D^0 – THIS IS PART 1 OF 3

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

PART 1

Page #	Section name
1	Mass
1	Mass differences
2	Mean life
3	Mean life difference/average
3	Decay modes
11	Branching ratios
11	Inclusive modes
13	Semileptonic modes

PART 2

Page #	Section name
	Branching ratios (continued)
16	Hadronic modes with a $\overline{K}$ or $\overline{K}K\overline{K}$

PART 3

Page #	Section name
	Branching ratios (continued)
30	Pionic modes
31	Hadronic modes with a $K\overline{K}$ pair
37	Rare or forbidden modes
43	CP-violating decay-rate asymmetries
43	Production cross section at $\psi(3770)$
44	References

D^0

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

D^0 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*
1864.5± 0.5 OUR FIT	Error includes scale factor of 1.1.				
1864.1± 1.0 OUR AVERAGE					
1864.6± 0.3± 1.0	641	BARLAG	90C	ACCM	π^- Cu 230 GeV
1852 ± 7	16	ADAMOVICH	87	EMUL	Photoproduction
1861 ± 4		DERRICK	84	HRS	e^+e^- 29 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1856 ±36	22	ADAMOVICH	84B	EMUL	Photoproduction
1847 ± 7	1	FIORINO	81	EMUL	$\gamma N \rightarrow \overline{D}^0 +$
1863.8± 0.5	[1]	SCHINDLER	81	MRK2	e^+e^- 3.77 GeV
1864.7± 0.6	[1]	TRILLING	81	RVUE	e^+e^- 3.77 GeV
1863.0± 2.5	238	ASTON	80E	OMEG	$\gamma p \rightarrow \overline{D}^0$
1860 ± 2	143	[2] AVERY	80	SPEC	$\gamma N \rightarrow D^{*+}$
1869 ± 4	35	[2] AVERY	80	SPEC	$\gamma N \rightarrow D^{*+}$
1854 ± 6	94	[2] ATIYA	79	SPEC	$\gamma N \rightarrow D^0\overline{D}^0$
1850 ±15	64	BALTAY	78C	HBC	$\nu N \rightarrow K^0\pi\pi$
1863 ± 3		GOLDHABER	77	MRK1	D^0, D^+ recoil spectra
1863.3± 0.9	[1]	PERUZZI	77	MRK1	e^+e^- 3.77 GeV
1868 ±11		PICCOLO	77	MRK1	e^+e^- 4.03, 4.41 GeV
1865 ±15	234	GOLDHABER	76	MRK1	$K\pi$ and $K3\pi$

[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. TRILLING 81 enters the fit in the $D^{\pm}$ mass, and PERUZZI 77 and SCHINDLER 81 enter in the $m_{D^{\pm}} - m_{D^0}$, below.

[2] Error does not include possible systematic mass scale shift, estimated to be less than 5 MeV.

$|m_{D_1^0} - m_{D_2^0}|$

The D_1^0 and D_2^0 are the mass eigenstates of the D^0 meson.

VALUE (10^{10} $\hbar$ s^{-1})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<24	90	[3,4] AITALA	96C	E791	π^- nucleus, 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<21	90	[3,5] ANJOS	88C	E691	Photoproduction

[3] Calculated by us using $\Delta m = (2r/(1-r))^{1/2}\hbar/4.15 \times 10^{-13}$ s, where r is the D^0-$\overline{D}^0$ mixing ratio.

[4] This limit is inferred from the D^0-$\overline{D}^0$ mixing ratio $\Gamma(K^+\ell^-\overline{\nu}_\ell(\text{via }\overline{D}^0))/\Gamma(K^-\ell^+\nu_\ell)$ given near the end of the D^0 Listings.

[5] This limit is inferred from the D^0-$\overline{D}^0$ mixing ratio $\Gamma(K^+\pi^-$ or $K^+\pi^-\pi^+\pi^-$ (via $\overline{D}^0))/\Gamma(K^-\pi^+$ or $K^-\pi^+\pi^+\pi^-)$ near the end of the D^0 Listings. ANJOS 88C uses decay-time information to distinguish doubly Cabibbo-suppressed decays from D^0-$\overline{D}^0$ mixing but assumes no interference between these processes. When interference is allowed, the limit degrades by about a factor of two.

$m_{D^\pm} - m_{D^0}$

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)	*DOCUMENT ID*		*TECN*	*COMMENT*
4.78±0.10 OUR FIT				
4.74±0.28 OUR AVERAGE				
4.7 ±0.3	[6] SCHINDLER	81	MRK2	e^+e^- 3.77 GeV
5.0 ±0.8	[6] PERUZZI	77	MRK1	e^+e^- 3.77 GeV

[6] See the footnote on TRILLING 81 in the D^0 and $D^\pm$ sections on the mass.

D^0 MEAN LIFE

Measurements with an error $> 0.05\times10^{-12}$ s are omitted from the average, and those with an error $> 0.1\times10^{-12}$ s or that have been superseded by later results have been removed from the Listings.

VALUE (10^{-12} s)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.415±0.004 OUR AVERAGE					
0.413±0.004±0.003	16k	FRABETTI	94D	E687	$K^-\pi^+$, $K^-\pi^+\pi^+\pi^-$
0.424±0.011±0.007	5118	FRABETTI	91	E687	$K^-\pi^+$, $K^-\pi^+\pi^+\pi^-$
0.417±0.018±0.015	890	ALVAREZ	90	NA14	$K^-\pi^+$, $K^-\pi^+\pi^+\pi^-$
$0.388^{+0.023}_{-0.021}$	641	[7] BARLAG	90C	ACCM	π^- Cu 230 GeV
0.48 ±0.04 ±0.03	776	ALBRECHT	88I	ARG	e^+e^- 10 GeV
0.422±0.008±0.010	4212	RAAB	88	E691	Photoproduction
0.42 ±0.05	90	BARLAG	87B	ACCM	K^- and π^- 200 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.34\ ^{+0.06}_{-0.05}$ ±0.03	58	AMENDOLIA	88	SPEC	Photoproduction
$0.46\ ^{+0.06}_{-0.05}$	145	AGUILAR-...	87D	HYBR	π^-p and pp
0.50 ±0.07 ±0.04	317	CSORNA	87	CLEO	e^+e^- 10 GeV
0.61 ±0.09 ±0.03	50	ABE	86	HYBR	γp 20 GeV
$0.47\ ^{+0.09}_{-0.08}$ ±0.05	74	GLADNEY	86	MRK2	e^+e^- 29 GeV
$0.43\ ^{+0.07}_{-0.05}\ ^{+0.01}_{-0.02}$	58	USHIDA	86B	EMUL	ν wideband
$0.37\ ^{+0.10}_{-0.07}$	26	BAILEY	85	SILI	π^- Be 200 GeV

[7] BARLAG 90C estimate systematic error to be negligible.

