$D^{\pm}$ – THIS IS PART 1 OF 2

To reduce the size of this section's PostScript file, we have divided it into two PostScript files. We present the following index:

PART 1

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PART 2

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$D^{\pm}$

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

$D^{\pm}$ 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*
1869.3± 0.5 OUR FIT Error includes scale factor of 1.1.					
1869.4± 0.5 OUR AVERAGE					
1870.0± 0.5±1.0	317	BARLAG	90C	ACCM	π^- Cu 230 GeV
1863 ± 4		DERRICK	84	HRS	e^+e^- 29 GeV
1869.4± 0.6		[1] TRILLING	81	RVUE	e^+e^- 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1875 ±10	9	ADAMOVICH	87	EMUL	Photoproduction
1860 ±16	6	ADAMOVICH	84	EMUL	Photoproduction
1868.4± 0.5		[1] SCHINDLER	81	MRK2	e^+e^- 3.77 GeV
1874 ± 5		GOLDHABER	77	MRK1	D^0, D^+ recoil spectra
1868.3± 0.9		[1] PERUZZI	77	MRK1	e^+e^- 3.77 GeV
1874 ±11		PICCOLO	77	MRK1	e^+e^- 4.03, 4.41 GeV
1876 ±15	50	PERUZZI	76	MRK1	$K^{\mp}\pi^{\pm}\pi^{\pm}$

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

$D^{\pm}$ MEAN LIFE

Measurements with an error $> 0.1\times10^{-12}$ s are omitted from the average, and those with an error $> 0.2 \times 10^{-12}$ s have been omitted from the Listings.

VALUE (10^{-12} s)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.057±0.015 OUR AVERAGE					
1.048±0.015±0.011	9k	FRABETTI	94D	E687	$D^+ \to K^-\pi^+\pi^+$
1.075±0.040±0.018	2455	FRABETTI	91	E687	γ Be, $D^+ \to K^-\pi^+\pi^+$
1.03 ±0.08 ±0.06	200	ALVAREZ	90	NA14	γ, $D^+ \to K^-\pi^+\pi^+$
1.05 $^{+0.077}_{-0.072}$	317	[2] BARLAG	90C	ACCM	π^- Cu 230 GeV
1.05 ±0.08 ±0.07	363	ALBRECHT	88I	ARG	e^+e^- 10 GeV
1.090±0.030±0.025	2992	RAAB	88	E691	Photoproduction

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

$1.12\ ^{+0.14}_{-0.11}$		149	AGUILAR-...	87D	HYBR	$\pi^-\,p$ and $p\,p$
$1.09\ ^{+0.19}_{-0.15}$		59	BARLAG	87B	ACCM	K^- and π^- 200 GeV
1.14 ± 0.16	± 0.07	247	CSORNA	87	CLEO	$e^+\,e^-$ 10 GeV
1.09 ± 0.14		74	[3] PALKA	87B	SILI	π Be 200 GeV
0.86 ± 0.13	$^{+0.07}_{-0.03}$	48	ABE	86	HYBR	$\gamma\,p$ 20 GeV

[2] BARLAG 90C estimates the systematic error to be negligible.
[3] PALKA 87B observes this in $D^+ \to \overline{K}^*(892)\,e\,\nu$.

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	μ^+ anything			
Γ_7	$\mu^+\,\mu^-$ anything			
	Leptonic and semileptonic modes			
Γ_8	$\mu^+\,\nu_\mu$		$< 7.2 \times 10^{-4}$	CL=90%
Γ_9	$\overline{K}^0\,\ell^+\,\nu_\ell$	[b]	(6.7 ± 0.8) %	
Γ_{10}	$\overline{K}^0\,e^+\,\nu_e$		(6.7 ± 0.9) %	
Γ_{11}	$\overline{K}^0\,\mu^+\,\nu_\mu$		$(7.0\ ^{+3.0}_{-2.0})$ %	
Γ_{12}	$K^-\,\pi^+\,e^+\,\nu_e$		$(4.1\ ^{+0.9}_{-0.7})$ %	
Γ_{13}	$\overline{K}^*(892)^0\,e^+\,\nu_e$ $\times$ B($\overline{K}^{*0} \to K^-\,\pi^+$)		(3.2 ± 0.33) %	
Γ_{14}	$K^-\,\pi^+\,e^+\,\nu_e$ nonresonant		$< 7 \times 10^{-3}$	CL=90%
Γ_{15}	$K^-\,\pi^+\,\mu^+\,\nu_\mu$		(3.2 ± 0.4) %	S=1.1
	In the fit as $\frac{2}{3}\Gamma_{27} + \Gamma_{17}$, where $\frac{2}{3}\Gamma_{27} = \Gamma_{16}$.			
Γ_{16}	$\overline{K}^*(892)^0\,\mu^+\,\nu_\mu$ $\times$ B($\overline{K}^{*0} \to K^-\,\pi^+$)		(3.0 ± 0.4) %	

