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± 0.4 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.

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

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	Error includes scale factor of 1.1.			
4.74±0.28 OUR AVERAGE				
4.7 ±0.3	[3] SCHINDLER	81	MRK2	e^+e^- 3.77 GeV
5.0 ±0.8	[3] PERUZZI	77	MRK1	e^+e^- 3.77 GeV

[3] 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 $> 10 \times 10^{-15}$ s have been omitted from the average.

VALUE (10^{-15} s)	EVTS	DOCUMENT ID		TECN	COMMENT
410.1± 1.5 OUR AVERAGE					
409.6± 1.1± 1.5	210k	LINK	02F	FOCS	γ nucleus, ≈ 180 GeV
407.9± 6.0± 4.3	10k	KUSHNIR...	01	SELX	$K^-\pi^+$, $K^-\pi^+\pi^+\pi^-$
413 ± 3 ± 4	35k	AITALA	99E	E791	$K^-\pi^+$
408.5± 4.1 $^{+3.5}_{-3.4}$	25k	BONVICINI	99	CLE2	$e^+e^- \approx \Upsilon(4S)$
413 ± 4 ± 3	16k	FRABETTI	94D	E687	$K^-\pi^+$, $K^-\pi^+\pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
424 ±11 ± 7	5118	FRABETTI	91	E687	$K^-\pi^+$, $K^-\pi^+\pi^+\pi^-$
417 ±18 ±15	890	ALVAREZ	90	NA14	$K^-\pi^+$, $K^-\pi^+\pi^+\pi^-$
388 $^{+23}_{-21}$	641	[4] BARLAG	90C	ACCM	π^- Cu 230 GeV
480 ±40 ±30	776	ALBRECHT	88I	ARG	e^+e^- 10 GeV
422 ± 8 ±10	4212	RAAB	88	E691	Photoproduction
420 ±50	90	BARLAG	87B	ACCM	K^- and π^- 200 GeV

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

D^0–$\overline{D}^0$ MIXING

Revised January 2006 by D. Asner (Carleton University)

Standard Model contributions to D^0–$\overline{D}^0$ mixing are strongly suppressed by CKM and GIM factors. Thus the observation of D^0–$\overline{D}^0$ mixing might be evidence for physics beyond the Standard Model. See Burdman and Shipsey [1] for a review of D^0–$\overline{D}^0$ mixing, Ref. [2] for a compilation of mixing predictions, and Ref. [3] for later predictions.

Formalism: The time evolution of the D^0–$\overline{D}^0$ system is described by the Schrödinger equation

$$i\frac{\partial}{\partial t}\begin{pmatrix} D^0(t) \\ \overline{D}^0(t) \end{pmatrix} = \left(\mathbf{M} - \tfrac{i}{2}\mathbf{\Gamma}\right)\begin{pmatrix} D^0(t) \\ \overline{D}^0(t) \end{pmatrix}, \tag{1}$$

where the $\mathbf{M}$ and $\mathbf{\Gamma}$ matrices are Hermitian, and CPT invariance requires that $M_{11} = M_{22} \equiv M$ and $\Gamma_{11} = \Gamma_{22} \equiv \Gamma$. The off-diagonal elements of these matrices describe the dispersive and absorptive parts of D^0–$\overline{D}^0$ mixing.

The two eigenstates D_1 and D_2 of the effective Hamiltonian matrix $(\mathbf{M} - \frac{i}{2}\mathbf{\Gamma})$ are given by

$$|D_{1,2}\rangle = p|D^0\rangle \pm q|\overline{D}^0\rangle\,. \tag{2}$$

The corresponding eigenvalues are

$$\lambda_{1,2} \equiv m_{1,2} - \tfrac{i}{2}\Gamma_{1,2} = \left(M - \tfrac{i}{2}\Gamma\right) \pm \frac{q}{p}\left(M_{12} - \tfrac{i}{2}\Gamma_{12}\right)\,, \tag{3}$$

where m_1 and Γ_1 are the mass and width of the D_1, *etc.*, and

$$\left|\frac{q}{p}\right|^2 = \frac{M_{12}^* - \frac{i}{2}\Gamma_{12}^*}{M_{12} - \frac{i}{2}\Gamma_{12}}\,. \tag{4}$$

We define reduced mixing amplitudes x and y by

$$x \equiv 2M_{12}/\Gamma = (m_1 - m_2)/\Gamma = \Delta m/\Gamma \tag{5}$$

and

$$y \equiv \Gamma_{12}/\Gamma = (\Gamma_1 - \Gamma_2)/2\Gamma = \Delta\Gamma/2\Gamma\,, \tag{6}$$

where $\Gamma \equiv (\Gamma_1 + \Gamma_2)/2$. The mixing rate, R_M, is approximately $(x^2 + y^2)/2$. In Eq. (5) and Eq. (6), the middle relation holds only in the limit of CP conservation, in which case the subscripts 1 and 2 denote the CP-even and CP-odd eigenstates.

The parameters x and y are measured in several ways. The most precise constraints are obtained using the time-dependence of D decays. Since D^0–$\overline{D}^0$ mixing is a small effect, the identification tag of the initial particle as a D^0 or a $\overline{D}^0$ must be extremely accurate. The usual tag is the charge of the distinctive slow pion in the decay sequence $D^{*+} \to D^0\pi^+$ or $D^{*-} \to \overline{D}^0\pi^-$. In current experiments, the probability of mistagging is about 0.1%. Another tag of comparable accuracy is identification of one of the D's produced from $\psi(3770) \to D^0\overline{D}^0$. Time-dependent analyses are not possible at symmetric charm threshold facilities (the D^0 and $\overline{D}^0$ do not travel far enough). However, the quantum coherent $D^0\overline{D}^0$ $C = -1$ state provides time-integrated sensitivity [4, 5].

Time-Dependent Analyses: We extend the formalism of this *Review*'s note on "B^0–$\overline{B}^0$ Mixing" [6]. In addition to the "right-sign" instantaneous decay amplitudes $\overline{A}_f \equiv \langle f|H|\overline{D}^0\rangle$ and $A_{\overline{f}} \equiv \langle \overline{f}|H|D^0\rangle$ for CP conjugate final states f and $\overline{f}$, we include the "wrong-sign" amplitudes $\overline{A}_{\overline{f}} \equiv \langle \overline{f}|H|\overline{D}^0\rangle$ and $A_f \equiv \langle f|H|D^0\rangle$.

It is usual to normalize the wrong-sign decay distributions to the integrated rate of right-sign decays and to express time in units of the precisely measured D^0 mean lifetime, $\overline{\tau}_{D^0} = 1/\Gamma = 2/(\Gamma_1 + \Gamma_2)$. Starting from a pure $|D^0\rangle$ or $|\overline{D}^0\rangle$ state at $t = 0$, the time-dependent rates of production of the wrong-sign final states relative to the integrated right-sign states are then

$$r(t) = \frac{\left|\langle f|H|D^0(t)\rangle\right|^2}{\left|\overline{A}_f\right|^2} = \left|\frac{q}{p}\right|^2 \left|g_+(t)\,\chi_f^{-1} + g_-(t)\right|^2 \qquad (7)$$

and

$$\overline{r}(t) = \frac{\left|\langle \overline{f}|H|\overline{D}^0(t)\rangle\right|^2}{\left|A_{\overline{f}}\right|^2} = \left|\frac{p}{q}\right|^2 \left|g_+(t)\,\chi_{\overline{f}} + g_-(t)\right|^2 , \qquad (8)$$

where

$$\chi_f \equiv q\overline{A}_f/pA_f\,, \quad \chi_{\bar{f}} \equiv q\overline{A}_{\bar{f}}/pA_{\bar{f}}\,, \qquad (9)$$

and

$$g_\pm(t) = \frac{1}{2}\left(e^{-iz_1 t} \pm e^{-iz_2 t}\right)\,, \quad z_{1,2} = \frac{\lambda_{1,2}}{\Gamma}\,. \qquad (10)$$

Note that a change in the convention for the relative phase of D^0 and $\overline{D}^0$ would cancel between q/p and $\overline{A}_f/A_f$ and leave χ_f invariant.

We expand $r(t)$ and $\overline{r}(t)$ to second order in time for modes where the ratio of decay amplitudes $R_D = |A_f/\overline{A}_f|^2$ is very small.

Semileptonic decays: In semileptonic D decays, $A_f = \overline{A}_{\overline{f}} = 0$ in the Standard Model. Then in the limit of weak mixing, where $|ix + y| \ll 1$, $r(t)$ is given by

$$r(t) = |g_-(t)|^2 \left|\frac{q}{p}\right|^2 \approx \frac{e^{-t}}{4}(x^2 + y^2)\, t^2 \left|\frac{q}{p}\right|^2 . \qquad (11)$$

For $\overline{r}(t)$ one replaces q/p here with p/q. In the limit of CP conservation, $r(t) = \overline{r}(t)$, and the time-integrated mixing rate relative to the time-integrated right-sign decay rate is

$$R_M = \int_0^\infty r(t)dt = \left|\frac{q}{p}\right|^2 \frac{x^2 + y^2}{2 + x^2 - y^2} \approx \frac{1}{2}(x^2 + y^2) . \qquad (12)$$

Table 1 summarizes results from semileptonic decays.

Table 1: Results for R_M in D^0 semileptonic decays.

Year	Exper.	Final state(s)	R_M (90 (95)% C.L.)
2005	Belle[a]	$K^{(*)+}e^-\overline{\nu}_e$	$< 1.0 \times 10^{-3}$
2005	CLEO[b]	$K^{(*)+}e^-\overline{\nu}_e$	$< 7.8 \times 10^{-3}$
2004	BABAR[c]	$K^{(*)+}e^-\overline{\nu}_e$	$< 4.2(4.6) \times 10^{-3}$
2002	FOCUS [7]	$K^+\mu^-\overline{\nu}_\mu$	$< 1.01(1.31) \times 10^{-3}$
1996	E791[d]	$K^+\ell^-\overline{\nu}_\ell$	$< 5.0 \times 10^{-3}$

See the end of the D^0 listings for these references: [a]BITENC 05, [b]CAWLFIELD 05, [c]AUBERT 04, [d]AITALA 96C.

Wrong-sign decays to hadronic non-CP eigenstates: Consider the final state $f = K^+\pi^-$, where A_f is doubly Cabibbo-suppressed. The ratio of decay amplitudes is

$$\frac{A_f}{\overline{A}_f} = -\sqrt{R_D}\, e^{-i\delta}, \qquad \left|\frac{A_f}{\overline{A}_f}\right| \sim O(\tan^2\theta_c)\,, \tag{13}$$

where R_D is the doubly Cabibbo-suppressed (DCS) decay rate relative to the Cabibbo-favored (CF) rate, the minus sign originates from the sign of V_{us} relative to V_{cd}, and δ is the phase difference between DCS and CF processes not attributed to the first-order electroweak spectator diagram.

We characterize the violation of CP in the mixing amplitude, the decay amplitude, and the interference between mixing and decay, by real-valued parameters A_M, A_D, and ϕ. We adopt a parametrization similar to that of Nir [8] and CLEO [GODANG 00] and express these quantities in a way that is convenient to describe the three types of CP violation:

$$\left|\frac{q}{p}\right| = 1 + A_M\,, \tag{14}$$

$$\chi_f^{-1} \equiv \frac{pA_f}{q\overline{A}_f} = \frac{-\sqrt{R_D}(1+A_D)}{(1+A_M)}\; e^{-i(\delta+\phi)}\,, \tag{15}$$

$$\chi_{\overline{f}} \equiv \frac{q\overline{A}_{\overline{f}}}{pA_{\overline{f}}} = \frac{-\sqrt{R_D}(1+A_M)}{(1+A_D)}\; e^{-i(\delta-\phi)}\,. \tag{16}$$

In general, $\chi_{\overline{f}}$ and χ_f^{-1} are independent complex numbers. To leading order,

$$r(t) = e^{-t} \times \Big[R_D(1+A_D)^2 + \sqrt{R_D}(1+A_M)(1+A_D)y'_{-}t + \frac{(1+A_M)^2 R_M}{2}\,t^2\Big] \tag{17}$$

and

$$\overline{r}(t)=e^{-t}\ \times \left[\frac{R_D}{(1+A_D)^2}\right.$$

$$\left.+\frac{\sqrt{R_D}}{(1+A_D)(1+A_M)}y'_+t+\frac{R_M}{2(1+A_M)^2}\,t^2\right]. \tag{18}$$

Here

$$y'_\pm \equiv\ y'\cos\phi \pm x'\sin\phi = y\cos(\delta\mp\phi) - x\sin(\delta\mp\phi) \tag{19}$$

$$y' \equiv\ y\cos\delta - x\sin\delta,\ \ x' \equiv x\cos\delta + y\sin\delta\,, \tag{20}$$

and R_M is the mixing rate relative to the time-integrated right-sign rate.

The three terms in Eq. (17) and Eq. (18) probe the three fundamental types of CP violation. In the limit of CP conservation, A_M, A_D, and ϕ are all zero, and then

$$r(t) = \overline{r}(t) = e^{-t}\left(R_D + \sqrt{R_D}\,y't + \frac{1}{2}R_M\,t^2\right)\,, \tag{21}$$

and the time-integrated wrong-sign rate relative to the integrated right-sign rate is

$$R = \int_0^\infty r(t)\,dt = R_D + \sqrt{R_D}\,y' + R_M\,. \tag{22}$$

The ratio R is the most readily accessible experimental quantity. Table 2 gives recent measurements of R in $D^0 \to K^+\pi^-$ decay. The average of these results, $R = (0.376 \pm 0.009)\,\%$, is about two standard deviations from the average of earlier, less precise results, $R = (0.81 \pm 0.23)\,\%$, which we have omitted.

Table 2: Results for R in $D^0 \to K^+\pi^-$.

Year	Exper.	Technique	$R(\times 10^{-3})$	$A_D(\%)$
2006	Belle[a]	$e^+e^- \to \Upsilon(4S)$	$3.77 \pm 0.08 \pm 0.05$	—
2005	FOCUS[b]	γ BeO	$4.29 \pm 0.63 \pm 0.28$	$18.0 \pm 14.0 \pm 4.1$
2003	BABAR[c]	$e^+e^- \to \Upsilon(4S)$	$3.57 \pm 0.22 \pm 0.27$	$9.5 \pm 6.1 \pm 8.3$
2000	CLEO[d]	$e^+e^- \to \Upsilon(4S)$	$3.32^{+0.63}_{-0.65} \pm 0.40$	$2^{+19}_{-20} \pm 1$

See the end of the D^0 listings for these references: [a]ZHANG 06, [b]LINK 05, [c]AUBERT 03Z, [d]GODANG 00.