$|\Gamma_{D_1^0} - \Gamma_{D_2^0}|/\Gamma_{D^0}$ MEAN LIFE DIFFERENCE/AVERAGE

The D_1^0 and D_2^0 are the mass eigenstates of the D^0 meson.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.20	90	[8,9] AITALA	96C	E791	π^- nucleus, 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.17	90	[8,10] ANJOS	88C	E691	Photoproduction

[8] Calculated by us using $\Delta\Gamma/\Gamma = [8r/(1+r)]^{1/2}$, where r is the D^0-$\overline{D}^0$ mixing ratio.

[9] This limit is inferred from the D^0-$\overline{D}^0$ mixing ratio $\Gamma(K^+\ell^-\overline{\nu}_\ell(\text{via }\overline{D}^0))/\Gamma(K^-\ell^+\nu_\ell)$ given near the end of the D^0 Listings.

[10] This limit is inferred from the D^0-$\overline{D}^0$ mixing ratio $\Gamma(K^+\pi^-$ or $K^+\pi^-\pi^+\pi^-$ (via $\overline{D}^0))/\Gamma(K^-\pi^+$ or $K^-\pi^+\pi^+\pi^-)$ near the end of the D^0 Listings. ANJOS 88C uses decay-time information to distinguish doubly Cabibbo-suppressed decays from D^0-$\overline{D}^0$ mixing but assumes no interference between these processes. When interference is allowed, the limit degrades by about a factor of two.

D^0 DECAY MODES

$\overline{D}^0$ modes are charge conjugates of the modes below.

	Mode		Fraction (Γ_i/Γ)	Scale factor/ Confidence level
	Inclusive modes			
Γ_1	e^+ anything		(6.75 ± 0.29) %	
Γ_2	μ^+ anything		(6.6 ± 0.8) %	
Γ_3	K^- anything		(53 ± 4) %	S=1.3
Γ_4	$\overline{K}^0$ anything + K^0 anything		(42 ± 5) %	
Γ_5	K^+ anything		(3.4 $^{+0.6}_{-0.4}$) %	
Γ_6	η anything	[a]	< 13 %	CL=90%
	Semileptonic modes			
Γ_7	$K^-\ell^+\nu_\ell$	[b]	(3.46 ± 0.16) %	S=1.2
Γ_8	$K^-e^+\nu_e$		(3.63 ± 0.20) %	S=1.1
Γ_9	$K^-\mu^+\nu_\mu$		(3.21 ± 0.18) %	
Γ_{10}	$K^-\pi^0 e^+\nu_e$		(1.6 $^{+1.3}_{-0.5}$) %	
Γ_{11}	$\overline{K}^0\pi^-e^+\nu_e$		(2.8 $^{+1.7}_{-0.9}$) %	
Γ_{12}	$\overline{K}^*(892)^-e^+\nu_e$ × B($K^{*-}\to\overline{K}^0\pi^-$)		(1.34 ± 0.22) %	
Γ_{13}	$K^*(892)^-\ell^+\nu_\ell$			
Γ_{14}	$\overline{K}^0\pi^-(\pi^0)e^+\nu_e$			
Γ_{15}	$\overline{K}^*(892)^0\pi^-e^+\nu_e$			
Γ_{16}	$K^-\pi^+\pi^-\mu^+\nu_\mu$		< 1.2 × 10^{-3}	CL=90%
Γ_{17}	$(\overline{K}^*(892)\pi)^-\mu^+\nu_\mu$		< 1.4 × 10^{-3}	CL=90%
Γ_{18}	$\pi^-e^+\nu_e$		(3.7 ± 0.6) × 10^{-3}	

A fraction of the following resonance mode has already appeared above as a submode of a charged-particle mode.

Γ_{19}	$K^*(892)^- e^+ \nu_e$		(2.01±0.33) %	

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

Γ_{20}	$K^- \pi^+$		(3.82±0.12) %	S=1.1
Γ_{21}	$\overline{K}^0 \pi^0$		(2.11±0.21) %	S=1.1
Γ_{22}	$\overline{K}^0 \pi^+ \pi^-$	[c]	(5.4 ±0.4) %	S=1.2
Γ_{23}	$\overline{K}^0 \rho^0$		(1.21±0.17) %	
Γ_{24}	$\overline{K}^0 f_0(980)$		(3.0 ±0.8) × 10^{-3}	
	× B($f_0 \rightarrow \pi^+ \pi^-$)			
Γ_{25}	$\overline{K}^0 f_2(1270)$		(2.3 ±0.9) × 10^{-3}	
	× B($f_2 \rightarrow \pi^+ \pi^-$)			
Γ_{26}	$\overline{K}^0 f_0(1370)$		(4.3 ±1.3) × 10^{-3}	
	× B($f_0 \rightarrow \pi^+ \pi^-$)			
Γ_{27}	$K^*(892)^- \pi^+$		(3.3 ±0.3) %	
	× B($K^{*-} \rightarrow \overline{K}^0 \pi^-$)			
Γ_{28}	$K_0^*(1430)^- \pi^+$		(6.4 ±1.6) × 10^{-3}	
	× B($K_0^*(1430)^- \rightarrow \overline{K}^0 \pi^-$)			
Γ_{29}	$\overline{K}^0 \pi^+ \pi^-$ nonresonant		(1.47±0.24) %	
Γ_{30}	$K^- \pi^+ \pi^0$	[c]	(13.9 ±0.9) %	S=1.3
Γ_{31}	$K^- \rho^+$		(10.7 ±1.0) %	
Γ_{32}	$K^*(892)^- \pi^+$		(1.7 ±0.2) %	
	× B($K^{*-} \rightarrow K^- \pi^0$)			
Γ_{33}	$\overline{K}^*(892)^0 \pi^0$		(2.1 ±0.3) %	
	× B($\overline{K}^{*0} \rightarrow K^- \pi^+$)			
Γ_{34}	$K^- \pi^+ \pi^0$ nonresonant		(6.8 ±2.5) × 10^{-3}	
Γ_{35}	$\overline{K}^0 \pi^0 \pi^0$			
Γ_{36}	$\overline{K}^*(892)^0 \pi^0$		(1.0 ±0.2) %	
	× B($\overline{K}^{*0} \rightarrow \overline{K}^0 \pi^0$)			
Γ_{37}	$\overline{K}^0 \pi^0 \pi^0$ nonresonant		(7.8 ±2.0) × 10^{-3}	
Γ_{38}	$K^- \pi^+ \pi^+ \pi^-$	[c]	(7.5 ±0.4) %	S=1.1
Γ_{39}	$K^- \pi^+ \rho^0$ total		(6.3 ±0.4) %	
Γ_{40}	$K^- \pi^+ \rho^0$ 3-body		(4.7 ±2.1) × 10^{-3}	
Γ_{41}	$\overline{K}^*(892)^0 \rho^0$		(9.8 ±2.2) × 10^{-3}	
	× B($\overline{K}^{*0} \rightarrow K^- \pi^+$)			
Γ_{42}	$K^- a_1(1260)^+$		(3.6 ±0.6) %	
	× B($a_1(1260)^+ \rightarrow \pi^+ \pi^+ \pi^-$)			
Γ_{43}	$\overline{K}^*(892)^0 \pi^+ \pi^-$ total		(1.5 ±0.4) %	
	× B($\overline{K}^{*0} \rightarrow K^- \pi^+$)			
Γ_{44}	$\overline{K}^*(892)^0 \pi^+ \pi^-$ 3-body		(9.5 ±2.1) × 10^{-3}	
	× B($\overline{K}^{*0} \rightarrow K^- \pi^+$)			
Γ_{45}	$K_1(1270)^- \pi^+$	[d]	(3.6 ±1.0) × 10^{-3}	
	× B($K_1(1270)^- \rightarrow K^- \pi^+ \pi^-$)			