Γ_{17}	$K^-\pi^+\mu^+\nu_\mu$ nonresonant		(2.7 ±1.1) $\times 10^{-3}$		
Γ_{18}	$\overline{K}^0\pi^+\pi^- e^+\nu_e$				
Γ_{19}	$K^-\pi^+\pi^0 e^+\nu_e$				
Γ_{20}	$(\overline{K}^*(892)\pi)^0 e^+\nu_e$		< 1.2	%	CL=90%
Γ_{21}	$(\overline{K}\pi\pi)^0 e^+\nu_e$ non-$\overline{K}^*(892)$		< 9	$\times 10^{-3}$	CL=90%
Γ_{22}	$K^-\pi^+\pi^0\mu^+\nu_\mu$		< 1.4	$\times 10^{-3}$	CL=90%
Γ_{23}	$\pi^0\ell^+\nu_\ell$	[c]	(5.7 ±2.2) $\times 10^{-3}$		
Γ_{24}	$\pi^+\pi^- e^+\nu_e$				

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

Γ_{25}	$\overline{K}^*(892)^0\ell^+\nu_\ell$	[b]	(4.7 ±0.4) %		
Γ_{26}	$\overline{K}^*(892)^0 e^+\nu_e$		(4.8 ±0.5) %		
Γ_{27}	$\overline{K}^*(892)^0\mu^+\nu_\mu$		(4.4 ±0.6) %		S=1.1
Γ_{28}	$\rho^0 e^+\nu_e$		(2.2 ±0.8) $\times 10^{-3}$		
Γ_{29}	$\rho^0\mu^+\nu_\mu$		(2.7 ±0.7) $\times 10^{-3}$		
Γ_{30}	$\phi e^+\nu_e$		< 2.09	%	CL=90%
Γ_{31}	$\phi\mu^+\nu_\mu$		< 3.72	%	CL=90%
Γ_{32}	$\eta'(958)\mu^+\nu_\mu$		< 9	$\times 10^{-3}$	CL=90%

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

Γ_{33}	$\overline{K}^0\pi^+$		(2.89±0.26) %		S=1.1
Γ_{34}	$K^-\pi^+\pi^+$	[d]	(9.0 ±0.6) %		
Γ_{35}	$\overline{K}^*(892)^0\pi^+$		(1.28±0.13) %		
	$\times$ B($\overline{K}^{*0} \rightarrow K^-\pi^+$)				
Γ_{36}	$\overline{K}_0^*(1430)^0\pi^+$		(2.3 ±0.3) %		
	$\times$ B($\overline{K}_0^*(1430)^0 \rightarrow K^-\pi^+$)				
Γ_{37}	$\overline{K}^*(1680)^0\pi^+$		(3.7 ±0.8) $\times 10^{-3}$		
	$\times$ B($\overline{K}^*(1680)^0 \rightarrow K^-\pi^+$)				
Γ_{38}	$K^-\pi^+\pi^+$ nonresonant		(8.5 ±0.8) %		
Γ_{39}	$\overline{K}^0\pi^+\pi^0$	[d]	(9.7 ±3.0) %		S=1.1
Γ_{40}	$\overline{K}^0\rho^+$		(6.6 ±2.5) %		
Γ_{41}	$\overline{K}^*(892)^0\pi^+$		(6.4 ±0.6) $\times 10^{-3}$		
	$\times$ B($\overline{K}^{*0} \rightarrow \overline{K}^0\pi^0$)				
Γ_{42}	$\overline{K}^0\pi^+\pi^0$ nonresonant		(1.3 ±1.1) %		
Γ_{43}	$K^-\pi^+\pi^+\pi^0$	[d]	(6.4 ±1.1) %		
Γ_{44}	$\overline{K}^*(892)^0\rho^+$ total		(1.4 ±0.9) %		
	$\times$ B($\overline{K}^{*0} \rightarrow K^-\pi^+$)				
Γ_{45}	$\overline{K}_1(1400)^0\pi^+$		(2.2 ±0.6) %		
	$\times$ B($\overline{K}_1(1400)^0 \rightarrow K^-\pi^+\pi^0$)				
Γ_{46}	$K^-\rho^+\pi^+$ total		(3.1 ±1.1) %		
Γ_{47}	$K^-\rho^+\pi^+$ 3-body		(1.1 ±0.4) %		
Γ_{48}	$\overline{K}^*(892)^0\pi^+\pi^0$ total		(4.5 ±0.9) %		
	$\times$ B($\overline{K}^{*0} \rightarrow K^-\pi^+$)				