Table 3: Results from studies of the time dependence $r(t)$.

Year	Exper.	y' (95% C.L.)	$x'^2/2$ (95% C.L.)
2006	Belle[a]	$-2.8 < y' < 2.1$ %	< 0.036 %
2005	FOCUS[b]	$-11.2 < y' < 6.7$ %	< 0.40 %
2003	BABAR[c]	$-5.6 < y' < 3.9$ %	< 0.11 %
2000	CLEO[d]	$-5.8 < y' < 1.0$ %	< 0.041 %

See the end of the D^0 listings for these references: [a]ZHANG 06, [b]LINK 05, [c]AUBERT 03Z, [d]GODANG 00.

The contributions to R—allowing for CP violation—can be extracted by fitting the $D^0 \to K^+\pi^-$ and $\overline{D}^0 \to K^-\pi^+$ decay rates. Table 2 gives the constraints on A_D with $x' = y' = 0$. Table 3 summarizes the results for y' and $x'^2/2$. Figure 1 shows the two-dimensional allowed regions. No meaningful constraints on A_M and ϕ have been reported.

Extraction of the amplitudes x and y from the results in Table 3 requires knowledge of the relative strong phase δ, a subject of theoretical discussion [4,9–11]. In most cases, it appears difficult for theory to accommodate $\delta > 25°$, although the judicious placement of a $K\pi$ resonance could allow δ to be as large as 40°.

A quantum interference effect that provides useful sensitivity to δ arises in the decay chain $\psi(3770) \to D^0\overline{D}^0 \to (f_{cp})(K^+\pi^-)$, where f_{cp} denotes a CP eigenstate from D^0 decay, such as K^+K^-[1, 16]. Here, the amplitude triangle relation

$$\sqrt{2}\, A(D_\pm \to K^-\pi^+) = A(D^0 \to K^-\pi^+) \pm A(\overline{D}^0 \to K^-\pi^+), \tag{23}$$

where $D_\pm$ denotes a CP eigenstate, implies that

$$\cos\delta = \frac{B(D_+ \to K^-\pi^+) - B(D_- \to K^-\pi^+)}{2\sqrt{R_D}\, B(D^0 \to K^-\pi^+)}\,, \tag{24}$$

neglecting CP violation and exploiting $R_D \ll \sqrt{R_D}$.

The strong phase δ might also be determined by constructing amplitude quadrangles from a complete set of branching fraction measurements of the other DCS D decays to two pseudoscalars [12]. This analysis would have to assume that the amplitudes from both $\Delta I = 1$ and $\Delta I = 0$ that populate the total $I = 1/2$ $K\pi$ state have the same strong phase relative to the amplitude that populates the total $I = 3/2$ $K\pi$ state.

The Dalitz-plot analyses of DCS D decays to a pseudoscalar and a vector allow the measurement of the relative strong phase between some amplitudes, providing additional constraints to the amplitude quadrangle [13] and thus the determination of the strong phase difference between the relevant DCS and CF amplitudes. In $D^0 \to K^0_S\pi^+\pi^-$, the DCS and CF decay amplitudes populate the same Dalitz plot, which allows direct

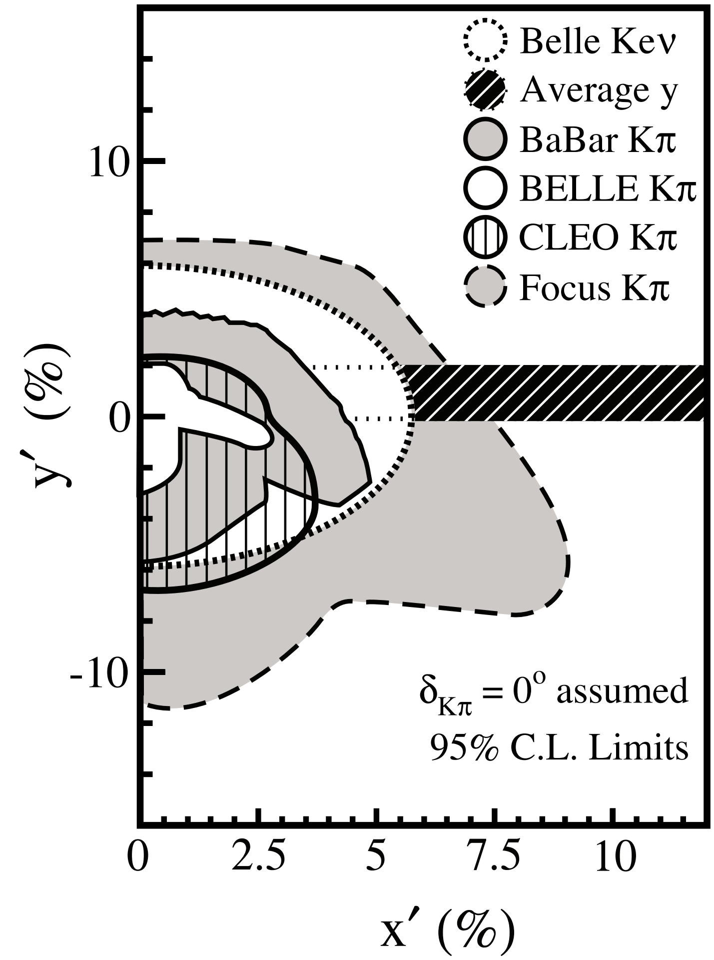

Figure 1: Allowed regions in the $x'y'$ plane. The allowed region for y is the average of the results from E791[a], FOCUS[b], CLEO[c], BABAR[d], and Belle[e]. Also shown is the limit from $D^0 \to K^{(*)}\ell\nu$ from Belle[f] and limits from $D \to K\pi$ from CLEO[g], BABAR[h], Belle[i] and FOCUS[j]. The CLEO, BABAR and Belle results allow CP violation in the decay and mixing amplitudes, and in the interference between these two processes. The FOCUS result does not allow CP violation. We assume $\delta = 0$ to place the y results. A non-zero δ would rotate the $D^0 \to CP$ eigenstates confidence region clockwise about the origin by δ. All results are consistent with the absence of mixing. See the end of the D^0 listings for these references: [a]AITALA 99E, [b]LINK 00, [c]CSORNA 02, [d]AUBERT 03P, [e]ABE 02I, [f]BITENC 05, [g]GODANG 00, [h]AUBERT 03Z, [i]ZHANG 06, [j]LINK 05. See full-color version on color pages at end of book.

measurement of the relative strong phase. CLEO has measured the relative phase between $D^0 \to K^*(892)^+\pi^-$ and $D^0 \to K^*(892)^-\pi^+$ to be $(189 \pm 10 \pm 3^{+15}_{-5})^\circ$ [MURAMATSU 02], consistent with the 180° expected from Cabibbo factors and a small strong phase.

There are several results for R measured in multibody final states with nonzero strangeness. Here R, defined in Eq. (22), becomes an average over the Dalitz space, weighted by experimental efficiencies and acceptance. Table 4 summarizes the results.

Table 4: Results for R in $D^0 \to K^{(*)+}\pi^-(n\pi)$.

Year	Exper.	D^0 final state	$R(\%)$
2005	Belle[a]	$K^+\pi^-\pi^+\pi^-$	$0.320 \pm 0.019^{+0.018}_{-0.013}$
2005	Belle[a]	$K^+\pi^-\pi^0$	$0.229 \pm 0.017^{+0.013}_{-0.009}$
2002	CLEO[b]	$K^{*+}\pi^-$	$0.5 \pm 0.2^{+0.6}_{-0.1}$
2001	CLEO[c]	$K^+\pi^-\pi^+\pi^-$	$0.41^{+0.12}_{-0.11} \pm 0.04$
2001	CLEO[d]	$K^+\pi^-\pi^0$	$0.43^{+0.11}_{-0.10} \pm 0.07$
1998	E791[e]	$K^+\pi^-\pi^+\pi^-$	$0.68^{+0.34}_{-0.33} \pm 0.07$

See the end of the D^0 listings for these references: [a]TIAN 05, [b]MURAMATSU 02, [c]DYTMAN 01, [d]BRANDENBURG 01, [e]AITALA 98.

For multibody final states, Eqs. (13)–(22) apply to one point in the Dalitz space. Although x and y do not vary across the space, knowledge of the resonant substructure is needed to extrapolate the strong phase difference δ from point to point. Both the sign and magnitude of x and y may be measured using the time-dependent resonant substructure of multibody D^0 decays. CLEO has performed a time-dependent Dalitz-plot analysis of $D^0 \to K^0_S \pi^+\pi^-$, and reports $(-4.5 < x < 9.3)\%$ and $(-6.4 < y < 3.6)\%$ at the 95% confidence level, without phase or sign ambiguity [ASNER 05], as shown in Figure 2.

Decays to CP Eigenstates: When the final state f is a CP eigenstate, there is no distinction between f and $\overline{f}$, and then $A_f = A_{\overline{f}}$ and $\overline{A}_{\overline{f}} = \overline{A}_f$. We denote final states with CP eigenvalues ± 1 by $f_\pm$. In analogy with Eqs. (7)–(8), the decay rates to CP eigenstates are then

$$\begin{aligned} r_\pm(t) &= \frac{\left|\langle f_\pm | H | D^0(t)\rangle\right|^2}{\left|\overline{A}_\pm\right|^2} \\ &= \frac{1}{4}\left| h_\pm(t)\left(\frac{A_\pm}{\overline{A}_\pm} \pm \frac{q}{p}\right) + h_\mp(t)\left(\frac{A_\pm}{\overline{A}_\pm} \mp \frac{q}{p}\right)\right|^2, \\ &\propto \frac{1}{|p|^2}\left| h_\pm(t) + \eta_\pm h_\mp(t)\right|^2, \end{aligned} \tag{25}$$

and

$$\overline{r}_\pm(t) = \frac{\left|\langle f_\pm | H | \overline{D}^0(t)\rangle\right|^2}{\left|A_\pm\right|^2} \propto \frac{1}{|q|^2}\left| h_\pm(t) - \eta_\pm h_\mp(t)\right|^2, \tag{26}$$

where

$$h_\pm(t) = g_+(t) \pm g_-(t) = e^{-iz_\pm t}\,, \tag{27}$$

and

$$\eta_\pm \equiv \frac{pA_\pm \mp q\overline{A}_\pm}{pA_\pm \pm q\overline{A}_\pm} = \frac{1 \mp \chi_\pm}{1 \pm \chi_\pm}\,. \tag{28}$$

The variable $\eta_\pm$ describes CP violation; it can receive contributions from each of the three fundamental types of CP violation.

The quantity y may be measured by comparing the rate for decays to non-CP eigenstates such as $D^0 \to K^-\pi^+$ with decays to CP eigenstates such as $D^0 \to K^+K^-$ [11]. A positive

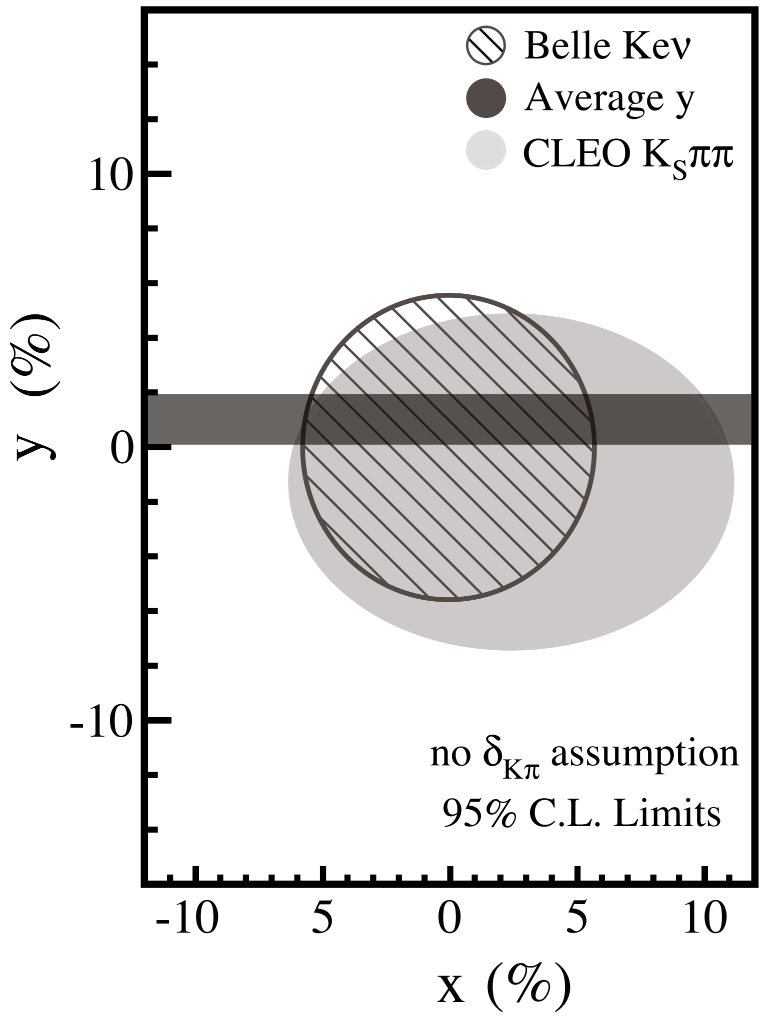

Figure 2: Allowed regions in the xy plane. No assumption is made regarding δ. The allowed region for y is the average of the results from E791[a], FOCUS[b], CLEO[c], BABAR[d], and Belle[e]. Also shown is the limit from $D^0 \rightarrow K^{(*)}\ell\nu$ from Belle[f]. The CLEO experiment has constrained x and y with the time-dependent Dalitz-plot analysis of $D^0 \rightarrow K^0_S\pi^+\pi^-$[g]. All results are consistent with the absence of mixing. See the end of the D^0 listings for these references: [a]AITALA 99E, [b]LINK 00, [c]CSORNA 02, [d]AUBERT 03P, [e]ABE 02I, [f]BITENC 05, [g]ASNER 05.

y would make K^+K^- decays appear to have a shorter lifetime than $K^-\pi^+$ decays. The decay rate for a D^0 into a CP eigenstate is not described by a single exponential in the presence of CP violation.