Γ_{46}	$K^-\pi^+\pi^+\pi^-$ nonresonant		(1.75±0.25) %
Γ_{47}	$\overline{K}^0\pi^+\pi^-\pi^0$	[c]	(10.0 ±1.2) %
Γ_{48}	$\overline{K}^0\eta\times$ B($\eta\to\ \pi^+\pi^-\pi^0$)		(1.6 ±0.3) $\times10^{-3}$
Γ_{49}	$\overline{K}^0\omega\times$ B($\omega\to\ \pi^+\pi^-\pi^0$)		(1.9 ±0.4) %
Γ_{50}	$K^*(892)^-\rho^+$		(4.1 ±1.6) %
	$\times$ B($K^{*-}\to\ \overline{K}^0\pi^-$)		
Γ_{51}	$\overline{K}^*(892)^0\rho^0$		(4.9 ±1.1) $\times10^{-3}$
	$\times$ B($\overline{K}^{*0}\to\ \overline{K}^0\pi^0$)		
Γ_{52}	$K_1(1270)^-\pi^+$	[d]	(5.1 ±1.4) $\times10^{-3}$
	$\times$ B($K_1(1270)^-\to\ \overline{K}^0\pi^-\pi^0$)		
Γ_{53}	$\overline{K}^*(892)^0\pi^+\pi^-$ 3-body		(4.7 ±1.1) $\times10^{-3}$
	$\times$ B($\overline{K}^{*0}\to\ \overline{K}^0\pi^0$)		
Γ_{54}	$\overline{K}^0\pi^+\pi^-\pi^0$ nonresonant		(2.1 ±2.1) %
Γ_{55}	$K^-\pi^+\pi^0\pi^0$		(15 ±5) %
Γ_{56}	$K^-\pi^+\pi^+\pi^-\pi^0$		(4.0 ±0.4) %
Γ_{57}	$\overline{K}^*(892)^0\pi^+\pi^-\pi^0$		(1.2 ±0.6) %
	$\times$ B($\overline{K}^{*0}\to\ K^-\pi^+$)		
Γ_{58}	$\overline{K}^*(892)^0\eta$		(3.0 ±0.8) $\times10^{-3}$
	$\times$ B($\overline{K}^{*0}\to\ K^-\pi^+$)		
	$\times$ B($\eta\to\ \pi^+\pi^-\pi^0$)		
Γ_{59}	$K^-\pi^+\omega\times$ B($\omega\to\ \pi^+\pi^-\pi^0$)		(2.7 ±0.5) %
Γ_{60}	$\overline{K}^*(892)^0\omega$		(7 ±3) $\times10^{-3}$
	$\times$ B($\overline{K}^{*0}\to\ K^-\pi^+$)		
	$\times$ B($\omega\to\ \pi^+\pi^-\pi^0$)		
Γ_{61}	$\overline{K}^0\pi^+\pi^+\pi^-\pi^-$		(5.8 ±1.6) $\times10^{-3}$
Γ_{62}	$\overline{K}^0\pi^+\pi^-\pi^0\pi^0(\pi^0)$		(10.6 $^{+7.3}_{-3.0}$) %
Γ_{63}	$\overline{K}^0K^+K^-$		(9.3 ±1.0) $\times10^{-3}$
	In the fit as $\frac{1}{2}\Gamma_{75}+\Gamma_{65}$, where $\frac{1}{2}\Gamma_{75}=\Gamma_{64}$.		
Γ_{64}	$\overline{K}^0\phi\times$ B($\phi\to\ K^+K^-$)		(4.3 ±0.5) $\times10^{-3}$
Γ_{65}	$\overline{K}^0K^+K^-$ non-ϕ		(5.1 ±0.8) $\times10^{-3}$
Γ_{66}	$K^0_SK^0_SK^0_S$		(8.3 ±1.5) $\times10^{-4}$
Γ_{67}	$K^+K^-K^-\pi^+$		(2.1 ±0.5) $\times10^{-4}$
Γ_{68}	$K^+K^-\overline{K}^0\pi^0$		(7.2 $^{+4.8}_{-3.5}$) $\times10^{-3}$

Fractions of many of the following modes with resonances have already appeared above as submodes of particular charged-particle modes. (Modes for which there are only upper limits and $\overline{K}^*(892)\,\rho$ submodes only appear below.)