Γ_{49}	$\overline{K}^*(892)^0\pi^+\pi^0$ 3-body $\times$ B($\overline{K}^{*0} \to K^-\pi^+$)		(2.8 $\pm$0.9) %		
Γ_{50}	$K^*(892)^-\pi^+\pi^+$ 3-body $\times$ B($K^{*-} \to K^-\pi^0$)		(7 $\pm$3) $\times 10^{-3}$		
Γ_{51}	$K^-\pi^+\pi^+\pi^0$ nonresonant	[e]	(1.2 $\pm$0.6) %		
Γ_{52}	$\overline{K}^0\pi^+\pi^+\pi^-$	[d]	(7.0 $\pm$0.9) %		
Γ_{53}	$\overline{K}^0 a_1(1260)^+$ $\times$ B($a_1(1260)^+ \to \pi^+\pi^+\pi^-$)		(4.0 $\pm$0.9) %		
Γ_{54}	$\overline{K}_1(1400)^0\pi^+$ $\times$ B($\overline{K}_1(1400)^0 \to \overline{K}^0\pi^+\pi^-$)		(2.2 $\pm$0.6) %		
Γ_{55}	$K^*(892)^-\pi^+\pi^+$ 3-body $\times$ B($K^{*-} \to \overline{K}^0\pi^-$)		(1.4 $\pm$0.6) %		
Γ_{56}	$\overline{K}^0\rho^0\pi^+$ total		(4.2 $\pm$0.9) %		
Γ_{57}	$\overline{K}^0\rho^0\pi^+$ 3-body		(5 $\pm$5) $\times 10^{-3}$		
Γ_{58}	$\overline{K}^0\pi^+\pi^+\pi^-$ nonresonant		(8 $\pm$4) $\times 10^{-3}$		
Γ_{59}	$K^-\pi^+\pi^+\pi^+\pi^-$		(7.2 $\pm$1.0) $\times 10^{-3}$		
Γ_{60}	$\overline{K}^*(892)^0\pi^+\pi^+\pi^-$ $\times$ B($\overline{K}^{*0} \to K^-\pi^+$)		(5.4 $\pm$2.4) $\times 10^{-3}$		
Γ_{61}	$\overline{K}^*(892)^0\pi^+\pi^+\pi^-$ no-ρ $\times$ B($\overline{K}^{*0} \to K^-\pi^+$)		(2.9 $\pm$1.2) $\times 10^{-3}$		
Γ_{62}	$K^-\rho^0\pi^+\pi^+$		(3.1 $\pm$0.9) $\times 10^{-3}$		
Γ_{63}	$\overline{K}^*(892)^0\rho^0\pi^+$ $\times$ B($\overline{K}^{*0} \to K^-\pi^+$)		(1.9 $^{+1.1}_{-1.0}$) $\times 10^{-3}$		
Γ_{64}	$K^-\pi^+\pi^+\pi^+\pi^-$ nonresonant		< 2.3	$\times 10^{-3}$	CL=90%
Γ_{65}	$K^-\pi^+\pi^+\pi^0\pi^0$		(2.2 $^{+5.0}_{-0.9}$) %		
Γ_{66}	$\overline{K}^0\pi^+\pi^+\pi^-\pi^0$		(5.4 $^{+3.0}_{-1.4}$) %		
Γ_{67}	$\overline{K}^0\pi^+\pi^+\pi^+\pi^-\pi^-$		(8 $\pm$7) $\times 10^{-4}$		
Γ_{68}	$K^-\pi^+\pi^+\pi^+\pi^-\pi^0$		(2.0 $\pm$1.8) $\times 10^{-3}$		
Γ_{69}	$\overline{K}^0\overline{K}^0K^+$		(1.8 $\pm$0.8) %		

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

Γ_{70}	$\overline{K}^0\rho^+$		(6.6 $\pm$2.5) %		
Γ_{71}	$\overline{K}^0 a_1(1260)^+$		(8.0 $\pm$1.7) %		
Γ_{72}	$\overline{K}^0 a_2(1320)^+$		< 3	$\times 10^{-3}$	CL=90%
Γ_{73}	$\overline{K}^*(892)^0\pi^+$		(1.90$\pm$0.19) %		
Γ_{74}	$\overline{K}^*(892)^0\rho^+$ total		(2.1 $\pm$1.3) %		
Γ_{75}	$\overline{K}^*(892)^0\rho^+$ S-wave	[e]	(1.6 $\pm$1.6) %		
Γ_{76}	$\overline{K}^*(892)^0\rho^+$ P-wave		< 1	$\times 10^{-3}$	CL=90%
Γ_{77}	$\overline{K}^*(892)^0\rho^+$ D-wave		(10 $\pm$7) $\times 10^{-3}$		
Γ_{78}	$\overline{K}^*(892)^0\rho^+$ D-wave longitudinal		< 7	$\times 10^{-3}$	CL=90%
Γ_{79}	$\overline{K}_1(1270)^0\pi^+$		< 7	$\times 10^{-3}$	CL=90%