In the limit of weak mixing, where $|ix + y| \ll 1$, and small CP violation, where $|A_M|$, $|A_D|$, and $|\sin\phi| \ll 1$, the time dependence of decays to CP eigenstates is proportional to a single exponential:

$$r_\pm(t) \propto \exp\left(-[1 \pm \left|\frac{p}{q}\right|(y\cos\phi - x\sin\phi)]t\right), \tag{29}$$

$$\overline{r}_\pm(t) \propto \exp\left(-[1 \pm \left|\frac{q}{p}\right|(y\cos\phi + x\sin\phi)]t\right), \tag{30}$$

$$r_\pm(t) + \overline{r}_\pm(t) \propto e^{-(1 \pm y_{CP})t}. \tag{31}$$

Here

$$\begin{aligned} y_{CP} = y\cos\phi & \left[\frac{1}{2}\left(\left|\frac{p}{q}\right| + \left|\frac{q}{p}\right|\right) + \frac{A_{\text{prod}}}{2}\left(\left|\frac{p}{q}\right| - \left|\frac{q}{p}\right|\right)\right] \\ & - x\sin\phi\left[\frac{1}{2}\left(\left|\frac{p}{q}\right| - \left|\frac{q}{p}\right|\right) + \frac{A_{\text{prod}}}{2}\left(\left|\frac{p}{q}\right| + \left|\frac{q}{p}\right|\right)\right], \end{aligned} \tag{32}$$

and

$$A_{\text{prod}} \equiv \frac{N(D^0) - N(\overline{D}^0)}{N(D^0) + N(\overline{D}^0)} \tag{33}$$

is defined as the production asymmetry of the D^0 and $\overline{D}^0$.

The possibility of CP violation has been considered in the limit of weak mixing and small CP violation. In this limit there is no sensitivity to CP violation in direct decay. Belle [14] and BABAR [AUBERT 03P] have measure A_Γ, where

$$A_\Gamma \equiv \frac{r_\pm(t) - \overline{r}_\pm(t)}{r_\pm(t) - \overline{r}_\pm(t)} \approx A_M\, y\cos\phi - x\sin\phi,$$

allowing CP violation in interference and mixing.

In the limit of CP conservation, $A_\pm = \pm\overline{A}_\pm$, $\eta_\pm = 0$, $y = y_{CP}$, and

$$r_\pm(t)\left|\overline{A}_\pm\right|^2 = \overline{r}_\pm(t)\left|A_\pm\right|^2 \propto e^{-(1\pm y_{CP})t} \,. \tag{34}$$

All measurements of y and A_Γ are relative to the $D^0 \to K^-\pi^+$ decay rate. Table 5 summarizes the current status of measurements. The average of the six y_{CP} measurements is $0.90 \pm 0.42\,\%$.

Table 5: Results for y from $D^0 \to K^+K^-$ and $\pi^+\pi^-$.

Year	Exper.	D^0 final state(s)	$y_{CP}(\%)$	$A_\Gamma(\times 10^{-3})$
2003	Belle [14]	K^+K^-	$1.15 \pm 0.69 \pm 0.38$	$-2.0 \pm 6.3 \pm 3.0$
2003	BABAR[a]	$K^+K^-, \pi^+\pi^-$	$0.8 \pm 0.4^{+0.5}_{-0.4}$	$-8 \pm 6 \pm 2$
2001	CLEO[b]	$K^+K^-, \pi^+\pi^-$	$-1.1 \pm 2.5 \pm 1.4$	—
2001	Belle[c]	K^+K^-	$-0.5 \pm 1.0^{+0.7}_{-0.8}$	—
2000	FOCUS[d]	K^+K^-	$3.4 \pm 1.4 \pm 0.7$	—
1999	E791[e]	K^+K^-	$0.8 \pm 2.9 \pm 1.0$	—

See the end of the D^0 listings for these references: [a]AUBERT 03P, [b]CSORNA 02, [c]ABE 02I, [d]LINK 00, [e]AITALA 99E.

Substantial work on the integrated CP asymmetries in decays to CP eigenstates indicates that A_{CP} is consistent with zero at the few percent level [15]. The expression for the integrated CP asymmetry that includes the possibility of CP violation in mixing is

$$A_{CP} = \frac{\Gamma(D^0 \to f_\pm) - \Gamma(\overline{D}^0 \to f_\pm)}{\Gamma(D^0 \to f_\pm) + \Gamma(\overline{D}^0 \to f_\pm)} \tag{35}$$

$$= \frac{|q|^2 - |p|^2}{|q|^2 + |p|^2} + 2\mathrm{Re}(\eta_\pm) \,. \tag{36}$$

Coherent $D^0\overline{D}^0$ Analyses: Measurements of R_D, $\cos\delta$, x, and y can be made simultaneously in a combined fit to the single-tag (ST) and double-tag (DT) yields or individually by a series of "targeted" analyses [16, 17].

The "comprehensive" analysis simultaneously measures mixing and DCS parameters by examining various ST and DT rates. Due to quantum correlations in the $C = -1$ and $C = +1$ $D^0\overline{D}^0$ pairs produced in the reactions $e^+e^- \to D^0\overline{D}^0(\pi^0)$ and $e^+e^- \to D^0\overline{D}^0\gamma(\pi^0)$, respectively, the time-integrated $D^0\overline{D}^0$ decay rates are sensitive to interference between amplitudes for indistinguishable final states. The size of this interference is governed by the relevant amplitude ratios and can include contributions from D^0-$\overline{D}^0$ mixing.

Table 6: CLEO-c results from time-integrated yields at $\psi(3770) \to D\bar{D}$.

Parameter	CLEO-c fitted value	Other results
y (Table 5)	-0.058 ± 0.066	$(0.90 \pm 0.42)\%$
$\cos\delta_{K\pi}$	1.09 ± 0.66	—
R_M (Table 1)	$(1.7 \pm 1.5) \times 10^{-3}$	$<0.1\%$ (95% C.L.)
$x^2/2$ (Table 3)	$< 0.44\%$ @(95% C.L.)	$<0.036\%$ (95% C.L.)

The following categories of final states are considered:

f or $\bar{f}$: Hadronic states accessed from either D^0 or $\overline{D}^0$ decay but that are not CP eigenstates. An example is $K^-\pi^+$, which results from Cabibbo-favored D^0 transitions or DCS $\overline{D}^0$ transitions.

ℓ^+ or ℓ^-: Semileptonic or purely leptonic final states, which, in the absence of mixing, tag unambiguously the flavor of the parent D.

S_+ or S_-: CP-even and CP-odd eigenstates, respectively.

The decay rates for $D^0\overline{D}^0$ pairs to all possible combinations of the above categories of final states are calculated in Ref. [4], for both $C = -1$ and $C = +1$, reproducing the work of Refs. [5, 10]. Such $D^0\overline{D}^0$ combinations, where both D final states are specified, are double tags. In addition, the rates for single tags, where either the D^0 or $\overline{D}^0$ is identified and the other neutral D decays generically are given in Ref. [4].

CLEO-c has reported results using 281 pb^{-1} of $e^+e^- \to \psi(3770)$ data [18], where the quantum coherent $D^0\overline{D}^0$ pairs are in the $C = -1$ state. The values of y, R_M, and $\cos\delta$ are determined from a combined fit to the ST (hadronic only) and DT yields. The hadronic final states included in the analysis are $K^-\pi^+$ (f), $K^+\pi^-$ ($\bar{f}$), K^-K^+ ($S+$), $\pi^+\pi^-$ (S_+), $K^0_S\pi^0\pi^0$ (S_+), and $K^0_S\pi^0$ (S_-). Both of the two flavored final states, $K^-\pi^+$ and $K^+\pi^-$, can be reached via CF or DCS transitions.

Semileptonic DT yields are also included, where one D is fully reconstructed in one of the hadronic modes listed above, and the other D is partially reconstructed, requiring that only the electron be found. When the electron is accompanied by a flavor tag ($D \to K^-\pi^+$ or $K^+\pi^-$), only the "right-sign" DT sample, where the electron and kaon charges are the same, is used. Extraction of the DCS "wrong-sign" semileptonic yield is not feasible with the current CLEO-c data sample, and the parameter $r_{K\pi}$ is constrained to the world average. Table 6 shows the results of the fit to the CLEO-c data.

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

The D_1^0 and D_2^0 are the mass eigenstates of the D^0 meson, as described in the note on "D^0-$\overline{D}^0$ Mixing," above.

VALUE (10^{10} $\hbar$ s^{-1})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
< 7	95	[5] ZHANG	06	BELL	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •					
−11 to +22		[6] ASNER	05	CLEO	$e^+e^- \approx$ 10 GeV
< 11	90	BITENC	05	BELL	
< 30	90	CAWLFIELD	05	CLEO	
< 7	95	[5] LI	05A	BELL	See ZHANG 06
< 22	95	[7] LINK	05H	FOCS	γ nucleus
< 23	95	AUBERT	04Q	BABR	
< 11	95	[5] AUBERT	03Z	BABR	e^+e^-, 10.6 GeV
< 7	95	[8] GODANG	00	CLE2	e^+e^-
< 32	90	[9,10] AITALA	98	E791	π^- nucleus, 500 GeV
< 24	90	[11] AITALA	96C	E791	π^- nucleus, 500 GeV
< 21	90	[10,12] ANJOS	88C	E691	Photoproduction

[5] The AUBERT 03Z, LI 05A, and ZHANG 06 limits are inferred from the D^0-$\overline{D}^0$ mixing ratio $\Gamma(K^+\pi^-$ (via $\overline{D}^0))/\Gamma(K^-\pi^+)$ given near the end of this D^0 Listings. Decay-time information is used to distinguish DCS decays from D^0-$\overline{D}^0$ mixing. The limit allows interference between the DCS and mixing ratios, and also allows *CP* violation. AUBERT 03Z assumes the strong phase between $D^0 \rightarrow K^+\pi^-$ and $\overline{D}^0 \rightarrow K^+\pi^-$ amplitudes is small; if an arbitrary phase is allowed, the limit degrades by 20%. The LI 05A and ZHANG 06 limits are valid for an arbitrary strong phase.

[6] This ASNER 05 limit is from the time-dependent Dalitz-plot analysis of $D^0 \to K^0_S \pi^+ \pi^-$. Decay-time information and interference on the Dalitz plot are used to distinguish doubly Cabibbo-suppressed decays from mixing and to measure the relative phase between $D^0 \to K^{*+} \pi^-$ and $\overline{D}^0 \to K^{*+} \pi^-$. This limit allows CP violation and is sensitive to the sign of Δm.

[7] This LINK 05H limit is inferred from the D^0-$\overline{D}^0$ mixing ratio $\Gamma(K^+ \pi^-$ (via $\overline{D}^0))/\Gamma(K^- \pi^+)$ given near the end of this D^0 Listings. Decay-time information is used to distinguish DCS decays from D^0-$\overline{D}^0$ mixing. The limit allows interference between the DCS and mixing ratios, and also allows CP violation. The strong phase between $D^0 \to K^+ \pi^-$ and $\overline{D}^0 \to K^+ \pi^-$ is assumed to be small. If an arbitrary relative strong phase is allowed, the limit degrades by 25%.

[8] This GODANG 00 limit is inferred from the D^0-$\overline{D}^0$ mixing ratio $\Gamma(K^+ \pi^-$ (via $\overline{D}^0))/\Gamma(K^- \pi^+)$ given near the end of this D^0 Listings. Decay-time information is used to distinguish DCS decays from D^0-$\overline{D}^0$ mixing. The limit allows interference between the DCS and mixing ratios, and also allows CP violation. The strong phase between $D^0 \to K^+ \pi^-$ and $\overline{D}^0 \to K^+ \pi^-$ is assumed to be small. If an arbitrary relative strong phase is allowed, the limit degrades by a factor of two.

[9] AITALA 98 allows interference between the doubly Cabibbo-suppressed and mixing amplitudes, and also allows CP violation in this term, but assumes that A_D=A_R=0. See the note on "D^0-$\overline{D}^0$ Mixing," above.

[10] This limit is inferred from R_M for $f = K^+ \pi^-$ and $f = K^+ \pi^- \pi^+ \pi^-$. See the note on "$D^0$-$\overline{D}^0$ Mixing," above. Decay-time information is used to distinguish doubly Cabibbo-suppressed decays from D^0-$\overline{D}^0$ mixing.

[11] This limit is inferred from R_M for $f = K^+ \ell^- \overline{\nu}_\ell$. See the note on "$D^0$-$\overline{D}^0$ Mixing," above.

[12] ANJOS 88C assumes that $y = 0$. See the note on "D^0-$\overline{D}^0$ Mixing," above. Without this assumption, the limit degrades by about a factor of two.

$(\Gamma_{D^0_1} - \Gamma_{D^0_2})/\Gamma = 2y$

The D^0_1 and D^0_2 are the mass eigenstates of the D^0 meson, as described in the note on "D^0-$\overline{D}^0$ Mixing," above.

VALUE (units 10^{-2})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
1.4 ± 1.0 OUR AVERAGE						
$-3.0 \, ^{+5.0}_{-4.8} \, ^{+1.6}_{-0.8}$			[13] ASNER	05	CLEO	$e^+ e^- \approx$ 10 GeV
$1.6 \pm 0.8 \, ^{+1.0}_{-0.8}$		450k	[14] AUBERT	03P	BABR	$e^+ e^- \approx \Upsilon(4S)$
$-1.0 \pm 2.0 \, ^{+1.4}_{-1.6}$		18k	[15] ABE	02I	BELL	$e^+ e^- \approx \Upsilon(4S)$
$-2.4 \pm 5.0 \pm 2.8$		3393	[16] CSORNA	02	CLE2	$e^+ e^- \approx \Upsilon(4S)$
$6.84 \pm 2.78 \pm 1.48$		10k	[15] LINK	00	FOCS	γ nucleus
$+1.6 \pm 5.8 \pm 2.1$			[15] AITALA	99E	E791	$K^- \pi^+$, $K^+ K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
-0.7 ± 4.9		4k±88	[17,18] ZHANG	06	BELL	$e^+ e^-$
-0.3 ± 5.7			[17,18] LI	05A	BELL	See ZHANG 06
$-5.2 \, ^{+18.4}_{-16.8}$			[17,18] LINK	05H	FOCS	γ nucleus
$1.6 \, ^{+6.2}_{-12.8}$			[17,18] AUBERT	03Z	BABR	$e^+ e^-$, 10.6 GeV

$-5.0 \, {}^{+\,2.8}_{-\,3.2} \, \pm 0.6$		[18] GODANG	00	CLE2	$e^+ e^-$
$\lvert\Delta\Gamma\rvert/\Gamma < 26$	90	[19,20] AITALA	98	E791	π^- nucleus, 500 GeV
$\lvert\Delta\Gamma\rvert/\Gamma < 20$	90	[21] AITALA	96C	E791	π^- nucleus, 500 GeV
$\lvert\Delta\Gamma\rvert/\Gamma < 17$	90	[20,22] ANJOS	88C	E691	Photoproduction

[13] This ASNER 05 limit is from the time-dependent Dalitz-plot analysis of $D^0 \to K^0_S \pi^+ \pi^-$. Decay-time information and interference on the Dalitz plot are used to distinguish doubly Cabibbo-suppressed decays from mixing and to measure the relative phase between $D^0 \to K^{*+} \pi^-$ and $\overline{D}^0 \to K^{*+} \pi^-$. This limit allows CP violation.