Γ_{69}	$\overline{K}^0\,\eta$		(7.0 ±1.0) $\times 10^{-3}$		
Γ_{70}	$\overline{K}^0\,\rho^0$		(1.21±0.17) %		
Γ_{71}	$K^-\,\rho^+$		(10.7 ±1.0) %		S=1.2
Γ_{72}	$\overline{K}^0\,\omega$		(2.1 ±0.4) %		
Γ_{73}	$\overline{K}^0\,\eta'(958)$		(1.71±0.26) %		
Γ_{74}	$\overline{K}^0\,f_0(980)$		(5.7 ±1.6) $\times 10^{-3}$		
Γ_{75}	$\overline{K}^0\,\phi$		(8.6 ±1.0) $\times 10^{-3}$		
Γ_{76}	$K^-\,a_1(1260)^+$		(7.3 ±1.1) %		
Γ_{77}	$\overline{K}^0\,a_1(1260)^0$		< 1.9 %		CL=90%
Γ_{78}	$\overline{K}^0\,f_2(1270)$		(4.1 ±1.5) $\times 10^{-3}$		
Γ_{79}	$K^-\,a_2(1320)^+$		< 2 $\times 10^{-3}$		CL=90%
Γ_{80}	$\overline{K}^0\,f_0(1370)$		(6.9 ±2.1) $\times 10^{-3}$		
Γ_{81}	$K^*(892)^-\,\pi^+$		(5.0 ±0.4) %		S=1.2
Γ_{82}	$\overline{K}^*(892)^0\,\pi^0$		(3.1 ±0.4) %		
Γ_{83}	$\overline{K}^*(892)^0\,\pi^+\,\pi^-$ total		(2.3 ±0.5) %		
Γ_{84}	$\overline{K}^*(892)^0\,\pi^+\,\pi^-$ 3-body		(1.42±0.32) %		
Γ_{85}	$K^-\,\pi^+\,\rho^0$ total		(6.3 ±0.4) %		
Γ_{86}	$K^-\,\pi^+\,\rho^0$ 3-body		(4.7 ±2.1) $\times 10^{-3}$		
Γ_{87}	$\overline{K}^*(892)^0\,\rho^0$		(1.47±0.33) %		
Γ_{88}	$\overline{K}^*(892)^0\,\rho^0$ transverse		(1.5 ±0.5) %		
Γ_{89}	$\overline{K}^*(892)^0\,\rho^0$ S-wave		(2.8 ±0.6) %		
Γ_{90}	$\overline{K}^*(892)^0\,\rho^0$ S-wave long.		< 3 $\times 10^{-3}$		CL=90%
Γ_{91}	$\overline{K}^*(892)^0\,\rho^0$ P-wave		< 3 $\times 10^{-3}$		CL=90%
Γ_{92}	$\overline{K}^*(892)^0\,\rho^0$ D-wave		(1.9 ±0.6) %		
Γ_{93}	$K^*(892)^-\,\rho^+$		(6.1 ±2.4) %		
Γ_{94}	$K^*(892)^-\,\rho^+$ longitudinal		(2.9 ±1.2) %		
Γ_{95}	$K^*(892)^-\,\rho^+$ transverse		(3.2 ±1.8) %		
Γ_{96}	$K^*(892)^-\,\rho^+$ P-wave		< 1.5 %		CL=90%
Γ_{97}	$K^-\,\pi^+\,f_0(980)$		< 1.1 %		CL=90%
Γ_{98}	$\overline{K}^*(892)^0\,f_0(980)$		< 7 $\times 10^{-3}$		CL=90%
Γ_{99}	$K_1(1270)^-\,\pi^+$	[d]	(1.06±0.29) %		
Γ_{100}	$K_1(1400)^-\,\pi^+$		< 1.2 %		CL=90%
Γ_{101}	$\overline{K}_1(1400)^0\,\pi^0$		< 3.7 %		CL=90%
Γ_{102}	$K^*(1410)^-\,\pi^+$		< 1.2 %		CL=90%
Γ_{103}	$K_0^*(1430)^-\,\pi^+$		(1.04±0.26) %		
Γ_{104}	$K_2^*(1430)^-\,\pi^+$		< 8 $\times 10^{-3}$		CL=90%
Γ_{105}	$\overline{K}_2^*(1430)^0\,\pi^0$		< 4 $\times 10^{-3}$		CL=90%
Γ_{106}	$\overline{K}^*(892)^0\,\pi^+\,\pi^-\,\pi^0$		(1.8 ±0.9) %		

Γ_{107}	$\overline{K}^*(892)^0\eta$		(1.9 ±0.5) %		
Γ_{108}	$K^-\pi^+\omega$		(3.0 ±0.6) %		
Γ_{109}	$\overline{K}^*(892)^0\omega$		(1.1 ±0.4) %		
Γ_{110}	$K^-\pi^+\eta'(958)$		(7.0 ±1.8) $\times 10^{-3}$		
Γ_{111}	$\overline{K}^*(892)^0\eta'(958)$		< 1.0 $\times 10^{-3}$		CL=90%

Pionic modes

Γ_{112}	$\pi^+\pi^-$		(1.51±0.11) $\times 10^{-3}$		
Γ_{113}	$\pi^0\pi^0$		(8.4 ±2.2) $\times 10^{-4}$		
Γ_{114}	$\pi^+\pi^-\pi^0$		(1.6 ±1.1) %		S=2.7
Γ_{115}	$\pi^+\pi^+\pi^-\pi^-$		(7.4 ±0.6) $\times 10^{-3}$		
Γ_{116}	$\pi^+\pi^+\pi^-\pi^-\pi^0$		(1.9 ±0.4) %		
Γ_{117}	$\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-$		(4.0 ±3.0) $\times 10^{-4}$		