Γ_{80}	$\overline{K}_1(1400)^0\,\pi^+$	(4.9 $\pm$1.2) %	
Γ_{81}	$\overline{K}^*(1410)^0\,\pi^+$	$<$ 7 $\times 10^{-3}$	CL=90%
Γ_{82}	$\overline{K}_0^*(1430)^0\,\pi^+$	(3.7 $\pm$0.4) %	
Γ_{83}	$\overline{K}^*(1680)^0\,\pi^+$	(1.43$\pm$0.30) %	
Γ_{84}	$\overline{K}^*(892)^0\,\pi^+\,\pi^0$ total	(6.7 $\pm$1.4) %	
Γ_{85}	$\overline{K}^*(892)^0\,\pi^+\,\pi^0$ 3-body	(4.2 $\pm$1.4) %	
Γ_{86}	$K^*(892)^-\,\pi^+\,\pi^+$ total		
Γ_{87}	$K^*(892)^-\,\pi^+\,\pi^+$ 3-body	(2.0 $\pm$0.9) %	
Γ_{88}	$K^-\,\rho^+\,\pi^+$ total	(3.1 $\pm$1.1) %	
Γ_{89}	$K^-\,\rho^+\,\pi^+$ 3-body	(1.1 $\pm$0.4) %	
Γ_{90}	$\overline{K}^0\,\rho^0\,\pi^+$ total	(4.2 $\pm$0.9) %	CL=90%
Γ_{91}	$\overline{K}^0\,\rho^0\,\pi^+$ 3-body	(5 $\pm$5) $\times 10^{-3}$	
Γ_{92}	$\overline{K}^0\,f_0(980)\,\pi^+$	$<$ 5 $\times 10^{-3}$	CL=90%
Γ_{93}	$\overline{K}^*(892)^0\,\pi^+\,\pi^+\,\pi^-$	(8.1 $\pm$3.4) $\times 10^{-3}$	S=1.7
Γ_{94}	$\overline{K}^*(892)^0\,\pi^+\,\pi^+\,\pi^-$ no-ρ	(4.3 $\pm$1.7) $\times 10^{-3}$	
Γ_{95}	$K^-\,\rho^0\,\pi^+\,\pi^+$	(3.1 $\pm$0.9) $\times 10^{-3}$	
Γ_{96}	$\overline{K}^*(892)^0\,\rho^0\,\pi^+$	(2.9 $^{+1.7}_{-1.5}$) $\times 10^{-3}$	S=1.8

Pionic modes

Γ_{97}	$\pi^+\,\pi^0$	(2.5 $\pm$0.7) $\times 10^{-3}$	
Γ_{98}	$\pi^+\,\pi^+\,\pi^-$	(3.1 $\pm$0.6) $\times 10^{-3}$	
Γ_{99}	$\rho^0\,\pi^+$	$<$ 1.3 $\times 10^{-3}$	CL=90%
Γ_{100}	$\pi^+\,\pi^+\,\pi^-$ nonresonant	(2.4 $\pm$0.7) $\times 10^{-3}$	
Γ_{101}	$\pi^+\,\pi^+\,\pi^-\,\pi^0$	(1.9 $^{+1.5}_{-1.2}$) %	
Γ_{102}	$\eta\,\pi^+ \times$ B($\eta \to \pi^+\,\pi^-\,\pi^0$)	(1.8 $\pm$0.6) $\times 10^{-3}$	
Γ_{103}	$\omega\,\pi^+ \times$ B($\omega \to \pi^+\,\pi^-\,\pi^0$)	$<$ 6 $\times 10^{-3}$	CL=90%
Γ_{104}	$\pi^+\,\pi^+\,\pi^+\,\pi^-\,\pi^-$	(2.1 $\pm$0.4) $\times 10^{-3}$	
Γ_{105}	$\pi^+\,\pi^+\,\pi^+\,\pi^-\,\pi^-\,\pi^0$	(2.9 $^{+2.9}_{-2.0}$) $\times 10^{-3}$	

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

Γ_{106}	$\eta\,\pi^+$	(7.5 $\pm$2.5) $\times 10^{-3}$	
Γ_{107}	$\rho^0\,\pi^+$	$<$ 1.4 $\times 10^{-3}$	CL=90%
Γ_{108}	$\omega\,\pi^+$	$<$ 7 $\times 10^{-3}$	CL=90%
Γ_{109}	$\eta\,\rho^+$	$<$ 1.2 %	CL=90%
Γ_{110}	$\eta'(958)\,\pi^+$	$<$ 9 $\times 10^{-3}$	CL=90%
Γ_{111}	$\eta'(958)\,\rho^+$	$<$ 1.5 %	CL=90%