[14] AUBERT 03P measures $Y \equiv 2\,\tau^0 / (\tau^+ + \tau^-) - 1$, where τ^0 is the $D^0 \to K^- \pi^+$ (and $\overline{D}^0 \to K^+ \pi^-$) lifetime, and τ^+ and τ^- are the D^0 and $\overline{D}^0$ lifetimes to CP-even states (here $K^- K^+$ and $\pi^- \pi^+$). In the limit of CP conservation, $Y = y \equiv \Delta\Gamma / 2\,\Gamma$ (we list $2y = \Delta\Gamma/\Gamma$). AUBERT 03P also uses $\tau^+ - \tau^-$ to get $\Delta Y = -0.008 \pm 0.006 \pm 0.002$.

[15] LINK 00, AITALA 99E, and ABE 02I measure the lifetime difference between $D^0 \to K^- K^+$ (CP even) decays and $D^0 \to K^- \pi^+$ (CP mixed) decays, or y_{CP}= $[\Gamma(CP+)-\Gamma(CP-)]/[\Gamma(CP+)+\Gamma(CP-)]$. We list $2y_{CP}$=$\Delta\Gamma/\Gamma$.

[16] CSORNA 02 measures the lifetime difference between $D^0 \to K^- K^+$ and $\pi^- \pi^+$ (CP even) decays and $D^0 \to K^- \pi^+$ (CP mixed) decays, or y_{CP}= $[\Gamma(CP+)-\Gamma(CP-)]/[\Gamma(CP+)+\Gamma(CP-)]$. We list $2y_{CP}$=$\Delta\Gamma/\Gamma$.

[17] The ranges of AUBERT 03Z, LINK 05H, LI 05A, and ZHANG 06 measurements are for 95% confidence level.

[18] The GODANG 00, AUBERT 03Z, LINK 05H, LI 05A, and ZHANG 06 limits are inferred from the D^0-$\overline{D}^0$ mixing ratio $\Gamma(K^+ \pi^-$ (via $\overline{D}^0$))/$\Gamma(K^- \pi^+)$ given near the end of this D^0 Listings. Decay-time information is used to distinguish DCS decays from D^0-$\overline{D}^0$ mixing. The limit allows interference between the DCS and mixing ratios, and also allows CP violation. The phase between $D^0 \to K^+ \pi^-$ and $\overline{D}^0 \to K^+ \pi^-$ is assumed to be small. This is a measurement of y' and is not the same as the y_{CP} of our note above on "D^0-$\overline{D}^0$ Mixing."

[19] AITALA 98 allows interference between the doubly Cabibbo-suppressed and mixing amplitudes, and also allows CP violation in this term, but assumes that A_D=A_R=0. See the note on "D^0-$\overline{D}^0$ Mixing," above.

[20] This limit is inferred from R_M for $f = K^+ \pi^-$ and $f = K^+ \pi^- \pi^+ \pi^-$. See the note on "$D^0$-$\overline{D}^0$ Mixing," above. Decay-time information is used to distinguish doubly Cabibbo-suppressed decays from D^0-$\overline{D}^0$ mixing.

[21] This limit is inferred from R_M for $f = K^+ \ell^- \overline{\nu}_\ell$. See the note on "$D^0$-$\overline{D}^0$ Mixing," above.

[22] ANJOS 88C assumes that $y = 0$. See the note on "D^0-$\overline{D}^0$ Mixing," above. Without this assumption, the limit degrades by about a factor of two.

D^0 DECAY MODES

Most decay modes (other than the semileptonic modes) that involve a neutral K meson are now given as K^0_S modes, not as $\overline{K}^0$ modes. Nearly always it is a K^0_S that is measured, and interference between Cabibbo-allowed and doubly Cabibbo-suppressed modes can invalidate the assumption that $2\,\Gamma(K^0_S) = \Gamma(\overline{K}^0)$.

Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level

Topological modes

Γ_1	0-prongs	[a]	(19 ± 6) %	
Γ_2	2-prongs		(67 ± 6) %	
Γ_3	4-prongs	[b]	(13.8 ± 0.5) %	
Γ_4	6-prongs		$(1.2 ^{+1.3}_{-0.7}) \times 10^{-3}$	

Inclusive modes

Γ_5	e^+ anything	[c]	(6.71 ± 0.29) %	
Γ_6	μ^+ anything		(6.5 ± 0.7) %	
Γ_7	K^- anything		(53 ± 4) %	S=1.3
Γ_8	$\overline{K}^0$ anything + K^0 anything		(42 ± 5) %	
Γ_9	K^+ anything		$(3.4 ^{+0.6}_{-0.4})$ %	
Γ_{10}	$\overline{K}^*(892)^0$ anything		(9 ± 4) %	
Γ_{11}	$K^*(892)^0$ anything		(2.8 ± 1.3) %	
Γ_{12}	η anything	[d]	< 13 %	CL=90%
Γ_{13}	ϕ anything		(1.7 ± 0.8) %	

Semileptonic modes

Γ_{14}	$K^- \ell^+ \nu_\ell$			
Γ_{15}	$K^- e^+ \nu_e$		(3.51 ± 0.11) %	
Γ_{16}	$K^- \mu^+ \nu_\mu$		(3.19 ± 0.16) %	
Γ_{17}	$K^*(892)^- e^+ \nu_e$		(2.17 ± 0.16) %	
Γ_{18}	$K^*(892)^- \mu^+ \nu_\mu$		(1.95 ± 0.25) %	
Γ_{19}	$K^- \pi^0 e^+ \nu_e$			
Γ_{20}	$\overline{K}^0 \pi^- e^+ \nu_e$			
Γ_{21}	$\overline{K}^0 \pi^- \mu^+ \nu_\mu$			
Γ_{22}	$K^*(892)^- \ell^+ \nu_\ell$			
Γ_{23}	$\overline{K}^*(892)^0 \pi^- e^+ \nu_e$			
Γ_{24}	$K^- \pi^+ \pi^- \mu^+ \nu_\mu$		$< 1.2 \times 10^{-3}$	CL=90%
Γ_{25}	$(\overline{K}^*(892) \pi)^- \mu^+ \nu_\mu$		$< 1.4 \times 10^{-3}$	CL=90%
Γ_{26}	$\pi^- e^+ \nu_e$		$(2.81 \pm 0.19) \times 10^{-3}$	
Γ_{27}	$\pi^- \mu^+ \nu_\mu$		$(2.4 \pm 0.4) \times 10^{-3}$	
Γ_{28}	$\rho^- e^+ \nu_e$		$(1.9 \pm 0.4) \times 10^{-3}$	

Hadronic modes with one $\overline{K}$

Γ_{29}	$K^- \pi^+$		(3.80 ± 0.07) %	S=1.1
Γ_{30}	$K^0_S \pi^0$		(1.14 ± 0.12) %	
Γ_{31}	$K^0_S \pi^+ \pi^-$	[e]	(2.90 ± 0.19) %	
Γ_{32}	$K^0_S \rho^0$		$(7.5 ^{+0.6}_{-0.8}) \times 10^{-3}$	
Γ_{33}	$K^0_S \omega$, $\omega \to \pi^+ \pi^-$		$(2.1 \pm 0.6) \times 10^{-4}$	
Γ_{34}	$K^0_S f_0(980)$, $f_0(980) \to \pi^+ \pi^-$		$(1.36 ^{+0.30}_{-0.22}) \times 10^{-3}$	

Γ_{35}	$K^0_S f_2(1270)$, $f_2(1270) \to \pi^+\pi^-$		$(1.3\ {}^{+\ 1.1}_{-\ 0.7}) \times 10^{-4}$	
Γ_{36}	$K^0_S f_0(1370)$, $f_0(1370) \to \pi^+\pi^-$		$(2.5 \pm 0.6) \times 10^{-3}$	
Γ_{37}	$K^*(892)^-\pi^+$, $K^*(892)^- \to K^0_S\pi^-$		(1.91 ± 0.14) %	
Γ_{38}	$K^*(892)^+\pi^-$, $K^*(892)^+ \to K^0_S\pi^+$	[f]	$(10\ {}^{+12}_{-\ 4}) \times 10^{-5}$	
Γ_{39}	$K^*_0(1430)^-\pi^+$, $K^*_0(1430)^- \to K^0_S\pi^-$		$(2.8\ {}^{+\ 0.6}_{-\ 0.4}) \times 10^{-3}$	
Γ_{40}	$K^*_2(1430)^-\pi^+$, $K^*_2(1430)^- \to K^0_S\pi^-$		$(3.2\ {}^{+\ 2.1}_{-\ 1.1}) \times 10^{-4}$	
Γ_{41}	$K^*(1680)^-\pi^+$, $K^*(1680)^- \to K^0_S\pi^-$		$(6 \pm 5) \times 10^{-4}$	
Γ_{42}	$K^0_S\pi^+\pi^-$ nonresonant		$(2.6\ {}^{+\ 5.9}_{-\ 1.6}) \times 10^{-4}$	
Γ_{43}	$K^-\pi^+\pi^0$	[e]	(14.1 ± 0.5) %	S=1.2
Γ_{44}	$K^-\rho^+$		(11.0 ± 0.7) %	
Γ_{45}	$K^-\rho(1700)^+$, $\rho(1700)^+ \to \pi^+\pi^0$		$(8.0 \pm 1.7) \times 10^{-3}$	
Γ_{46}	$K^*(892)^-\pi^+$, $K^*(892)^- \to K^-\pi^0$		$(2.25\ {}^{+\ 0.36}_{-\ 0.20})$ %	
Γ_{47}	$\overline{K}^*(892)^0\pi^0$, $\overline{K}^*(892)^0 \to K^-\pi^+$		(1.91 ± 0.24) %	
Γ_{48}	$K^*_0(1430)^-\pi^+$, $K^*_0(1430)^- \to K^-\pi^0$		$(4.6 \pm 2.2) \times 10^{-3}$	
Γ_{49}	$\overline{K}^*_0(1430)^0\pi^0$, $\overline{K}^*_0(1430)^0 \to K^-\pi^+$		$(5.8\ {}^{+\ 4.6}_{-\ 1.5}) \times 10^{-3}$	
Γ_{50}	$K^*(1680)^-\pi^+$, $K^*(1680)^- \to K^-\pi^0$		$(1.8 \pm 0.7) \times 10^{-3}$	
Γ_{51}	$K^-\pi^+\pi^0$ nonresonant		$(1.13\ {}^{+\ 0.54}_{-\ 0.20})$ %	
Γ_{52}	$K^0_S\pi^0\pi^0$		—	
Γ_{53}	$\overline{K}^*(892)^0\pi^0$, $\overline{K}^*(892)^0 \to K^0_S\pi^0$		$(6.3\ {}^{+\ 1.8}_{-\ 1.5}) \times 10^{-3}$	
Γ_{54}	$K^0_S\pi^0\pi^0$ nonresonant		$(4.2 \pm 1.1) \times 10^{-3}$	
Γ_{55}	$K^-\pi^+\pi^+\pi^-$	[e]	(7.72 ± 0.28) %	S=1.3
Γ_{56}	$K^-\pi^+\rho^0$ total		(6.4 ± 0.4) %	
Γ_{57}	$K^-\pi^+\rho^0$ 3-body		$(4.9 \pm 2.2) \times 10^{-3}$	
Γ_{58}	$\overline{K}^*(892)^0\rho^0$, $\overline{K}^*(892)^0 \to K^-\pi^+$		(1.00 ± 0.22) %	