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

Γ_{118}	K^+K^-		(4.34±0.24) $\times 10^{-3}$		
Γ_{119}	$K^0\overline{K}^0$		(6.5 ±1.8) $\times 10^{-4}$		S=1.2
Γ_{120}	$K^0K^-\pi^+$		(6.4 ±1.0) $\times 10^{-3}$		S=1.1
Γ_{121}	$\overline{K}^*(892)^0K^0$ $\times$ B($\overline{K}^{*0} \to K^-\pi^+$)		< 1.1 $\times 10^{-3}$		CL=90%
Γ_{122}	$K^*(892)^+K^-$ $\times$ B($K^{*+} \to K^0\pi^+$)		(2.3 ±0.5) $\times 10^{-3}$		
Γ_{123}	$K^0K^-\pi^+$ nonresonant		(2.3 ±2.3) $\times 10^{-3}$		
Γ_{124}	$\overline{K}^0K^+\pi^-$		(4.9 ±1.0) $\times 10^{-3}$		
Γ_{125}	$K^*(892)^0\overline{K}^0$ $\times$ B($K^{*0} \to K^+\pi^-$)		< 5 $\times 10^{-4}$		CL=90%
Γ_{126}	$K^*(892)^-K^+$ $\times$ B($K^{*-} \to \overline{K}^0\pi^-$)		(1.2 ±0.7) $\times 10^{-3}$		
Γ_{127}	$\overline{K}^0K^+\pi^-$ nonresonant		(3.8 $^{+2.3}_{-1.9}$) $\times 10^{-3}$		
Γ_{128}	$K^+K^-\pi^0$		(1.3 ±0.4) $\times 10^{-3}$		
Γ_{129}	$K^0_SK^0_S\pi^0$		< 5.9 $\times 10^{-4}$		
Γ_{130}	$K^+K^-\pi^+\pi^-$	[e]	(2.57±0.28) $\times 10^{-3}$		
Γ_{131}	$\phi\pi^+\pi^-$ $\times$ B($\phi \to K^+K^-$)		(5.3 ±1.4) $\times 10^{-4}$		
Γ_{132}	$\phi\rho^0$ $\times$ B($\phi \to K^+K^-$)		(5.3 ±1.4) $\times 10^{-4}$		
Γ_{133}	$K^+K^-\rho^0$ 3-body		(9.0 ±2.3) $\times 10^{-4}$		
Γ_{134}	$K^*(892)^0K^-\pi^+$ $\times$ B($K^{*0} \to K^+\pi^-$)		(2.1 ±0.9) $\times 10^{-3}$		
Γ_{135}	$\overline{K}^*(892)^0K^+\pi^-$ $\times$ B($\overline{K}^{*0} \to K^-\pi^+$)		(1.1 ±0.8) $\times 10^{-3}$		
Γ_{136}	$K^*(892)^0\overline{K}^*(892)^0$ $\times$ B^2($K^{*0} \to K^+\pi^-$)		(6 ±2) $\times 10^{-4}$		
Γ_{137}	$K^+K^-\pi^+\pi^-$ non-ϕ		(1.7 ±0.5) $\times 10^{-3}$		
Γ_{138}	$K^+K^-\pi^+\pi^-$ nonresonant		< 8 $\times 10^{-4}$		CL=90%
Γ_{139}	$K^0\overline{K}^0\pi^+\pi^-$		(6.8 ±2.7) $\times 10^{-3}$		
Γ_{140}	$K^+K^-\pi^+\pi^-\pi^0$		(3.1 ±2.0) $\times 10^{-3}$		

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

Γ_{141}	$\overline{K}^*(892)^0 K^0$		$<$ 1.6	$\times 10^{-3}$	CL=90%
Γ_{142}	$K^*(892)^+ K^-$		(3.5 $\pm$0.8)	$\times 10^{-3}$	
Γ_{143}	$K^*(892)^0 \overline{K}^0$		$<$ 8	$\times 10^{-4}$	CL=90%
Γ_{144}	$K^*(892)^- K^+$		(1.8 $\pm$1.0)	$\times 10^{-3}$	
Γ_{145}	$\phi\pi^0$		$<$ 1.4	$\times 10^{-3}$	CL=90%
Γ_{146}	$\phi\eta$		$<$ 2.8	$\times 10^{-3}$	CL=90%
Γ_{147}	$\phi\omega$		$<$ 2.1	$\times 10^{-3}$	CL=90%
Γ_{148}	$\phi\pi^+\pi^-$		(1.07$\pm$0.29)	$\times 10^{-3}$	
Γ_{149}	$\phi\rho^0$		(1.07$\pm$0.29)	$\times 10^{-3}$	
Γ_{150}	$\phi\pi^+\pi^-$ 3-body		$<$ 5	$\times 10^{-4}$	CL=90%
Γ_{151}	$K^*(892)^0 K^-\pi^+ +$ c.c.				
Γ_{152}	$K^*(892)^0 K^-\pi^+$		(3.2 $\pm$1.3)	$\times 10^{-3}$	
Γ_{153}	$\overline{K}^*(892)^0 K^+\pi^-$		(1.7 $\pm$1.2)	$\times 10^{-3}$	
Γ_{154}	$K^*(892)^0 \overline{K}^*(892)^0$		(1.4 $\pm$0.5)	$\times 10^{-3}$	

Doubly Cabibbo suppressed (*DC*) modes, $\Delta C = 2$ forbidden via mixing (*C2M*) modes, $\Delta C = 1$ weak neutral current (*C1*) modes, or Lepton Family number (*LF*) violating modes

Γ_{155}	$K^+\ell^-\overline{\nu}_\ell$(via $\overline{D}^0$)	*C2M*		$<$ 1.7	$\times 10^{-4}$	CL=90%
Γ_{156}	$K^+\pi^-$	*DC*		(2.9 $\pm$1.4)	$\times 10^{-4}$	
Γ_{157}	$K^+\pi^-$(via $\overline{D}^0$)	*C2M*		$<$ 1.9	$\times 10^{-4}$	CL=90%
Γ_{158}	$K^+\pi^-\pi^+\pi^-$	*DC*		$<$ 1.4	$\times 10^{-3}$	CL=90%
Γ_{159}	$K^+\pi^-\pi^+\pi^-$(via $\overline{D}^0$)	*C2M*		$<$ 4	$\times 10^{-4}$	CL=90%
Γ_{160}	μ^- anything (via $\overline{D}^0$)	*C2M*		$<$ 4	$\times 10^{-4}$	CL=90%
Γ_{161}	e^+e^-	*C1*		$<$ 1.3	$\times 10^{-5}$	CL=90%
Γ_{162}	$\mu^+\mu^-$	*C1*		$<$ 4.2	$\times 10^{-6}$	CL=90%
Γ_{163}	$\pi^0 e^+ e^-$	*C1*		$<$ 4.5	$\times 10^{-5}$	CL=90%
Γ_{164}	$\pi^0\mu^+\mu^-$	*C1*		$<$ 1.8	$\times 10^{-4}$	CL=90%
Γ_{165}	$\eta e^+ e^-$	*C1*		$<$ 1.1	$\times 10^{-4}$	CL=90%
Γ_{166}	$\eta\mu^+\mu^-$	*C1*		$<$ 5.3	$\times 10^{-4}$	CL=90%
Γ_{167}	$\rho^0 e^+ e^-$	*C1*		$<$ 1.0	$\times 10^{-4}$	CL=90%
Γ_{168}	$\rho^0\mu^+\mu^-$	*C1*		$<$ 2.3	$\times 10^{-4}$	CL=90%
Γ_{169}	$\omega e^+ e^-$	*C1*		$<$ 1.8	$\times 10^{-4}$	CL=90%
Γ_{170}	$\omega\mu^+\mu^-$	*C1*		$<$ 8.3	$\times 10^{-4}$	CL=90%
Γ_{171}	$\phi e^+ e^-$	*C1*		$<$ 5.2	$\times 10^{-5}$	CL=90%
Γ_{172}	$\phi\mu^+\mu^-$	*C1*		$<$ 4.1	$\times 10^{-4}$	CL=90%
Γ_{173}	$\overline{K}^0 e^+ e^-$		[*f*]	$<$ 1.1	$\times 10^{-4}$	CL=90%
Γ_{174}	$\overline{K}^0\mu^+\mu^-$		[*f*]	$<$ 2.6	$\times 10^{-4}$	CL=90%