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

Γ_{112}	$K^+\overline{K}^0$		$(\ 7.4 \pm 1.0\ ) \times 10^{-3}$		
Γ_{113}	$K^+K^-\pi^+$	[d]	$(\ 8.8 \pm 0.8\ ) \times 10^{-3}$		
Γ_{114}	$\phi\pi^+ \times$ B($\phi \to K^+K^-$)		$(\ 3.0 \pm 0.3\ ) \times 10^{-3}$		
Γ_{115}	$K^+\overline{K}^*(892)^0$ $\times$ B($\overline{K}^{*0} \to K^-\pi^+$)		$(\ 2.8 \pm 0.4\ ) \times 10^{-3}$		
Γ_{116}	$K^+K^-\pi^+$ nonresonant		$(\ 4.5 \pm 0.9\ ) \times 10^{-3}$		
Γ_{117}	$K^0\overline{K}^0\pi^+$				
Γ_{118}	$K^*(892)^+\overline{K}^0$ $\times$ B($K^{*+} \to K^0\pi^+$)		$(\ 2.1 \pm 0.9\ )\%$		
Γ_{119}	$K^+K^-\pi^+\pi^0$				
Γ_{120}	$\phi\pi^+\pi^0 \times$ B($\phi \to K^+K^-$)		$(\ 1.1 \pm 0.5\ )\%$		
Γ_{121}	$\phi\rho^+ \times$ B($\phi \to K^+K^-$)		< 7	$\times 10^{-3}$	CL=90%
Γ_{122}	$K^+K^-\pi^+\pi^0$ non-ϕ		$(\ 1.5\ ^{+0.7}_{-0.6}\ )\%$		
Γ_{123}	$K^+\overline{K}^0\pi^+\pi^-$		< 2	%	CL=90%
Γ_{124}	$K^0K^-\pi^+\pi^+$		$(\ 1.0 \pm 0.6\ )\%$		
Γ_{125}	$K^*(892)^+\overline{K}^*(892)^0$ $\times$ B^2($K^* \to K\pi^+$)		$(\ 1.2 \pm 0.5\ )\%$		
Γ_{126}	$K^0K^-\pi^+\pi^+$ non-$K^{*+}\overline{K}^{*0}$		< 7.9	$\times 10^{-3}$	CL=90%
Γ_{127}	$K^+K^-\pi^+\pi^+\pi^-$				
Γ_{128}	$\phi\pi^+\pi^+\pi^-$ $\times$ B($\phi \to K^+K^-$)		< 1	$\times 10^{-3}$	CL=90%
Γ_{129}	$K^+K^-\pi^+\pi^+\pi^-$ nonresonant		< 3	%	CL=90%

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

Γ_{130}	$\phi\pi^+$		$(\ 6.1 \pm 0.6\ ) \times 10^{-3}$		
Γ_{131}	$\phi\pi^+\pi^0$		$(\ 2.3 \pm 1.0\ )\%$		
Γ_{132}	$\phi\rho^+$		< 1.4	%	CL=90%
Γ_{133}	$\phi\pi^+\pi^+\pi^-$		< 2	$\times 10^{-3}$	CL=90%
Γ_{134}	$K^+\overline{K}^*(892)^0$		$(\ 4.2 \pm 0.5\ ) \times 10^{-3}$		
Γ_{135}	$K^*(892)^+\overline{K}^0$		$(\ 3.2 \pm 1.5\ )\%$		
Γ_{136}	$K^*(892)^+\overline{K}^*(892)^0$		$(\ 2.6 \pm 1.1\ )\%$		

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_{137}	$K^+\pi^+\pi^-$	DC	$(\ 6.5 \pm 2.6\ ) \times 10^{-4}$		
Γ_{138}	$K^+\rho^0$	DC	< 6	$\times 10^{-4}$	CL=90%
Γ_{139}	$K^*(892)^0\pi^+$	DC	< 1.9	$\times 10^{-4}$	CL=90%
Γ_{140}	$K^+K^+K^-$	DC	< 1.4	$\times 10^{-4}$	CL=90%
Γ_{141}	ϕK^+	DC	< 1.3	$\times 10^{-4}$	CL=90%
Γ_{142}	$\pi^+e^+e^-$	$C1$	< 6.6	$\times 10^{-5}$	CL=90%
Γ_{143}	$\pi^+\mu^+\mu^-$	$C1$	< 1.8	$\times 10^{-5}$	CL=90%

Γ_{144}	$\rho^+ \mu^+ \mu^-$	*C1*	$<$	5.6	$\times 10^{-4}$	CL=90%
Γ_{145}	$K^+ e^+ e^-$	[*f*]	$<$	2.0	$\times 10^{-4}$	CL=90%
Γ_{146}	$K^+ \mu^+ \mu^-$	[*f*]	$<$	9.7	$\times 10^{-5}$	CL=90%
Γ_{147}	$\pi^+ e^\pm \mu^\mp$	*LF*				
Γ_{148}	$\pi^+ e^+ \mu^-$	*LF*	$<$	1.1	$\times 10^{-4}$	CL=90%
Γ_{149}	$\pi^+ e^- \mu^+$	*LF*	$<$	1.3	$\times 10^{-4}$	CL=90%
Γ_{150}	$K^+ e^+ \mu^-$	*LF*	$<$	1.3	$\times 10^{-4}$	CL=90%
Γ_{151}	$K^+ e^- \mu^+$	*LF*	$<$	1.2	$\times 10^{-4}$	CL=90%
Γ_{152}	$\pi^- e^+ e^+$	*L*	$<$	1.1	$\times 10^{-4}$	CL=90%
Γ_{153}	$\pi^- \mu^+ \mu^+$	*L*	$<$	8.7	$\times 10^{-5}$	CL=90%
Γ_{154}	$\pi^- e^+ \mu^+$	*L*	$<$	1.1	$\times 10^{-4}$	CL=90%
Γ_{155}	$\rho^- \mu^+ \mu^+$	*L*	$<$	5.6	$\times 10^{-4}$	CL=90%
Γ_{156}	$K^- e^+ e^+$	*L*	$<$	1.2	$\times 10^{-4}$	CL=90%
Γ_{157}	$K^- \mu^+ \mu^+$	*L*	$<$	1.2	$\times 10^{-4}$	CL=90%
Γ_{158}	$K^- e^+ \mu^+$	*L*	$<$	1.3	$\times 10^{-4}$	CL=90%
Γ_{159}	$K^*(892)^- \mu^+ \mu^+$	*L*	$<$	8.5	$\times 10^{-4}$	CL=90%

Γ_{160} A dummy mode used by the fit. (33 $\pm$5)%

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

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

[*c*] ℓ indicates e or μ mode, not sum over modes.