Γ_{59}	$K^- a_1(1260)^+$, $a_1(1260)^+ \to \pi^+\pi^+\pi^-$		(3.6 ± 0.6) %	
Γ_{60}	$\overline{K}^*(892)^0 \pi^+\pi^-$ total, $\overline{K}^*(892)^0 \to K^-\pi^+$		(1.5 ± 0.4) %	
Γ_{61}	$\overline{K}^*(892)^0 \pi^+\pi^-$ 3-body, $\overline{K}^*(892)^0 \to K^-\pi^+$		$(9.7 \pm 2.1) \times 10^{-3}$	
Γ_{62}	$K_1(1270)^-\pi^+$, $K_1(1270)^- \to K^-\pi^+\pi^-$	[g]	$(2.9 \pm 0.3) \times 10^{-3}$	
Γ_{63}	$K^-\pi^+\pi^+\pi^-$ nonresonant		(1.80 ± 0.25) %	
Γ_{64}	$K^0_S \pi^+\pi^-\pi^0$	[e]	(5.3 ± 0.6) %	
Γ_{65}	$K^0_S \eta$, $\eta \to \pi^+\pi^-\pi^0$		$(8.6 \pm 1.4) \times 10^{-4}$	
Γ_{66}	$K^0_S \omega$, $\omega \to \pi^+\pi^-\pi^0$		$(9.8 \pm 1.8) \times 10^{-3}$	
Γ_{67}	$K^*(892)^-\rho^+$, $K^*(892)^- \to K^0_S\pi^-$		(2.1 ± 0.8) %	
Γ_{68}	$K_1(1270)^-\pi^+$, $K_1(1270)^- \to K^0_S\pi^-\pi^0$	[g]	$(2.2 \pm 0.6) \times 10^{-3}$	
Γ_{69}	$\overline{K}^*(892)^0 \pi^+\pi^-$ 3-body, $\overline{K}^*(892)^0 \to K^0_S\pi^0$		$(2.4 \pm 0.5) \times 10^{-3}$	
Γ_{70}	$K^0_S \pi^+\pi^-\pi^0$ nonresonant		(1.1 ± 1.1) %	
Γ_{71}	$K^-\pi^+\pi^0\pi^0$			
Γ_{72}	$K^-\pi^+\pi^+\pi^-\pi^0$		(4.1 ± 0.4) %	
Γ_{73}	$\overline{K}^*(892)^0 \pi^+\pi^-\pi^0$, $\overline{K}^*(892)^0 \to K^-\pi^+$		(1.2 ± 0.6) %	
Γ_{74}	$K^-\pi^+\omega$, $\omega \to \pi^+\pi^-\pi^0$		(2.7 ± 0.5) %	
Γ_{75}	$\overline{K}^*(892)^0 \omega$, $\overline{K}^*(892)^0 \to K^-\pi^+$, $\omega \to \pi^+\pi^-\pi^0$		$(6.5 \pm 2.4) \times 10^{-3}$	
Γ_{76}	$K^0_S \eta\pi^0$		$(5.2 \pm 1.2) \times 10^{-3}$	
Γ_{77}	$K^0_S a_0(980)$, $a_0(980) \to \eta\pi^0$		$(6.2 \pm 2.0) \times 10^{-3}$	
Γ_{78}	$\overline{K}^*(892)^0 \eta$, $\overline{K}^*(892)^0 \to K^0_S\pi^0$		$(1.5 \pm 0.5) \times 10^{-3}$	
Γ_{79}	$K^0_S 2\pi^+ 2\pi^-$		$(2.75 \pm 0.31) \times 10^{-3}$	
Γ_{80}	$K^0_S \rho^0\pi^+\pi^-$, no $K^*(892)^-$		$(1.1 \pm 0.7) \times 10^{-3}$	
Γ_{81}	$K^*(892)^-\pi^+\pi^+\pi^-$, $K^*(892)^- \to K^0_S\pi^-$, no ρ^0		$(5 \pm 8) \times 10^{-4}$	
Γ_{82}	$K^*(892)^-\rho^0\pi^+$, $K^*(892)^- \to K^0_S\pi^-$		$(1.7 \pm 0.7) \times 10^{-3}$	
Γ_{83}	$K^0_S 2\pi^+ 2\pi^-$ nonresonant		$< 1.3 \times 10^{-3}$	CL=90%
Γ_{84}	$\overline{K}^0 \pi^+\pi^-\pi^0\pi^0(\pi^0)$			
Γ_{85}	$K^- 3\pi^+ 2\pi^-$		$(2.1 \pm 0.5) \times 10^{-4}$	

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_{86}	$K^0_S\eta$		$(3.8 \pm 0.6) \times 10^{-3}$		
Γ_{87}	$K^0_S\omega$		(1.10 ± 0.20) %		
Γ_{88}	$K^0_S\eta'(958)$		$(9.1 \pm 1.4) \times 10^{-3}$		
Γ_{89}	$K^- a_1(1260)^+$		(7.5 ± 1.1) %		
Γ_{90}	$\overline{K}^0 a_1(1260)^0$		< 1.9	%	CL=90%
Γ_{91}	$K^- a_2(1320)^+$		< 2	$\times 10^{-3}$	CL=90%
Γ_{92}	$\overline{K}^*(892)^0\pi^+\pi^-$ total		(2.3 ± 0.5) %		
Γ_{93}	$\quad\overline{K}^*(892)^0\pi^+\pi^-$ 3-body		(1.46 ± 0.32) %		
Γ_{94}	$\overline{K}^*(892)^0\rho^0$		(1.50 ± 0.33) %		
Γ_{95}	$\quad\overline{K}^*(892)^0\rho^0$ transverse		(1.6 ± 0.5) %		
Γ_{96}	$\quad\overline{K}^*(892)^0\rho^0$ S-wave		(2.9 ± 0.6) %		
Γ_{97}	$\quad\overline{K}^*(892)^0\rho^0$ S-wave long.		< 3	$\times 10^{-3}$	CL=90%
Γ_{98}	$\quad\overline{K}^*(892)^0\rho^0$ P-wave		< 3	$\times 10^{-3}$	CL=90%
Γ_{99}	$\quad\overline{K}^*(892)^0\rho^0$ D-wave		(2.0 ± 0.6) %		
Γ_{100}	$K^*(892)^-\rho^+$		(6.4 ± 2.5) %		
Γ_{101}	$\quad K^*(892)^-\rho^+$ longitudinal		(3.1 ± 1.2) %		
Γ_{102}	$\quad K^*(892)^-\rho^+$ transverse		(3.4 ± 2.0) %		
Γ_{103}	$\quad K^*(892)^-\rho^+$ P-wave		< 1.5	%	CL=90%
Γ_{104}	$K^-\pi^+ f_0(980)$				
Γ_{105}	$\quad\overline{K}^*(892)^0 f_0(980)$				
Γ_{106}	$K_1(1270)^-\pi^+$	[g]	(1.12 ± 0.31) %		
Γ_{107}	$K_1(1400)^-\pi^+$		< 1.2	%	CL=90%
Γ_{108}	$\overline{K}_1(1400)^0\pi^0$		< 3.7	%	CL=90%
Γ_{109}	$K^*(1410)^-\pi^+$				
Γ_{110}	$\overline{K}^*(892)^0\pi^+\pi^-\pi^0$		(1.8 ± 0.9) %		
Γ_{111}	$\quad\overline{K}^*(892)^0\eta$				
Γ_{112}	$K^-\pi^+\omega$		(3.0 ± 0.6) %		
Γ_{113}	$\quad\overline{K}^*(892)^0\omega$		(1.1 ± 0.4) %		
Γ_{114}	$K^-\pi^+\eta'(958)$		$(7.2 \pm 1.8) \times 10^{-3}$		
Γ_{115}	$\quad\overline{K}^*(892)^0\eta'(958)$		< 1.1	$\times 10^{-3}$	CL=90%

Hadronic modes with three K's

Γ_{116}	$K^0_S K^+ K^-$	$(4.58 \pm 0.34) \times 10^{-3}$		
Γ_{117}	$\quad K^0_S a_0(980)^0,\ a^0_0 \to K^+K^-$	$(3.0 \pm 0.4) \times 10^{-3}$		
Γ_{118}	$\quad K^- a_0(980)^+,\ a^+_0 \to K^+K^0_S$	$(6.1 \pm 1.8) \times 10^{-4}$		
Γ_{119}	$\quad K^+ a_0(980)^-,\ a^-_0 \to K^-K^0_S$	< 1.1	$\times 10^{-4}$	CL=95%
Γ_{120}	$\quad K^0_S f_0(980),\ f_0 \to K^+K^-$	< 1.0	$\times 10^{-4}$	CL=95%
Γ_{121}	$\quad K^0_S\phi,\ \phi \to K^+K^-$	$(2.10 \pm 0.16) \times 10^{-3}$		
Γ_{122}	$\quad K^0_S f_0(1400),\ f_0 \to K^+K^-$	$(1.7 \pm 1.1) \times 10^{-4}$		

Γ_{123}	$3K^0_S$		$(9.3 \pm 1.3) \times 10^{-4}$	
Γ_{124}	$K^+K^-K^-\pi^+$		$(2.11 \pm 0.31) \times 10^{-4}$	
Γ_{125}	$K^+K^-\overline{K}^*(892)^0$, $\overline{K}^*(892)^0 \to K^-\pi^+$		$(4.2 \pm 1.7) \times 10^{-5}$	
Γ_{126}	$K^-\pi^+\phi$, $\phi \to K^+K^-$		$(3.8 \pm 1.6) \times 10^{-5}$	
Γ_{127}	$\phi\overline{K}^*(892)^0$, $\phi \to K^+K^-$, $\overline{K}^*(892)^0 \to K^-\pi^+$		$(1.01 \pm 0.20) \times 10^{-4}$	
Γ_{128}	$K^+K^-K^-\pi^+$ nonresonant		$(3.2 \pm 1.4) \times 10^{-5}$	
Γ_{129}	$K^0_S K^0_S K^\pm\pi^\mp$		$(6.1 \pm 1.3) \times 10^{-4}$	

Pionic modes

Γ_{130}	$\pi^+\pi^-$		$(1.364 \pm 0.032) \times 10^{-3}$	
Γ_{131}	$\pi^0\pi^0$		$(7.9 \pm 0.8) \times 10^{-4}$	
Γ_{132}	$\pi^+\pi^-\pi^0$		(1.31 ± 0.06) %	
Γ_{133}	$\rho^+\pi^-$		$(10.0 \pm 0.6) \times 10^{-3}$	
Γ_{134}	$\rho^0\pi^0$		$(3.2 \pm 0.4) \times 10^{-3}$	
Γ_{135}	$\rho^-\pi^+$		$(4.5 \pm 0.4) \times 10^{-3}$	
Γ_{136}	$f_0(980)\pi^0$, $f_0(980) \to \pi^+\pi^-$		$< 3.4 \times 10^{-6}$	CL=95%
Γ_{137}	$f_0(600)\pi^0$, $f_0(600) \to \pi^+\pi^-$		$< 2.7 \times 10^{-5}$	CL=95%
Γ_{138}	$(\pi^+\pi^-)_{S-\text{wave}}\pi^0$		$< 2.5 \times 10^{-4}$	CL=95%
Γ_{139}	$3\pi^0$		$< 3.5 \times 10^{-4}$	CL=90%
Γ_{140}	$2\pi^+2\pi^-$		$(7.31 \pm 0.27) \times 10^{-3}$	
Γ_{141}	$\pi^+\pi^-2\pi^0$		$(9.8 \pm 0.9) \times 10^{-3}$	
Γ_{142}	$\eta\pi^0$	[h]	$(5.6 \pm 1.4) \times 10^{-4}$	
Γ_{143}	$\omega\pi^0$	[h]	$< 2.6 \times 10^{-4}$	CL=90%
Γ_{144}	$2\pi^+2\pi^-\pi^0$		$(4.1 \pm 0.5) \times 10^{-3}$	
Γ_{145}	$\eta\pi^+\pi^-$	[h]	$< 1.9 \times 10^{-3}$	CL=90%
Γ_{146}	$\omega\pi^+\pi^-$	[h]	$(1.6 \pm 0.5) \times 10^{-3}$	
Γ_{147}	$3\pi^+3\pi^-$		$(4.0 \pm 1.1) \times 10^{-4}$	

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

Γ_{148}	K^+K^-		$(3.84 \pm 0.10) \times 10^{-3}$	
Γ_{149}	$2K^0_S$		$(3.7 \pm 0.7) \times 10^{-4}$	
Γ_{150}	$K^0_S K^-\pi^+$		$(3.4 \pm 0.5) \times 10^{-3}$	S=1.1
Γ_{151}	$\overline{K}^*(892)^0 K^0_S$, $\overline{K}^*(892)^0 \to K^-\pi^+$		$< 6 \times 10^{-4}$	CL=90%
Γ_{152}	$K^*(892)^+K^-$, $K^*(892)^+ \to K^0_S\pi^+$		$(1.2 \pm 0.3) \times 10^{-3}$	
Γ_{153}	$K^0_S K^-\pi^+$ nonresonant		$(1.1 \pm 1.1) \times 10^{-3}$	
Γ_{154}	$K^0_S K^+\pi^-$		$(2.6 \pm 0.5) \times 10^{-3}$	
Γ_{155}	$K^*(892)^0 K^0_S$, $K^*(892)^0 \to K^+\pi^-$		$< 3 \times 10^{-4}$	CL=90%
Γ_{156}	$K^*(892)^-K^+$, $K^*(892)^- \to K^0_S\pi^-$		$(7 \pm 4) \times 10^{-4}$	

Γ_{157}	$K^0_S K^+ \pi^-$ nonresonant		$(1.9 \ ^{+1.1}_{-0.8}) \times 10^{-3}$		
Γ_{158}	$K^+ K^- \pi^0$		$(1.3 \pm 0.4) \times 10^{-3}$		
Γ_{159}	$K^0_S K^0_S \pi^0$		$< 5.9 \times 10^{-4}$		
Γ_{160}	$K^+ K^- \pi^+ \pi^-$	[i]	$(2.32 \pm 0.13) \times 10^{-3}$		
Γ_{161}	$\phi \pi^+ \pi^-$ 3-body, $\phi \rightarrow K^+ K^-$		$(2.3 \pm 2.3) \times 10^{-5}$		
Γ_{162}	$\phi \rho^0$, $\phi \rightarrow K^+ K^-$		$(6.7 \pm 0.6) \times 10^{-4}$		
Γ_{163}	$K^+ K^- \rho^0$ 3-body		$(5 \pm 7) \times 10^{-5}$		
Γ_{164}	$f_0(980) \pi^+ \pi^-$, $f_0 \rightarrow K^+ K^-$		$(3.5 \pm 0.9) \times 10^{-4}$		
Γ_{165}	$K^*(892)^0 K^\mp \pi^\pm$ 3-body, $K^{*0} \rightarrow K^\pm \pi^\mp$	[j]	$(2.5 \pm 0.5) \times 10^{-4}$		
Γ_{166}	$K^*(892)^0 \overline{K}^*(892)^0$, $K^{*0} \rightarrow K^\pm \pi^\mp$		$(7 \pm 5) \times 10^{-5}$		
Γ_{167}	$K_1(1270)^\pm K^\mp$, $K_1(1270)^\pm \rightarrow K^\pm \pi^+ \pi^-$		$(7.6 \pm 1.7) \times 10^{-4}$		
Γ_{168}	$K_1(1400)^\pm K^\mp$, $K_1(1400)^\pm \rightarrow K^\pm \pi^+ \pi^-$		$(5.1 \pm 1.2) \times 10^{-4}$		
Γ_{169}	$K^+ K^- \pi^+ \pi^-$ non-ϕ				
Γ_{170}	$K^+ K^- \pi^+ \pi^-$ nonresonant				
Γ_{171}	$K^0_S K^0_S \pi^+ \pi^-$		$(1.26 \pm 0.24) \times 10^{-3}$		
Γ_{172}	$K^0_S K^- \pi^+ \pi^+ \pi^-$		$< 1.5 \times 10^{-4}$	CL=90%	
Γ_{173}	$K^+ K^- \pi^+ \pi^- \pi^0$		$(3.1 \pm 2.0) \times 10^{-3}$		