Γ_{175}	$\overline{K}^*(892)^0\, e^+\, e^-$		[f]	< 1.4	$\times 10^{-4}$	CL=90%
Γ_{176}	$\overline{K}^*(892)^0\, \mu^+\, \mu^-$		[f]	< 1.18	$\times 10^{-3}$	CL=90%
Γ_{177}	$\pi^+\, \pi^-\, \pi^0\, \mu^+\, \mu^-$	*C1*		< 8.1	$\times 10^{-4}$	CL=90%
Γ_{178}	$\mu^\pm\, e^\mp$	*LF*	[g]	< 1.9	$\times 10^{-5}$	CL=90%
Γ_{179}	$\pi^0\, e^\pm\, \mu^\mp$	*LF*	[g]	< 8.6	$\times 10^{-5}$	CL=90%
Γ_{180}	$\eta\, e^\pm\, \mu^\mp$	*LF*	[g]	< 1.0	$\times 10^{-4}$	CL=90%
Γ_{181}	$\rho^0\, e^\pm\, \mu^\mp$	*LF*	[g]	< 4.9	$\times 10^{-5}$	CL=90%
Γ_{182}	$\omega\, e^\pm\, \mu^\mp$	*LF*	[g]	< 1.2	$\times 10^{-4}$	CL=90%
Γ_{183}	$\phi\, e^\pm\, \mu^\mp$	*LF*	[g]	< 3.4	$\times 10^{-5}$	CL=90%
Γ_{184}	$\overline{K}^0\, e^\pm\, \mu^\mp$	*LF*	[g]	< 1.0	$\times 10^{-4}$	CL=90%
Γ_{185}	$\overline{K}^*(892)^0\, e^\pm\, \mu^\mp$	*LF*	[g]	< 1.0	$\times 10^{-4}$	CL=90%

Γ_{186}	A dummy mode used by the fit.	(17 ±4) %		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] 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.

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

[e] The experiments on the division of this charge mode amongst its submodes disagree, and the submode branching fractions here add up to considerably more than the charged-mode fraction.

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

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

CONSTRAINED FIT INFORMATION

An overall fit to 51 branching ratios uses 119 measurements and one constraint to determine 28 parameters. The overall fit has a $\chi^2 = 63.9$ for 92 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_8	11									
x_9	34	33								
x_{18}	3	27	9							
x_{19}	2	10	5	3						
x_{20}	19	59	55	16	9					
x_{21}	2	7	6	2	24	11				
x_{22}	3	10	8	3	36	14	66			
x_{30}	6	19	17	5	8	31	18	19		
x_{38}	7	21	20	6	3	36	4	6	11	
x_{47}	1	5	4	1	18	8	34	51	10	4
x_{56}	4	14	13	4	2	24	3	4	7	34
x_{65}	1	5	4	1	17	6	30	46	9	3
x_{69}	1	5	4	1	17	7	58	47	11	3
x_{72}	1	4	3	1	13	5	25	37	7	3
x_{75}	2	6	5	2	22	8	40	60	11	4
x_{81}	2	9	7	2	31	13	56	84	20	5
x_{82}	3	9	8	2	7	15	24	19	44	5
x_{84}	1	5	4	1	1	8	1	1	2	22
x_{88}	1	3	3	1	2	5	3	5	2	12
x_{99}	1	3	2	1	7	4	13	20	4	4
x_{107}	2	5	5	1	2	9	4	5	24	3
x_{118}	11	34	32	9	5	58	6	8	18	21
x_{119}	1	3	2	1	9	4	17	25	5	1
x_{120}	2	6	5	2	14	9	26	39	9	3
x_{124}	1	5	4	1	11	8	20	30	7	3
x_{142}	1	3	2	1	11	4	20	30	6	2
x_{186}	−30	−30	−32	−10	−35	−42	−53	−69	−53	−31
	x_2	x_8	x_9	x_{18}	x_{19}	x_{20}	x_{21}	x_{22}	x_{30}	x_{38}

x_{56}	2									
x_{65}	23	2								
x_{69}	24	2	22							
x_{72}	43	1	17	17						
x_{75}	30	2	7	28	22					
x_{81}	43	3	39	40	31	50				
x_{82}	10	4	9	15	7	12	18			
x_{84}	1	7	1	1	1	1	1	1		
x_{88}	9	4	2	2	4	3	4	1	3	
x_{99}	40	2	9	10	17	12	17	4	1	4
x_{107}	2	2	2	3	2	3	5	10	1	1
x_{118}	4	14	4	4	3	5	7	8	4	3
x_{119}	13	1	12	12	9	15	21	5	0	1
x_{120}	20	2	18	19	15	24	33	8	1	2
x_{124}	15	2	14	14	11	18	25	6	1	2
x_{142}	15	1	14	14	11	18	26	6	0	2
x_{186}	−66	−24	−33	−38	−44	−43	−63	−40	−15	−23
	x_{47}	x_{56}	x_{65}	x_{69}	x_{72}	x_{75}	x_{81}	x_{82}	x_{84}	x_{88}

x_{107}	1						
x_{118}	2	5					
x_{119}	5	1	2				
x_{120}	8	2	5	10			
x_{124}	6	2	5	8	12		
x_{142}	6	1	2	8	12	9	
x_{186}	−34	−25	−25	−18	−31	−24	−23
	x_{99}	x_{107}	x_{118}	x_{119}	x_{120}	x_{124}	x_{142}

D^0 BRANCHING RATIOS

See the "Note on D Mesons" in the $D^{\pm}$ Listings.

Some older now obsolete results have been omitted from these Listings.