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

CONSTRAINED FIT INFORMATION

An overall fit to 29 branching ratios uses 48 measurements and one constraint to determine 18 parameters. The overall fit has a $\chi^2 = 19.2$ for 31 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, $x_i \equiv \Gamma_i / \Gamma_{\text{total}}$. The fit constrains the x_i whose labels appear in this array to sum to one.

x_{12}	5									
x_{17}	4	2								
x_{26}	18	29	8							
x_{27}	14	7	31	25						
x_{33}	38	9	8	31	25					
x_{34}	32	16	14	56	45	55				
x_{39}	0	0	0	0	0	0	0			
x_{43}	7	4	3	13	10	12	23	0		
x_{52}	9	5	4	17	14	16	30	0	18	
x_{59}	15	8	7	28	22	27	49	0	11	15
x_{73}	21	11	9	37	29	36	65	0	15	20
x_{80}	5	3	2	9	7	8	16	0	31	37
x_{87}	3	1	1	5	4	5	9	0	29	13
x_{93}	5	2	2	9	7	8	15	0	3	5
x_{96}	3	2	1	6	5	6	11	0	2	3
x_{112}	22	7	6	23	18	53	41	0	9	12
x_{160}	−35	−26	−12	−41	−34	−38	−55	−58	−46	−45
	x_{10}	x_{12}	x_{17}	x_{26}	x_{27}	x_{33}	x_{34}	x_{39}	x_{43}	x_{52}

x_{73}	32						
x_{80}	8	10					
x_{87}	4	6	12				
x_{93}	29	10	2	1			
x_{96}	8	7	2	1	15		
x_{112}	20	26	6	4	6	4	
x_{160}	−30	−38	−46	−32	−16	−10	−27
	x_{59}	x_{73}	x_{80}	x_{87}	x_{93}	x_{96}	x_{112}

D^+ BRANCHING RATIOS

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

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 $D^0 \rightarrow$ (e^+ 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.

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		[4] 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	[5] ALBRECHT	96C	ARG	$e^+e^- \approx$ 10 GeV
0.134±0.015±0.010		[6] ABE	93E	VNS	e^+e^- 58 GeV
$0.098\pm0.009^{+0.006}_{-0.005}$	240	[7] ALBRECHT	92F	ARG	$e^+e^- \approx$ 10 GeV
0.096±0.007±0.015		[8] ONG	88	MRK2	e^+e^- 29 GeV
$0.116^{+0.011}_{-0.009}$		[8] PAL	86	DLCO	e^+e^- 29 GeV
0.091±0.009±0.013		[8] AIHARA	85	TPC	e^+e^- 29 GeV
0.092±0.022±0.040		[8] ALTHOFF	84J	TASS	e^+e^- 34.6 GeV
0.091±0.013		[8] KOOP	84	DLCO	See PAL 86
0.08 ±0.015		[9] BACINO	79	DLCO	e^+e^- 3.772 GeV

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

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

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

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

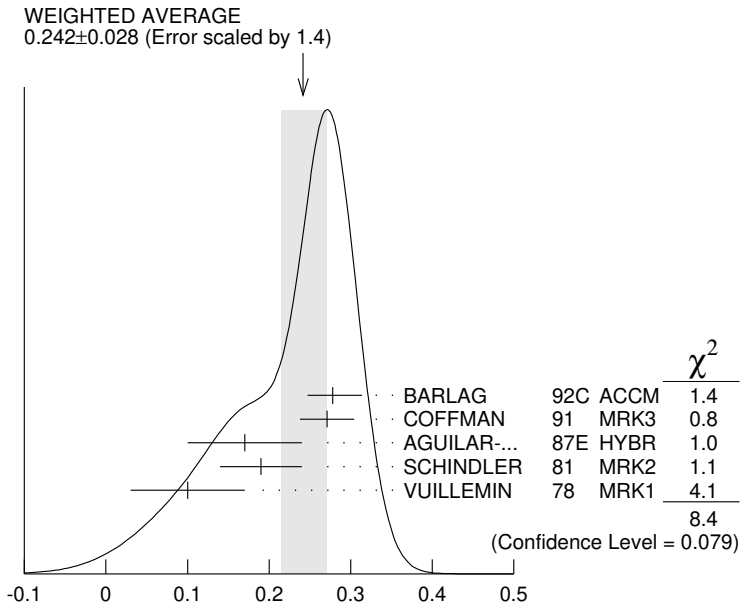
[8] Average BR for charm $\rightarrow e^+ X$. Unlike at $E_{\text{cm}} = 3.77$ GeV, the admixture of charmed mesons is unknown.