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

Γ_{174}	$\overline{K}^*(892)^0 K^0_S$		$< 8 \times 10^{-4}$	CL=90%
Γ_{175}	$K^*(892)^+ K^-$		$(3.7 \pm 0.8) \times 10^{-3}$	
Γ_{176}	$K^*(892)^0 K^0_S$		$< 4 \times 10^{-4}$	CL=90%
Γ_{177}	$K^*(892)^- K^+$		$(2.0 \pm 1.1) \times 10^{-3}$	
Γ_{178}	$\phi \pi^0$		$(7.4 \pm 0.5) \times 10^{-4}$	
Γ_{179}	$\phi \eta$		$(1.4 \pm 0.4) \times 10^{-4}$	
Γ_{180}	$\phi \omega$		$< 2.1 \times 10^{-3}$	CL=90%

Radiative modes

Γ_{181}	$\rho^0 \gamma$		$< 2.4 \times 10^{-4}$	CL=90%
Γ_{182}	$\omega \gamma$		$< 2.4 \times 10^{-4}$	CL=90%
Γ_{183}	$\phi \gamma$		$(2.4 \ ^{+0.7}_{-0.6}) \times 10^{-5}$	
Γ_{184}	$\overline{K}^*(892)^0 \gamma$		$< 7.6 \times 10^{-4}$	CL=90%

Doubly Cabibbo suppressed (*DC*) modes or $\Delta C = 2$ forbidden via mixing (*C2M*) modes

Γ_{185}	$K^+ \ell^- \overline{\nu}_\ell$ (via $\overline{D}^0$)	*C2M*	$< 1.8 \times 10^{-4}$	CL=90%
Γ_{186}	K^+ or $K^*(892)^+ e^- \overline{\nu}_e$ (via $\overline{D}^0$)	*C2M*	$< 6 \times 10^{-5}$	CL=90%
Γ_{187}	$K^+ \pi^-$	*DC*	$(1.43 \pm 0.04) \times 10^{-4}$	

Γ_{188}	$K^+\pi^-$ (via $\overline{D}^0$)	C2M		< 1.5	$\times 10^{-5}$	CL=95%
Γ_{189}	$K^0_S\pi^+\pi^-$ (in $D^0 \to \overline{D}^0$)	C2M		< 1.8	$\times 10^{-4}$	CL=95%
Γ_{190}	$K^*(892)^+\pi^-$, $K^*(892)^+ \to K^0_S\pi^+$	DC		$(10\ ^{+12}_{-\ 4}$	$) \times 10^{-5}$	
Γ_{191}	$K^+\pi^-\pi^0$	DC		$(3.29\ ^{+0.30}_{-0.27}$	$) \times 10^{-4}$	
Γ_{192}	$K^+\pi^-\pi^+\pi^-$	DC		$(2.49\ ^{+0.21}_{-0.19}$	$) \times 10^{-4}$	
Γ_{193}	$K^+\pi^-\pi^+\pi^-$ (via $\overline{D}^0$)	C2M		< 4	$\times 10^{-4}$	CL=90%
Γ_{194}	$K^+\pi^-$ or $K^+\pi^-\pi^+\pi^-$ (via $\overline{D}^0$)					
Γ_{195}	μ^- anything (via $\overline{D}^0$)	C2M		< 4	$\times 10^{-4}$	CL=90%

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

Γ_{196}	$\gamma\gamma$	C1		< 2.6	$\times 10^{-5}$	CL=90%
Γ_{197}	e^+e^-	C1		< 1.2	$\times 10^{-6}$	CL=90%
Γ_{198}	$\mu^+\mu^-$	C1		< 1.3	$\times 10^{-6}$	CL=90%
Γ_{199}	$\pi^0 e^+e^-$	C1		< 4.5	$\times 10^{-5}$	CL=90%
Γ_{200}	$\pi^0\mu^+\mu^-$	C1		< 1.8	$\times 10^{-4}$	CL=90%
Γ_{201}	ηe^+e^-	C1		< 1.1	$\times 10^{-4}$	CL=90%
Γ_{202}	$\eta\mu^+\mu^-$	C1		< 5.3	$\times 10^{-4}$	CL=90%
Γ_{203}	$\pi^+\pi^-e^+e^-$	C1		< 3.73	$\times 10^{-4}$	CL=90%
Γ_{204}	$\rho^0 e^+e^-$	C1		< 1.0	$\times 10^{-4}$	CL=90%
Γ_{205}	$\pi^+\pi^-\mu^+\mu^-$	C1		< 3.0	$\times 10^{-5}$	CL=90%
Γ_{206}	$\rho^0\mu^+\mu^-$	C1		< 2.2	$\times 10^{-5}$	CL=90%
Γ_{207}	ωe^+e^-	C1		< 1.8	$\times 10^{-4}$	CL=90%
Γ_{208}	$\omega\mu^+\mu^-$	C1		< 8.3	$\times 10^{-4}$	CL=90%
Γ_{209}	$K^-K^+e^+e^-$	C1		< 3.15	$\times 10^{-4}$	CL=90%
Γ_{210}	ϕe^+e^-	C1		< 5.2	$\times 10^{-5}$	CL=90%
Γ_{211}	$K^-K^+\mu^+\mu^-$	C1		< 3.3	$\times 10^{-5}$	CL=90%
Γ_{212}	$\phi\mu^+\mu^-$	C1		< 3.1	$\times 10^{-5}$	CL=90%
Γ_{213}	$\overline{K}^0 e^+e^-$		[k]	< 1.1	$\times 10^{-4}$	CL=90%
Γ_{214}	$\overline{K}^0\mu^+\mu^-$		[k]	< 2.6	$\times 10^{-4}$	CL=90%
Γ_{215}	$K^-\pi^+e^+e^-$	C1		< 3.85	$\times 10^{-4}$	CL=90%
Γ_{216}	$\overline{K}^*(892)^0 e^+e^-$		[k]	< 4.7	$\times 10^{-5}$	CL=90%
Γ_{217}	$K^-\pi^+\mu^+\mu^-$	C1		< 3.59	$\times 10^{-4}$	CL=90%
Γ_{218}	$\overline{K}^*(892)^0\mu^+\mu^-$		[k]	< 2.4	$\times 10^{-5}$	CL=90%
Γ_{219}	$\pi^+\pi^-\pi^0\mu^+\mu^-$	C1		< 8.1	$\times 10^{-4}$	CL=90%
Γ_{220}	$\mu^\pm e^\mp$	LF	[l]	< 8.1	$\times 10^{-7}$	CL=90%
Γ_{221}	$\pi^0 e^\pm\mu^\mp$	LF	[l]	< 8.6	$\times 10^{-5}$	CL=90%
Γ_{222}	$\eta e^\pm\mu^\mp$	LF	[l]	< 1.0	$\times 10^{-4}$	CL=90%
Γ_{223}	$\pi^+\pi^-e^\pm\mu^\mp$	LF	[l]	< 1.5	$\times 10^{-5}$	CL=90%
Γ_{224}	$\rho^0 e^\pm\mu^\mp$	LF	[l]	< 4.9	$\times 10^{-5}$	CL=90%

Γ_{225}	$\omega e^{\pm}\mu^{\mp}$	*LF*	[*l*]	<	1.2	$\times 10^{-4}$	CL=90%
Γ_{226}	$K^- K^+ e^{\pm}\mu^{\mp}$	*LF*	[*l*]	<	1.8	$\times 10^{-4}$	CL=90%
Γ_{227}	$\phi e^{\pm}\mu^{\mp}$	*LF*	[*l*]	<	3.4	$\times 10^{-5}$	CL=90%
Γ_{228}	$\overline{K}^0 e^{\pm}\mu^{\mp}$	*LF*	[*l*]	<	1.0	$\times 10^{-4}$	CL=90%
Γ_{229}	$K^-\pi^+ e^{\pm}\mu^{\mp}$	*LF*	[*l*]	<	5.53	$\times 10^{-4}$	CL=90%
Γ_{230}	$\overline{K}^*(892)^0 e^{\pm}\mu^{\mp}$	*LF*	[*l*]	<	8.3	$\times 10^{-5}$	CL=90%
Γ_{231}	$\pi^-\pi^- e^+ e^+ +$ c.c.	*L*		<	1.12	$\times 10^{-4}$	CL=90%
Γ_{232}	$\pi^-\pi^-\mu^+\mu^+ +$ c.c.	*L*		<	2.9	$\times 10^{-5}$	CL=90%
Γ_{233}	$K^-\pi^- e^+ e^+ +$ c.c.	*L*		<	2.06	$\times 10^{-4}$	CL=90%
Γ_{234}	$K^-\pi^-\mu^+\mu^+ +$ c.c.	*L*		<	3.9	$\times 10^{-4}$	CL=90%
Γ_{235}	$K^- K^- e^+ e^+ +$ c.c.	*L*		<	1.52	$\times 10^{-4}$	CL=90%
Γ_{236}	$K^- K^-\mu^+\mu^+ +$ c.c.	*L*		<	9.4	$\times 10^{-5}$	CL=90%
Γ_{237}	$\pi^-\pi^- e^+\mu^+ +$ c.c.	*L*		<	7.9	$\times 10^{-5}$	CL=90%
Γ_{238}	$K^-\pi^- e^+\mu^+ +$ c.c.	*L*		<	2.18	$\times 10^{-4}$	CL=90%
Γ_{239}	$K^- K^- e^+\mu^+ +$ c.c.	*L*		<	5.7	$\times 10^{-5}$	CL=90%

Γ_{240} A dummy mode used by the fit. (38.0 ± 1.9) %

[*a*] This value is obtained by subtracting the branching fractions for 2-, 4- and 6-prongs from unity.

[*b*] This is the sum of our $K^-\pi^+\pi^+\pi^-$, $K^-\pi^+\pi^+\pi^-\pi^0$, $\overline{K}^0 2\pi^+ 2\pi^-$, $2\pi^+ 2\pi^-$, $2\pi^+ 2\pi^-\pi^0$, $K^+ K^-\pi^+\pi^-$, and $K^+ K^-\pi^+\pi^-\pi^0$, branching fractions.

[*c*] The branching fractions for the $K^- e^+\nu_e$, $K^*(892)^- e^+\nu_e$, $\pi^- e^+\nu_e$, and $\rho^- e^+\nu_e$ modes add up to 6.14 ± 0.20 %.

[*d*] 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.

[*e*] 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.

[*f*] This is a doubly Cabibbo-suppressed mode.

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

[*h*] This branching fraction includes all the decay modes of the resonance in the final state.

[*i*] 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.

[*j*] However, these upper limits are in serious disagreement with values obtained in another experiment.

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

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

CONSTRAINED FIT INFORMATION

An overall fit to 41 branching ratios uses 78 measurements and one constraint to determine 22 parameters. The overall fit has a $\chi^2 = 42.6$ for 57 degrees of freedom.

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

	x_6	x_{15}	x_{16}	x_{17}	x_{26}	x_{29}	x_{30}	x_{31}	x_{43}	x_{55}
x_{15}	2									
x_{16}	26	9								
x_{17}	0	0	1							
x_{26}	1	23	2	0						
x_{29}	9	26	35	2	6					
x_{30}	1	2	2	10	0	6				
x_{31}	1	3	3	16	1	10	63			
x_{43}	3	7	10	0	2	28	2	3		
x_{55}	4	10	14	1	2	38	3	4	57	
x_{64}	0	1	2	7	0	5	29	46	2	3
x_{72}	2	4	6	0	1	16	1	2	15	25
x_{86}	0	1	2	7	0	4	58	45	1	2
x_{87}	0	1	1	5	0	3	21	33	1	2
x_{93}	1	2	2	0	0	6	0	1	9	16
x_{95}	0	1	1	1	0	4	2	4	5	9
x_{106}	0	1	1	3	0	3	11	18	2	3
x_{140}	4	12	16	1	3	46	3	5	26	41
x_{150}	1	1	2	6	0	6	23	37	2	2
x_{154}	0	1	2	4	0	5	16	26	1	2
x_{175}	0	1	1	4	0	3	18	28	1	1
x_{240}	−39	−15	−28	−15	−4	−36	−33	−46	−48	−49

x_{72}	1									
x_{86}	21	1								
x_{87}	40	1	15							
x_{93}	0	4	0	0						
x_{95}	8	2	2	3	1					
x_{106}	38	1	8	15	0	3				
x_{140}	3	13	2	2	7	4	2			
x_{150}	17	1	16	12	0	2	6	3		
x_{154}	12	1	12	9	0	1	5	2	9	
x_{175}	13	1	13	9	0	1	5	2	10	7
x_{240}	−57	−33	−25	−35	−24	−36	−37	−27	−20	−15
	x_{64}	x_{72}	x_{86}	x_{87}	x_{93}	x_{95}	x_{106}	x_{140}	x_{150}	x_{154}

x_{240}	−17
	x_{175}

CONSTRAINED FIT INFORMATION

An overall fit to 3 branching ratios uses 3 measurements and one constraint to determine 4 parameters. The overall fit has a $\chi^2 =$ 0.0 for 0 degrees of freedom.

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

x_2	−100		
x_3	−48	41	
x_4	−2	0	0
	x_1	x_2	x_3

D^0 BRANCHING RATIOS

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

——— Topological modes ———

Γ(0-prongs)/$\Gamma_{\rm total}$ **Γ_1/Γ**

This value is obtained by subtracting the branching fractions for 2-, 4-, and 6-prongs from unity.

VALUE	*DOCUMENT ID*
0.19±0.06 OUR FIT	

$\Gamma(\text{4-prongs})/\Gamma_{total}$ — Γ_3/Γ

This is the sum of our $K^-\pi^+\pi^+\pi^-$, $K^-\pi^+\pi^+\pi^-\pi^0$, $\overline{K}^0 2\pi^+ 2\pi^-$, $2\pi^+ 2\pi^-$, $2\pi^+ 2\pi^- \pi^0$, $K^+ K^- \pi^+ \pi^-$, and $K^+ K^- \pi^+ \pi^- \pi^0$ branching fractions.