Inclusive modes

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

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.0675±0.0029 OUR AVERAGE					
0.069 ±0.003 ±0.005	1670	ALBRECHT	96C	ARG	$e^+e^- \approx$ 10 GeV
0.0664±0.0018±0.0029	4609	[11] KUBOTA	96B	CLEO	$e^+e^- \approx \Upsilon(4S)$
0.075 ±0.011 ±0.004	137	BALTRUSAIT..	85B	MRK3	e^+e^- 3.77 GeV

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

0.15 ±0.05			AGUILAR-...	87E	HYBR	πp, pp 360, 400 GeV
0.055 ±0.037		12	SCHINDLER	81	MRK2	$e^+ e^-$ 3.771 GeV

[11] KUBOTA 96B uses $D^{*+} \rightarrow D^0 \pi^+$ (and charge conjugate) events in which the D^0 subsequently decays to $X e^+ \nu_e$.

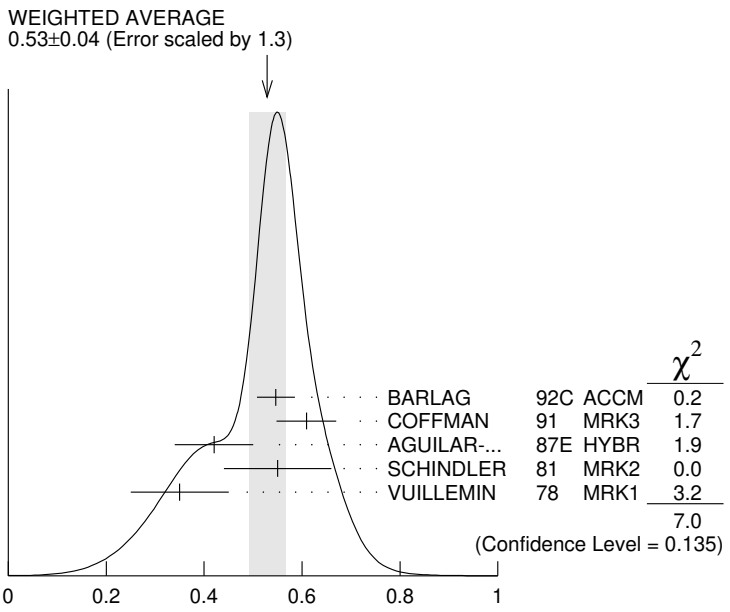
$\Gamma(\mu^+ \text{anything})/\Gamma_{\text{total}}$ Γ_2/Γ

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.066±0.008 OUR FIT				
0.060±0.007±0.012	310	ALBRECHT	96C ARG	$e^+ e^- \approx$ 10 GeV

$\Gamma(K^- \text{anything})/\Gamma_{\text{total}}$ Γ_3/Γ

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.53 ±0.04 OUR AVERAGE		Error includes scale factor of 1.3. See the ideogram below.		
$0.546^{+0.039}_{-0.038}$		[12] BARLAG	92C ACCM	π^- Cu 230 GeV
0.609±0.032±0.052		COFFMAN	91 MRK3	$e^+ e^-$ 3.77 GeV
0.42 ±0.08		AGUILAR-...	87E HYBR	πp, pp 360, 400 GeV
0.55 ±0.11	121	SCHINDLER	81 MRK2	$e^+ e^-$ 3.771 GeV
0.35 ±0.10	19	VUILLEMIN	78 MRK1	$e^+ e^-$ 3.772 GeV

[12] 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_4/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.42 ±0.05 OUR AVERAGE					
0.455±0.050±0.032		COFFMAN	91	MRK3	e^+e^- 3.77 GeV
0.29 ±0.11	13	SCHINDLER	81	MRK2	e^+e^- 3.771 GeV
0.57 ±0.26	6	VUILLEMIN	78	MRK1	e^+e^- 3.772 GeV

$\Gamma(K^+\text{anything})/\Gamma_{\text{total}}$ Γ_5/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.034^{+0.006}_{-0.004}$ OUR AVERAGE					
$0.034^{+0.007}_{-0.005}$		[13] BARLAG	92C	ACCM	π^- Cu 230 GeV
0.028±0.009±0.004		COFFMAN	91	MRK3	e^+e^- 3.77 GeV
$0.03\ ^{+0.05}_{-0.02}$		AGUILAR-...	87E	HYBR	πp, pp 360, 400 GeV
0.08 ±0.03	25	SCHINDLER	81	MRK2	e^+e^- 3.771 GeV

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

Semileptonic modes

$\Gamma(K^-\ell^+\nu_\ell)/\Gamma_{\text{total}}$ Γ_7/Γ

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

VALUE	DOCUMENT ID		COMMENT
0.0346±0.0016 OUR AVERAGE	Error includes scale factor of 1.2.		
0.0363±0.0020	PDG	97	Our $\Gamma(K^-e^+\nu_e)/\Gamma_{\text{total}}$
0.0331±0.0019	PDG	97	1.03 × our $\Gamma(K^-\mu^+\nu_\mu)/\Gamma_{\text{total}}$

$\Gamma(K^-e^+\nu_e)/\Gamma_{\text{total}}$ Γ_8/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0363±0.0020 OUR FIT	Error includes scale factor of 1.1.				
0.034 ±0.005 ±0.004	55	ADLER	89	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^-e^+\nu_e)/\Gamma(K^-\pi^+)$ Γ_8/Γ_{20}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.95 ±0.04 OUR FIT					
0.95 ±0.04 OUR AVERAGE					
0.978±0.027±0.044	2510	[14] BEAN	93C	CLEO	$e^+e^- \approx \Upsilon(4S)$
0.90 ±0.06 ±0.06	584	[15] CRAWFORD	91B	CLEO	$e^+e^- \approx$ 10.5 GeV
0.91 ±0.07 ±0.11	250	[16] ANJOS	89F	E691	Photoproduction

[14] BEAN 93C uses $K^-\mu^+\nu_\mu$ as well as $K^-e^+\nu_e$ events and makes a small phase-space adjustment to the number of the μ^+ events to use them as e^+ events. A pole mass of 2.00 ± 0.12 ± 0.18 GeV/c^2 is obtained from the q^2 dependence of the decay rate.

[15] CRAWFORD 91B uses $K^-e^+\nu_e$ and $K^-\mu^+\nu_\mu$ candidates to measure a pole mass of $2.1^{+0.4}_{-0.2}{}^{+0.3}_{-0.2}$ GeV/c^2 from the q^2 dependence of the decay rate.

[16] ANJOS 89F measures a pole mass of $2.1^{+0.4}_{-0.2}$ ± 0.2 GeV/c^2 from the q^2 dependence of the decay rate.

