	(Mark III Collab.)
BALTRUSAIT...	85E	PRL 55 150	R.M. Baltrusaitis *et al.*	(Mark III Collab.)
BARTEL	85J	PL 163B 277	W. Bartel *et al.*	(JADE Collab.)
ADAMOVICH	84	PL 140B 119	M.I. Adamovich *et al.*	(CERN WA58 Collab.)
ALTHOFF	84G	ZPHY C22 219	M. Althoff *et al.*	(TASSO Collab.)
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DERRICK	84	PRL 53 1971	M. Derrick *et al.*	(HRS Collab.)
KOOP	84	PRL 52 970	D.E. Koop *et al.*	(DELCO Collab.)
PARTRIDGE	84	Thesis CALT-68-1150	R.A. Partridge	(Crystal Ball Collab.)
AGUILAR-...	83B	PL 123B 98	M. Aguilar-Benitez *et al.*	(LEBC-EHS Collab.)
AUBERT	83	NP B213 31	J.J. Aubert *et al.*	(EMC Collab.)
PARTRIDGE	81	PRL 47 760	R. Partridge *et al.*	(Crystal Ball Collab.)
SCHINDLER	81	PR D24 78	R.H. Schindler *et al.*	(Mark II Collab.)
TRILLING	81	PRPL 75 57	G.H. Trilling	(LBL, UCB) J
BACINO	80	PRL 45 329	W.J. Bacino *et al.*	(DELCO Collab.)
SCHINDLER	80	PR D21 2716	R.H. Schindler *et al.*	(Mark II Collab.)
ZHOLENTZ	80	PL 96B 214	A.A. Zholents *et al.*	(NOVO)
Also	81	SJNP 34 814	A.A. Zholents *et al.*	(NOVO)
		Translated from YAF 34 1471.		
BACINO	79	PRL 43 1073	W.J. Bacino *et al.*	(DELCO Collab.)
BRANDELIK	79	PL 80B 412	R. Brandelik *et al.*	(DASP Collab.)
FELLER	78	PRL 40 274	J.M. Feller *et al.*	(Mark I Collab.)
VUILLEMIN	78	PRL 41 1149	V. Vuillemin *et al.*	(Mark I Collab.)
GOLDHABER	77	PL 69B 503	G. Goldhaber *et al.*	(Mark I Collab.)
PERUZZI	77	PRL 39 1301	I. Peruzzi *et al.*	(Mark I Collab.)
PICCOLO	77	PL 70B 260	M. Piccolo *et al.*	(Mark I Collab.)
RAPIDIS	77	PRL 39 526	P.A. Rapidis *et al.*	(Mark I Collab.)
PERUZZI	76	PRL 37 569	I. Peruzzi *et al.*	(Mark I Collab.)

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