VALUE	DOCUMENT ID	
0.138±0.005 OUR FIT		
0.138±0.005	PDG	06

$\Gamma(\text{4-prongs})/\Gamma(\text{2-prongs})$ — Γ_3/Γ_2

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.207±0.016 OUR FIT					
0.207±0.016±0.004	226	ONENGUT	05	CHRS	ν_μ emulsion, $\overline{E}_\nu \approx 27$ GeV

$\Gamma(\text{6-prongs})/\Gamma_{total}$ — Γ_4/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{1.2^{+1.3}_{-0.7}}$ **OUR FIT**					
$\mathbf{1.2^{+1.3}_{-0.9}\pm0.2}$	3	ONENGUT	05	CHRS	ν_μ emulsion, $\overline{E}_\nu \approx 27$ GeV

Inclusive modes

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

The branching fractions for the $K^- e^+ \nu_e$, $K^*(892)^- e^+ \nu_e$, $\pi^- e^+ \nu_e$, and $\rho^- e^+ \nu_e$ modes add up to 6.14 ± 0.20 %.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0671±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	[23] KUBOTA	96B	CLE2	$e^+e^- \approx \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.15 ±0.05		AGUILAR-...	87E	HYBR	πp, $p p$ 360, 400 GeV
0.075 ±0.011 ±0.004	137	BALTRUSAIT...	85B	MRK3	e^+e^- 3.77 GeV
0.055 ±0.037	12	SCHINDLER	81	MRK2	e^+e^- 3.771 GeV

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

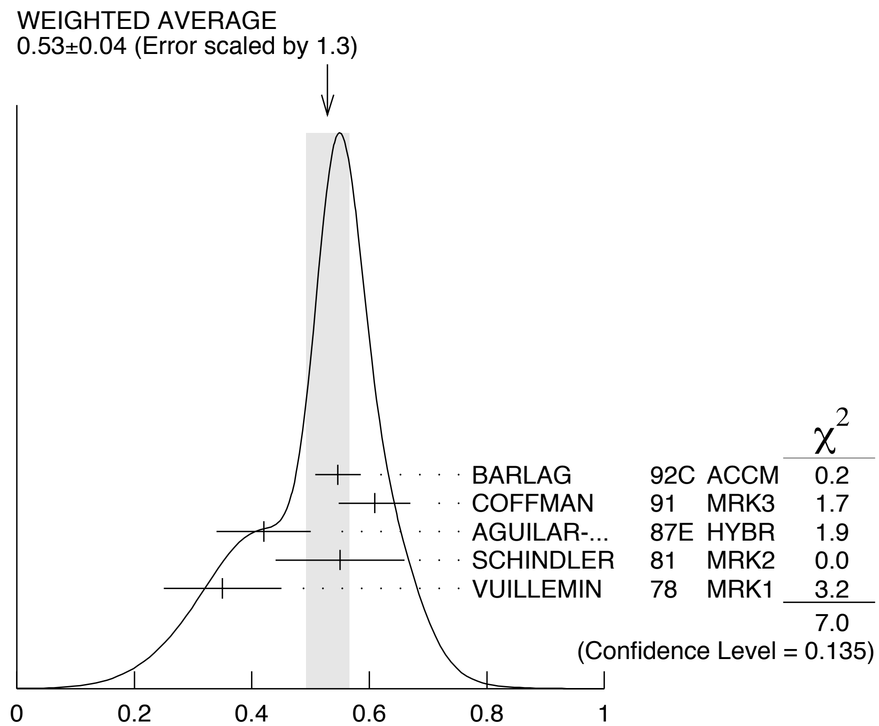
$\Gamma(\mu^+\text{ anything})/\Gamma_{total}$ — Γ_6/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.065±0.007 OUR FIT					
0.063±0.009 OUR AVERAGE					
0.065±0.012±0.003	36	KAYIS-TOPAK...	05	CHRS	ν_μ emulsion
0.060±0.007±0.012	310	ALBRECHT	96C	ARG	$e^+e^- \approx$ 10 GeV

$\Gamma(K^-\text{ anything})/\Gamma_{total}$ — Γ_7/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.53 ±0.04 OUR AVERAGE		Error includes scale factor of 1.3. See the ideogram below.			
$0.546^{+0.039}_{-0.038}$		[24] 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, $p p$ 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

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



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

$\left[\Gamma(\overline{K}^0\text{ anything}) + \Gamma(K^0\text{ anything})\right]/\Gamma_{\text{total}}$ Γ_8/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_9/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.034^{+0.006}_{-0.004}$ OUR AVERAGE					
$0.034^{+0.007}_{-0.005}$		[25] 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

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

$\Gamma(\overline{K}^*(892)^0\text{ anything})/\Gamma_{\text{total}}$ Γ_{10}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.087±0.040±0.012	96 ± 44	ABLIKIM	05P	BES	$e^+e^- \approx$ 3773 MeV

$\Gamma(K^*(892)^0 \text{anything})/\Gamma_{\text{total}}$ — Γ_{11}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.028±0.012±0.004	31 ± 12	ABLIKIM	05P	BES	$e^+e^- \approx$ 3773 MeV

$\Gamma(\phi \text{ anything})/\Gamma_{\text{total}}$ — Γ_{13}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{1.71^{+0.76}_{-0.71}\pm0.17}$	9	[26] BAI	00C	BES	$e^+e^- \rightarrow D\overline{D}^*, D^*\overline{D}^*$

[26] 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)%.

Semileptonic modes

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

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
3.51±0.11 OUR FIT					
3.47±0.13 OUR AVERAGE					
3.44±0.10±0.10	1311 ± 37	COAN	05	CLEO	e^+e^- at $\psi(3770)$
3.82±0.40±0.27	104 ± 11	ABLIKIM	04C	BES	e^+e^-, 3.773 GeV
3.4 ±0.5 ±0.4	55	ADLER	89	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^- e^+ \nu_e)/\Gamma(K^-\pi^+)$ — Γ_{15}/Γ_{29}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.923±0.029 OUR FIT					
0.95 ±0.04 OUR AVERAGE					
0.978±0.027±0.044	2510	[27] BEAN	93C	CLE2	$e^+e^- \approx \Upsilon(4S)$
0.90 ±0.06 ±0.06	584	[28] CRAWFORD	91B	CLEO	$e^+e^- \approx$ 10.5 GeV
0.91 ±0.07 ±0.11	250	[29] ANJOS	89F	E691	Photoproduction

[27] 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.

[28] 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.

[29] 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_{16}/Γ_{29}

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	[30] FRABETTI	95G	E687	γBe $\overline{E}_\gamma$= 220 GeV
0.82 ±0.13 ±0.13	338	[31] FRABETTI	93I	E687	γBe $\overline{E}_\gamma$= 221 GeV
0.79 ±0.08 ±0.09	231	[32] CRAWFORD	91B	CLEO	$e^+e^- \approx$ 10.5 GeV

[30] 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 $1.87^{+0.11}_{-0.08}{}^{+0.07}_{-0.06}$ GeV/c^2 from the q^2 dependence of the decay rate.

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

[32] 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_{16}/Γ_6

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.49 ±0.05 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_{19}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.016^{+0.013}_{-0.005}\pm0.002$	4	[33] BAI	91	MRK3	$e^+ e^- \approx$ 3.77 GeV

[33] 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 $\overline{K}^*(892) e^+ \nu_e$. 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_{20}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.028^{+0.017}_{-0.008}\pm0.003$	6	[34] BAI	91	MRK3	$e^+ e^- \approx$ 3.77 GeV

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

$\Gamma(K^*(892)^- e^+ \nu_e)/\Gamma_{\text{total}}$ — Γ_{17}/Γ

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

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
2.17±0.16 OUR FIT					
2.16±0.15±0.08	219 ± 16	[35] COAN	05	CLEO	$e^+ e^-$ at $\psi(3770)$

[35] COAN 05 uses both $K^- \pi^0$ and $K^0_S \pi^-$ events.

$\Gamma(K^*(892)^- e^+ \nu_e)/\Gamma(K^0_S \pi^+ \pi^-)$ — Γ_{17}/Γ_{31}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.75±0.07 OUR FIT					
0.76±0.12±0.06	152	[36] BEAN	93C	CLE2	$e^+ e^- \approx \Upsilon(4S)$

[36] 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.

$\Gamma(K^*(892)^- e^+ \nu_e)/\Gamma(K^- e^+ \nu_e)$ — Γ_{17}/Γ_{15}

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

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.51±0.18±0.06	CRAWFORD	91B	CLEO	$e^+ e^- \approx$ 10.5 GeV

$\Gamma(K^*(892)^- \mu^+ \nu_\mu)/\Gamma(K^0_S \pi^+ \pi^-)$ — Γ_{18}/Γ_{31}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.674±0.068±0.026	175 ± 17	[37] LINK	05B	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

[37] LINK 05B finds that in $D^0 \to \overline{K}^0 \pi^- \mu^+ \nu_\mu$ the $\overline{K}^0 \pi^-$ system is 6% in S-wave.

$\Gamma(K^*(892)^- \ell^+ \nu_\ell)/\Gamma(K^0_S \pi^+ \pi^-)$ — Γ_{22}/Γ_{31}

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. • • •					
0.48±0.14±0.12	137	[38] ALEXANDER	90B	CLEO	$e^+ e^-$ 10.5–11 GeV

[38] ALEXANDER 90B cannot exclude extra π^0's in the final state.

$\Gamma(K^- \pi^+ \pi^- \mu^+ \nu_\mu)/\Gamma(K^- \mu^+ \nu_\mu)$ — Γ_{24}/Γ_{16}

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_{25}/Γ_{16}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.043	90	[39] KODAMA	93B	E653	π^- emulsion 600 GeV

[39] 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_{26}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
0.281±0.019 OUR FIT					
0.262±0.025±0.008	117 ± 11	COAN	05	CLEO	$e^+ e^-$ at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.33 ±0.13 ±0.03	9 ± 4	[40] ABLIKIM	04C	BES	$e^+ e^-$, 3.773 GeV
0.39 $^{+0.23}_{-0.11}$ ±0.04	7	[41] ADLER	89	MRK3	$e^+ e^-$ 3.77 GeV

[40] ABLIKIM 04C measures $\left|\frac{f^\pi_+(0)}{f^K_+(0)}\right|$ to be 0.93 ± 0.19 ± 0.07.

[41] This result of ADLER 89 gives $\left|\frac{V_{cd}}{V_{cs}} \cdot \frac{f^\pi_+(0)}{f^K_+(0)}\right|^2 = 0.057^{+0.038}_{-0.015} \pm 0.005$.

$\Gamma(\pi^- e^+ \nu_e)/\Gamma(K^- e^+ \nu_e)$ — Γ_{26}/Γ_{15}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.080±0.005 OUR FIT					
0.085±0.007 OUR AVERAGE					
0.082±0.006±0.005		[42] HUANG	05	CLEO	$e^+ e^- \approx \Upsilon(4S)$
0.101±0.020±0.003	91	[43] FRABETTI	96B	E687	γ Be, $\overline{E}_\gamma \approx$ 200 GeV
0.103±0.039±0.013	87	[44] BUTLER	95	CLE2	< 0.156 (90% CL)

[42] HUANG 05 uses both e and μ events, and makes a small correction to the μ events to make them effectively e events. This result gives $|\frac{V_{cd}}{V_{cs}} \cdot \frac{f_+^\pi(0)}{f_+^K(0)}|^2 = 0.038^{+0.006}_{-0.007}{}^{+0.005}_{-0.003}$.

[43] 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 $|\frac{V_{cd}}{V_{cs}} \cdot \frac{f_+^\pi(0)}{f_+^K(0)}|^2 = 0.050 \pm 0.011 \pm 0.002$.

[44] BUTLER 95 has 87 ± 33 $\pi^- e^+ \nu_e$ events. The result gives $|\frac{V_{cd}}{V_{cs}} \cdot \frac{f_+^\pi(0)}{f_+^K(0)}|^2 = 0.052 \pm 0.020 \pm 0.007$.

$\Gamma(\pi^- \mu^+ \nu_\mu)/\Gamma(K^- \mu^+ \nu_\mu)$ $\qquad \Gamma_{27}/\Gamma_{16}$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.074±0.008±0.007	288 ± 29	[45] LINK	05	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

[45] LINK 05 finds the form-factor ratio $|f_0^\pi(0)/f_0^K(0)|$ to be 0.85 ± 0.04 ± 0.04 ± 0.01.

$\Gamma(\rho^- e^+ \nu_e)/\Gamma_{total}$ $\qquad \Gamma_{28}/\Gamma$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
0.194±0.039±0.013	31 ± 6	COAN	05	CLEO	$e^+ e^-$ at $\psi(3770)$

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

$\Gamma(K^- \pi^+)/\Gamma_{total}$ $\qquad \Gamma_{29}/\Gamma$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
3.80±0.07 OUR FIT	Error includes scale factor of 1.1.				
3.85±0.07 OUR AVERAGE					
3.91±0.08±0.09	10.3k ±100	[46] HE	05	CLEO	$e^+ e^-$ at $\psi(3770)$
3.82±0.07±0.12		[47] ARTUSO	98	CLE2	CLEO average
3.90±0.09±0.12	5392	[48] BARATE	97C	ALEP	From Z decays
3.41±0.12±0.28	1173 ± 37	[48] ALBRECHT	94F	ARG	$e^+ e^- \approx \Upsilon(4S)$
3.62±0.34±0.44		[48] DECAMP	91J	ALEP	From Z decays
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3.81±0.15±0.16	1165	[49] ARTUSO	98	CLE2	$e^+ e^-$ at $\Upsilon(4S)$
3.69±0.11±0.16		[50] COAN	98	CLE2	See ARTUSO 98
4.5 ±0.6 ±0.4		[51] ALBRECHT	94	ARG	$e^+ e^- \approx \Upsilon(4S)$
3.95±0.08±0.17	4208	[48,52] AKERIB	93	CLE2	See ARTUSO 98
4.5 ±0.8 ±0.5	56	[48] ABACHI	88	HRS	$e^+ e^-$ 29 GeV
4.2 ±0.4 ±0.4	930	ADLER	88C	MRK3	$e^+ e^-$ 3.77 GeV
4.1 ±0.6	263 ± 17	[53] SCHINDLER	81	MRK2	$e^+ e^-$ 3.771 GeV
4.3 ±1.0	130	[54] PERUZZI	77	MRK1	$e^+ e^-$ 3.77 GeV

[46] HE 05 uses single- and double-tagged events in an overall fit. The fraction here includes (unobserved) final-state photons.

[47] This combines the CLEO results of ARTUSO 98, COAN 98, and AKERIB 93.

[48] ABACHI 88, DECAMP 91J, AKERIB 93, ALBRECHT 94F, and BARATE 97C use $D^*(2010)^+ \rightarrow D^0 \pi^+$ decays. The π^+ is both slow and of low p_T with respect to the event thrust axis or nearest jet ($\approx D^{*+}$ direction). The excess number of such π^+'s over background gives the number of $D^*(2010)^+ \rightarrow D^0 \pi^+$ events, and the fraction with $D^0 \rightarrow K^- \pi^+$ gives the $D^0 \rightarrow K^- \pi^+$ branching fraction.