$\Gamma(K^- \mu^+ \nu_\mu)/\Gamma(K^- \pi^+)$ Γ_9/Γ_{20}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.84 ±0.04 OUR FIT					
0.84 ±0.04 OUR AVERAGE					
0.852±0.034±0.028	1897	[17] FRABETTI	95G	E687	γ Be $\overline{E}_\gamma$= 220 GeV
0.82 ±0.13 ±0.13	338	[18] FRABETTI	93I	E687	γ Be $\overline{E}_\gamma$= 221 GeV
0.79 ±0.08 ±0.09	231	[19] CRAWFORD	91B	CLEO	$e^+ e^-$ ≈ 10.5 GeV

[17] FRABETTI 95G extracts the ratio of form factors $f_-(0)/f_+(0) = -1.3^{+3.6}_{-3.4} \pm 0.6$, and measures a pole mass of $1.87^{+0.11+0.07}_{-0.08-0.06}$ GeV/c^2 from the q^2 dependence of the decay rate.

[18] FRABETTI 93I measures a pole mass of $2.1^{+0.7+0.7}_{-0.3-0.3}$ GeV/c^2 from the q^2 dependence of the decay rate.

[19] CRAWFORD 91B measures a pole mass of 2.00 ± 0.12 ± 0.18 GeV/c^2 from the q^2 dependence of the decay rate.

$\Gamma(K^- \mu^+ \nu_\mu)/\Gamma(\mu^+ \text{anything})$ Γ_9/Γ_2

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.49 ±0.06 OUR FIT					
0.472±0.051±0.040	232	KODAMA	94	E653	π^- emulsion 600 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.32 ±0.05 ±0.05	124	KODAMA	91	EMUL	pA 800 GeV

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.016^{+0.013}_{-0.005} \pm 0.002}$	4	[20] BAI	91	MRK3	$e^+ e^-$ ≈ 3.77 GeV

[20] BAI 91 finds that a fraction $0.79^{+0.15+0.09}_{-0.17-0.03}$ of combined D^+ and D^0 decays to $\overline{K}\pi e^+ \nu_e$ (24 events) are $\overline{K}^*(892) e^+ \nu_e$. BAI 91 uses 56 $K^- e^+ \nu_e$ events to measure a pole mass of 1.8 ± 0.3 ± 0.2 GeV/c^2 from the q^2 dependence of the decay rate.

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.028^{+0.017}_{-0.008} \pm 0.003}$	6	[21] BAI	91	MRK3	$e^+ e^-$ ≈ 3.77 GeV

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

$\Gamma(K^*(892)^- e^+ \nu_e)/\Gamma(K^- e^+ \nu_e)$ Γ_{19}/Γ_8

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.55±0.09 OUR FIT				
0.51±0.18±0.06	CRAWFORD	91B	CLEO	$e^+ e^-$ ≈ 10.5 GeV

$\Gamma(K^*(892)^- e^+ \nu_e)/\Gamma(\overline{K}^0 \pi^+ \pi^-)$ Γ_{19}/Γ_{22}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.37±0.06 OUR FIT					
0.38±0.06±0.03	152	[22] BEAN	93C	CLEO	$e^+ e^-$ ≈ $\Upsilon(4S)$

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

$\Gamma(K^*(892)^-\ell^+\nu_\ell)/\Gamma(\overline{K}^0\pi^+\pi^-)$ Γ_{13}/Γ_{22}

This an average of the $K^*(892)^- e^+\nu_e$ and $K^*(892)^-\mu^+\nu_\mu$ ratios. 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. • • •					
$0.24\pm0.07\pm0.06$	137	[23] ALEXANDER	90B	CLEO	e^+e^- 10.5–11 GeV

[23] ALEXANDER 90B cannot exclude extra π^0's in the final state. See nearby data blocks for more detailed results.

$\Gamma(\overline{K}^*(892)^0\pi^-e^+\nu_e)/\Gamma(K^*(892)^-e^+\nu_e)$ Γ_{15}/Γ_{19}

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. • • •					
<0.64	90	[24] CRAWFORD	91B	CLEO	$e^+e^-\approx$ 10.5 GeV

[24] The limit on $(\overline{K}^*(892)\pi)^-\ \mu^+\nu_\mu$ below is much stronger.

$\Gamma(K^-\pi^+\pi^-\mu^+\nu_\mu)/\Gamma(K^-\mu^+\nu_\mu)$ Γ_{16}/Γ_9

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.037	90	KODAMA	93B	E653	π^- emulsion 600 GeV

$\Gamma((\overline{K}^*(892)\pi)^-\mu^+\nu_\mu)/\Gamma(K^-\mu^+\nu_\mu)$ Γ_{17}/Γ_9

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.043	90	[25] KODAMA	93B	E653	π^- emulsion 600 GeV

[25] KODAMA 93B searched in $K^-\pi^+\pi^-\mu^+\nu_\mu$, but the limit includes other $(\overline{K}^*(892)\pi)^-$ charge states.

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0037 ± 0.0006 OUR FIT					
$\mathbf{0.0039^{+0.0023}_{-0.0011}\pm0.0004}$	7	[26] ADLER	89	MRK3	e^+e^- 3.77 GeV

[26] This result of ADLER 89 gives $\left|\frac{V_{cd}}{V_{cs}}\cdot\frac{f_+^\pi(0)}{f_+^K(0)}\right|^2 = 0.057^{+0.038}_{-0.015}\pm0.005$.

$\Gamma(\pi^-e^+\nu_e)/\Gamma(K^-e^+\nu_e)$ Γ_{18}/Γ_8

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.102 ± 0.017 OUR FIT					
0.101 ± 0.018 OUR AVERAGE					
$0.101\pm0.020\pm0.003$	91	[27] FRABETTI	96B	E687	γ Be, $\overline{E}_\gamma\approx$ 200 GeV
$0.103\pm0.039\pm0.013$	87	[28] BUTLER	95	CLEO	<0.156 (90% CL)

[27] FRABETTI 96B uses both e and μ events, and makes a small correction to the μ events to make them effectively e events. This result gives $\left|\frac{V_{cd}}{V_{cs}}\cdot\frac{f_+^\pi(0)}{f_+^K(0)}\right|^2 = 0.050\pm0.011\pm0.002$.

[28] BUTLER 95 has 87 ± 33 $\pi^-e^+\nu_e$ events. The result gives $\left|\frac{V_{cd}}{V_{cs}}\cdot\frac{f_+^\pi(0)}{f_+^K(0)}\right|^2 = 0.052\pm0.020\pm0.007$.