[9] 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 OR AVERAGE		Error includes scale factor of 1.4. See the ideogram below.			
$0.278^{+0.036}_{-0.031}$		[10] 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

[10] 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 OR 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 $D^0 \rightarrow$ (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	[11] BRANDELIK	79	DASP	e^+e^- 4.03 GeV

[11] 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.

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

This is the average branching ratio for charm $\rightarrow \mu^+ X$. The mixture of charmed particles is unknown and may actually contain states other than D mesons.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.081\ ^{+0.010}_{-0.009}$ OUR AVERAGE					
$0.086\pm0.017\ ^{+0.008}_{-0.007}$	69	[12] ALBRECHT	92F	ARG	$e^+e^- \approx$ 10 GeV
0.078±0.009±0.012		ONG	88	MRK2	e^+e^- 29 GeV
0.078±0.015±0.02		BARTEL	87	JADE	e^+e^- 34.6 GeV
$0.082\pm0.012\ ^{+0.02}_{-0.01}$		ALTHOFF	84G	TASS	e^+e^- 34.5 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.089±0.018±0.025		BARTEL	85J	JADE	See BARTEL 87

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

$\Gamma(c/\bar{c} \rightarrow e^+e^- \text{anything})/\Gamma(c/\bar{c} \rightarrow \text{anything})$

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<2.2\times10^{-3}$	90	0.1	[13] HAAS	88	CLEO	e^+e^- 10 GeV

[13] The normalization uses a continuum charm production estimate.

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<3.7\times10^{-3}$	90	0.2	[14] HAAS	88	CLEO	e^+e^- 10 GeV

[14] The normalization uses a continuum charm production estimate.

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.018	90	0.3	[15] HAAS	88	CLEO	e^+e^- 10 GeV
<0.007	95		[16] ALTHOFF	84G	TASS	e^+e^- 34.5 GeV

[15] The normalization uses a continuum charm production estimate.

[16] Average BR for charm $\to \mu^+\mu^-$X. The mixture of charmed particles is unknown and may actually contain states other than D mesons.

Leptonic and semileptonic modes

$\Gamma(\mu^+\nu_\mu)/\Gamma_{\text{total}}$ Γ_8/Γ

See the "Note on Pseudoscalar-Meson Decay Constants" in the $\pi^\pm$ Listings for the limit inferred on the D^+ decay constant from the limit here on $\Gamma(\mu^+\nu_\mu)/\Gamma_{\text{total}}$.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.00072	90		ADLER	88B	MRK3	e^+e^- 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.02	90	0	[17] AUBERT	83	SPEC	μ^+ Fe, 250 GeV

[17] 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_9/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	97	Our $\Gamma(\overline{K}^0 e^+\nu_e)/\Gamma_{\text{total}}$
$0.072^{+0.031}_{-0.021}$	PDG	97	1.03 × our $\Gamma(\overline{K}^0\mu^+\nu_\mu)/\Gamma_{\text{total}}$

$\Gamma(\overline{K}^0 e^+\nu_e)/\Gamma_{\text{total}}$ Γ_{10}/Γ

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

$\Gamma(\overline{K}^0 e^+\nu_e)/\Gamma(\overline{K}^0\pi^+)$ Γ_{10}/Γ_{33}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
2.32±0.31 OUR FIT					
2.60±0.35±0.26	186	[18] BEAN	93C	CLEO	$e^+e^- \approx \Upsilon(4S)$

[18] 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_{10}/Γ_{34}

VALUE	DOCUMENT ID		TECN	COMMENT
0.74±0.10 OUR FIT				
0.66±0.09±0.14	ANJOS	91C	E691	γ Be 80–240 GeV

$\Gamma(\overline{K}^0 \mu^+ \nu_\mu)/\Gamma_{total}$ Γ_{11}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.07\ ^{+0.028}_{-0.016} \pm 0.012$	14	BAI	91	MRK3	$e^+e^- \approx$ 3.77 GeV

$\Gamma(\overline{K}^0 \mu^+ \nu_\mu)/\Gamma(\mu^+ \text{anything})$ Γ_{11}/Γ_6

VALUE	EVTS	DOCUMENT ID		COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.76 ± 0.06	84	[19] AOKI	88	π^- emulsion

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

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$0.041\ ^{+0.009}_{-0.007}$ OUR FIT						
$0.035\ ^{+0.012}_{-0.007} \pm 0.004$		14	[20] BAI	91	MRK3	$e^+e^- \approx$ 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.057	90		[21] AGUILAR-...	87F	HYBR	πp, pp 360, 400 GeV

[20] 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 $\overline{K}^*(892)\, e^+ \nu_e$.

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

$\Gamma(\overline{K}^*(892)^0 \ell^+ \nu_\ell)/\Gamma_{total}$ Γ_{25}/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
0.047 ± 0.004 OUR AVERAGE			
0.048 ± 0.005	PDG	97	Our $\Gamma(\overline{K}^{*0} e^+ \nu_e)/\Gamma_{total}$
0.046 ± 0.006	PDG	97	1.05 × our $\Gamma(\overline{K}^{*0} \mu^+ \nu_\mu)/\Gamma_{total}$

$\Gamma(\overline{K}^*(892)^0 e^+ \nu_e)/\Gamma(K^- \pi^+ e^+ \nu_e)$ Γ_{26}/Γ_{12}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$1.16\ ^{+0.21}_{-0.24}$ OUR 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_{26}/Γ_{34}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.53 ± 0.05 OUR FIT					
0.54 ± 0.05 OUR AVERAGE					
$0.67 \pm 0.09 \pm 0.07$	710	[22] BEAN	93C	CLEO	$e^+e^- \approx \Upsilon(4S)$
$0.62 \pm 0.15 \pm 0.09$	35	ADAMOVICH	91	OMEG	π^- 340 GeV
$0.55 \pm 0.08 \pm 0.10$	880	ALBRECHT	91	ARG	$e^+e^- \approx$ 10.4 GeV
$0.49 \pm 0.04 \pm 0.05$		ANJOS	89B	E691	Photoproduction

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

$\Gamma(K^-\pi^+e^+\nu_e$ nonresonant$)/\Gamma_{total}$ Γ_{14}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.007	90	[23] ANJOS	89B	E691	Photoproduction

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

$\Gamma(K^-\pi^+\mu^+\nu_\mu)/\Gamma_{total}$ $\Gamma_{15}/\Gamma = (\Gamma_{17}+\frac{2}{3}\Gamma_{27})/\Gamma$

VALUE	DOCUMENT ID
0.032±0.004 OUR FIT	Error includes scale factor of 1.1.

$\Gamma(\overline{K}^*(892)^0\mu^+\nu_\mu)/\Gamma_{total}$ Γ_{27}/Γ

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.044 ±0.006 OUR FIT		Error includes scale factor of 1.1.			
0.0325±0.0071±0.0075	224	[24] KODAMA	92C	E653	π^- emulsion 600 GeV

[24] 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 $\Gamma(D^0 \to K^-\mu^+\nu_\mu) = (7.0 \pm 0.7) \times 10^{10}\ s^{-1}$ 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_{27}/Γ_{34}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.49±0.06 OUR FIT					
0.53±0.06 OUR AVERAGE					
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	[25] KODAMA	92C	E653	π^- emulsion 600 GeV

[25] 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.

$\Gamma(K^-\pi^+\mu^+\nu_\mu$ nonresonant$)/\Gamma(K^-\pi^+\mu^+\nu_\mu)$ $\Gamma_{17}/\Gamma_{15} = \Gamma_{17}/(\Gamma_{17}+\frac{2}{3}\Gamma_{27})$

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

$\Gamma(\overline{K}^0\pi^+\pi^-e^+\nu_e)/\Gamma_{total}$ Γ_{18}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.022^{+0.047}_{-0.006}\pm0.004$	1	[26] AGUILAR-...	87F	HYBR	πp, pp 360, 400 GeV

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.044^{+0.052}_{-0.013}\pm0.007$	2	[27] AGUILAR-...	87F	HYBR	πp, pp 360, 400 GeV

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

$\Gamma((\overline{K}^*(892)\pi)^0 e^+\nu_e)/\Gamma_{total}$ Γ_{20}/Γ

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

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

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

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

$\Gamma(K^-\pi^+\pi^0\mu^+\nu_\mu)/\Gamma(K^-\pi^+\mu^+\nu_\mu)$ $\Gamma_{22}/\Gamma_{15} = \Gamma_{22}/(\Gamma_{17}+\frac{2}{3}\Gamma_{27})$

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

$\Gamma(\pi^0\ell^+\nu_\ell)/\Gamma(\overline{K}^0\ell^+\nu_\ell)$ Γ_{23}/Γ_9

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.085 ± 0.027 ± 0.014	53	[28] ALAM	93	CLEO	$e^+e^- \approx \Upsilon(4S)$

[28] 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_{24}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.057	90	[29] AGUILAR-...	87F	HYBR	πp, pp 360, 400 GeV

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

$\Gamma(\rho^0 e^+\nu_e)/\Gamma_{total}$ Γ_{28}/Γ

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

$\Gamma(\rho^0 e^+\nu_e)/\Gamma(\overline{K}^*(892)^0 e^+\nu_e)$ Γ_{28}/Γ_{26}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.045 ± 0.014 ± 0.009	49	[30] AITALA	97	E791	π^- nucleus, 500 GeV

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

$\Gamma(\rho^0 \mu^+ \nu_\mu)/\Gamma(\overline{K}^*(892)^0 \mu^+ \nu_\mu)$ Γ_{29}/Γ_{27}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.061±0.014 OUR AVERAGE					
0.051±0.015±0.009	54	[31] AITALA	97	E791	π^- nucleus, 500 GeV
0.079±0.019±0.013	39	[32] 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	[33] KODAMA	93C	E653	π^- emulsion 600 GeV

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

[32] 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.

[33] 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_{30}/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_{31}/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

$\Gamma(\eta'(958)\mu^+ \nu_\mu)/\Gamma(\overline{K}^*(892)^0 \mu^+ \nu_\mu)$ Γ_{32}/Γ_{27}

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