[49] ARTUSO 98, following ALBRECHT 94, uses D^0 mesons from $\overline{B}^0 \to D^*(2010)^+ X \ell^- \overline{\nu}_\ell$ decays. Our average uses the CLEO average of this value with the values of COAN 98 and AKERIB 93.

[50] COAN 98 assumes that $\Gamma(B \to \overline{D} X \ell^+ \nu)/\Gamma(B \to X \ell^+ \nu) = 1.0 - 3|V_{ub}/V_{cb}|^2 - 0.010 \pm 0.005$, the last term accounting for $\overline{B} \to D_s^+ K X \ell^- \overline{\nu}$. COAN 98 is included in the CLEO average in ARTUSO 98.

[51] ALBRECHT 94 uses D^0 mesons from $\overline{B}^0 \to D^{*+} \ell^- \overline{\nu}_\ell$ decays. This is a different set of events than used by ALBRECHT 94F.

[52] This AKERIB 93 value includes radiative corrections; without them, the value is $0.0391 \pm 0.0008 \pm 0.0017$. AKERIB 93 is included in the CLEO average in ARTUSO 98.

[53] SCHINDLER 81 (MARK-2) measures $\sigma(e^+ e^- \to \psi(3770)) \times$ branching fraction to be 0.24 ± 0.02 nb. We use the MARK-3 (ADLER 88C) value of $\sigma = 5.8 \pm 0.5 \pm 0.6$ nb.

[54] PERUZZI 77 (MARK-1) measures $\sigma(e^+ e^- \to \psi(3770)) \times$ branching fraction to be 0.25 ± 0.05 nb. We use the MARK-3 (ADLER 88C) value of $\sigma = 5.8 \pm 0.5 \pm 0.6$ nb.

$\Gamma(K^0_S \pi^0)/\Gamma(K^- \pi^+)$ — Γ_{30}/Γ_{29}

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.300±0.031 OUR FIT				
0.68 ±0.12 ±0.11	119	ANJOS 92B	E691	γ Be 80–240 GeV

$\Gamma(K^0_S \pi^0)/\Gamma(K^0_S \pi^+ \pi^-)$ — Γ_{30}/Γ_{31}

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.393±0.033 OUR FIT Error includes scale factor of 1.1.				
0.378±0.033 OUR AVERAGE				
0.44 ±0.02 ±0.05	1942 ± 64	PROCARIO 93B	CLE2	$e^+ e^-$ 10.36–10.7 GeV
0.34 ±0.04 ±0.02	92	[55] ALBRECHT 92P	ARG	$e^+ e^- \approx$ 10 GeV
0.36 ±0.04 ±0.08	104	KINOSHITA 91	CLEO	$e^+ e^- \sim$ 10.7 GeV

[55] This value is calculated from numbers in Table 1 of ALBRECHT 92P.

$\Gamma(K^0_S \pi^+ \pi^-)/\Gamma_{total}$ — Γ_{31}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
2.90±0.19 OUR FIT				
2.68±0.29 OUR AVERAGE				
2.52±0.20±0.25	284 ± 22	[56] ALBRECHT 94F	ARG	$e^+ e^- \approx \Upsilon(4S)$
3.2 ±0.3 ±0.5		ADLER 87	MRK3	$e^+ e^-$ 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.6 ±0.8	32 ± 8	[57] SCHINDLER 81	MRK2	$e^+ e^-$ 3.771 GeV
4.0 ±1.2	28	[58] PERUZZI 77	MRK1	$e^+ e^-$ 3.77 GeV

[56] See the footnote on the ALBRECHT 94F measurement of $\Gamma(K^- \pi^+)/\Gamma_{total}$ for the method used.

[57] SCHINDLER 81 (MARK-2) measures $\sigma(e^+ e^- \to \psi(3770)) \times$ branching fraction to be 0.30 ± 0.08 nb. We use the MARK-3 (ADLER 88C) value of $\sigma = 5.8 \pm 0.5 \pm 0.6$ nb.

[58] PERUZZI 77 (MARK-1) measures $\sigma(e^+ e^- \to \psi(3770)) \times$ branching fraction to be 0.46 ± 0.12 nb. We use the MARK-3 (ADLER 88C) value of $\sigma = 5.8 \pm 0.5 \pm 0.6$ nb.

$\Gamma(K^0_S \pi^+ \pi^-)/\Gamma(K^- \pi^+)$ — Γ_{31}/Γ_{29}

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.76±0.05 OUR FIT				
0.81±0.05±0.08	856 ± 35	FRABETTI 94J	E687	γ Be $\overline{E}_\gamma$=220 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.85±0.40	35	AVERY 80	SPEC	$\gamma N \to D^{*+}$
1.4 ±0.5	116	PICCOLO 77	MRK1	$e^+ e^-$ 4.03, 4.41 GeV

$\Gamma(K^0_S\rho^0)/\Gamma(K^0_S\pi^+\pi^-)$ — Γ_{32}/Γ_{31}

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

VALUE	DOCUMENT ID		TECN	COMMENT
$0.259^{+0.014}_{-0.023}$ OUR AVERAGE Error includes scale factor of 1.1.				
$0.264\pm0.009^{+0.010}_{-0.026}$	MURAMATSU	02	CLE2	Dalitz fit, 5299 evts
$0.350\pm0.028\pm0.067$	FRABETTI	94G	E687	γ Be, $\overline{E}_\gamma\approx 220$ GeV
$0.227\pm0.032\pm0.009$	ALBRECHT	93D	ARG	$e^+e^-\approx 10$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.267\pm0.011^{+0.009}_{-0.028}$	ASNER	04A	CLEO	See MURAMATSU 02
$0.215\pm0.051\pm0.037$	ANJOS	93	E691	γ Be 90–260 GeV
$0.20\pm0.06\pm0.03$	FRABETTI	92B	E687	γ Be, $\overline{E}_\gamma= 221$ GeV
$0.12\pm0.01\pm0.07$	ADLER	87	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^0_S\omega, \omega\to\pi^+\pi^-)/\Gamma(K^0_S\pi^+\pi^-)$ — Γ_{33}/Γ_{31}

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

VALUE	DOCUMENT ID		TECN	COMMENT
$0.0072\pm0.0018^{+0.0010}_{-0.0009}$	MURAMATSU	02	CLE2	Dalitz fit, 5299 evts
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.0081\pm0.0019^{+0.0018}_{-0.0010}$	ASNER	04A	CLEO	See MURAMATSU 02

$\Gamma(K^0_S f_0(980), f_0(980)\to\pi^+\pi^-)/\Gamma(K^0_S\pi^+\pi^-)$ — Γ_{34}/Γ_{31}

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

VALUE	DOCUMENT ID		TECN	COMMENT
$0.047^{+0.010}_{-0.007}$ OUR AVERAGE				
$0.043\pm0.005^{+0.012}_{-0.006}$	MURAMATSU	02	CLE2	Dalitz fit, 5299 evts
$0.068\pm0.016\pm0.018$	FRABETTI	94G	E687	γ Be, $\overline{E}_\gamma\approx 220$ GeV
$0.046\pm0.018\pm0.006$	ALBRECHT	93D	ARG	$e^+e^-\approx 10$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.042\pm0.005^{+0.011}_{-0.005}$	ASNER	04A	CLEO	See MURAMATSU 02

$\Gamma(K^0_S f_2(1270), f_2(1270)\to\pi^+\pi^-)/\Gamma(K^0_S\pi^+\pi^-)$ — Γ_{35}/Γ_{31}

This is the "fit fraction" from the Dalitz-plot analysis. Note the large difference between the CLEO results and earlier measurements.

VALUE	DOCUMENT ID		TECN	COMMENT
$0.0045^{+0.0039}_{-0.0022}$ OUR AVERAGE				
$0.0027\pm0.0015^{+0.0037}_{-0.0017}$	MURAMATSU	02	CLE2	Dalitz fit, 5299 evts
$0.037\pm0.014\pm0.017$	FRABETTI	94G	E687	γ Be, $\overline{E}_\gamma\approx 220$ GeV
$0.050\pm0.021\pm0.008$	ALBRECHT	93D	ARG	$e^+e^-\approx 10$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.0036\pm0.0022^{+0.0032}_{-0.0019}$	ASNER	04A	CLEO	See MURAMATSU 02

$\Gamma\big(K^0_S f_0(1370), f_0(1370) \to \pi^+\pi^-\big)/\Gamma\big(K^0_S \pi^+\pi^-\big)$ — Γ_{36}/Γ_{31}

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

VALUE	DOCUMENT ID		TECN	COMMENT
$0.085^{+0.019}_{-0.021}$ OUR AVERAGE				
$0.099 \pm 0.011 {}^{+0.028}_{-0.044}$	MURAMATSU	02	CLE2	Dalitz fit, 5299 evts
$0.077 \pm 0.022 \pm 0.031$	FRABETTI	94G	E687	γBe, $\overline{E}_\gamma \approx 220$ GeV
$0.082 \pm 0.028 \pm 0.013$	ALBRECHT	93D	ARG	$e^+e^- \approx 10$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.098 \pm 0.014 {}^{+0.026}_{-0.036}$	ASNER	04A	CLEO	See MURAMATSU 02

$\Gamma\big(K^*(892)^-\pi^+, K^*(892)^- \to K^0_S \pi^-\big)/\Gamma\big(K^0_S \pi^+\pi^-\big)$ — Γ_{37}/Γ_{31}

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

VALUE	DOCUMENT ID		TECN	COMMENT
$0.660^{+0.019}_{-0.026}$ OUR AVERAGE				
$0.657 \pm 0.013 {}^{+0.018}_{-0.040}$	MURAMATSU	02	CLE2	Dalitz fit, 5299 evts
$0.625 \pm 0.036 \pm 0.026$	FRABETTI	94G	E687	γBe, $\overline{E}_\gamma \approx 220$ GeV
$0.718 \pm 0.042 \pm 0.030$	ALBRECHT	93D	ARG	$e^+e^- \approx 10$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.663 \pm 0.013 {}^{+0.024}_{-0.043}$	ASNER	04A	CLEO	See MURAMATSU 02
0.480 ± 0.097	ANJOS	93	E691	γBe 90–260 GeV
$0.56 \pm 0.04 \pm 0.05$	ADLER	87	MRK3	e^+e^- 3.77 GeV

$\Gamma\big(K^*(892)^+\pi^-, K^*(892)^+ \to K^0_S \pi^+\big)/\Gamma\big(K^0_S \pi^+\pi^-\big)$ — Γ_{190}/Γ_{31}

This is the "fit fraction" from the Dalitz-plot analysis. This is a doubly Cabibbo-suppressed mode.

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
$3.4 \pm 1.3 {}^{+4.1}_{-0.4}$	MURAMATSU	02	CLE2	Dalitz fit, 5299 evts
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$3.4 \pm 1.3 {}^{+3.6}_{-0.5}$	ASNER	04A	CLEO	See MURAMATSU 02

$\Gamma\big(K^*_0(1430)^-\pi^+, K^*_0(1430)^- \to K^0_S \pi^-\big)/\Gamma\big(K^0_S \pi^+\pi^-\big)$ — Γ_{39}/Γ_{31}

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

VALUE	DOCUMENT ID		TECN	COMMENT
$0.096^{+0.021}_{-0.012}$ OUR AVERAGE				
$0.073 \pm 0.007 {}^{+0.031}_{-0.011}$	MURAMATSU	02	CLE2	Dalitz fit, 5299 evts
$0.109 \pm 0.027 \pm 0.029$	FRABETTI	94G	E687	γBe, $\overline{E}_\gamma \approx 220$ GeV
$0.129 \pm 0.034 \pm 0.021$	ALBRECHT	93D	ARG	$e^+e^- \approx 10$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.072 \pm 0.007 {}^{+0.014}_{-0.013}$	ASNER	04A	CLEO	See MURAMATSU 02

$\Gamma\big(K_2^*(1430)^-\pi^+,\ K_2^*(1430)^- \to K_S^0\pi^-\big)/\Gamma\big(K_S^0\pi^+\pi^-\big)$ Γ_{40}/Γ_{31}

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

VALUE	DOCUMENT ID	TECN	COMMENT
$0.011\pm0.002^{+0.007}_{-0.003}$	MURAMATSU 02	CLE2	Dalitz fit, 5299 evts
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.011\pm0.002^{+0.005}_{-0.003}$	ASNER 04A	CLEO	See MURAMATSU 02

$\Gamma\big(K^*(1680)^-\pi^+,\ K^*(1680)^- \to K_S^0\pi^-\big)/\Gamma\big(K_S^0\pi^+\pi^-\big)$ Γ_{41}/Γ_{31}

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

VALUE	DOCUMENT ID	TECN	COMMENT
$0.022\pm0.004^{+0.018}_{-0.015}$	MURAMATSU 02	CLE2	Dalitz fit, 5299 evts
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.023\pm0.005^{+0.007}_{-0.014}$	ASNER 04A	CLEO	See MURAMATSU 02

$\Gamma\big(K_S^0\pi^+\pi^-\ \text{nonresonant}\big)/\Gamma\big(K_S^0\pi^+\pi^-\big)$ Γ_{42}/Γ_{31}

This is the "fit fraction" from the Dalitz-plot analysis. Neither FRABETTI 94G nor ALBRECHT 93D (quoted in many of the earlier submodes of $K_S^0\pi^+\pi^-$) sees evidence for a nonresonant component.

VALUE	DOCUMENT ID	TECN	COMMENT
$0.009\pm0.004^{+0.020}_{-0.004}$	MURAMATSU 02	CLE2	Dalitz fit, 5299 evts
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.007\pm0.007^{+0.021}_{-0.006}$	ASNER 04A	CLEO	See MURAMATSU 02
$0.263\pm0.024\pm0.041$	ANJOS 93	E691	γ Be 90–260 GeV
$0.26\pm0.08\pm0.05$	FRABETTI 92B	E687	γ Be, $\overline{E}_\gamma$= 221 GeV
$0.33\pm0.05\pm0.10$	ADLER 87	MRK3	e^+e^- 3.77 GeV

$\Gamma\big(K^-\pi^+\pi^0\big)/\Gamma_{\text{total}}$ Γ_{43}/Γ

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.141 ± 0.005 OUR FIT	Error includes scale factor of 1.2.			
$0.149\pm0.003\pm0.005$	19k $\pm$150	[59] HE 05	CLEO	e^+e^- at $\psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.133\pm0.012\pm0.013$	931	ADLER 88C	MRK3	e^+e^- 3.77 GeV
0.117 ± 0.043	37	[60] SCHINDLER 81	MRK2	e^+e^- 3.771 GeV

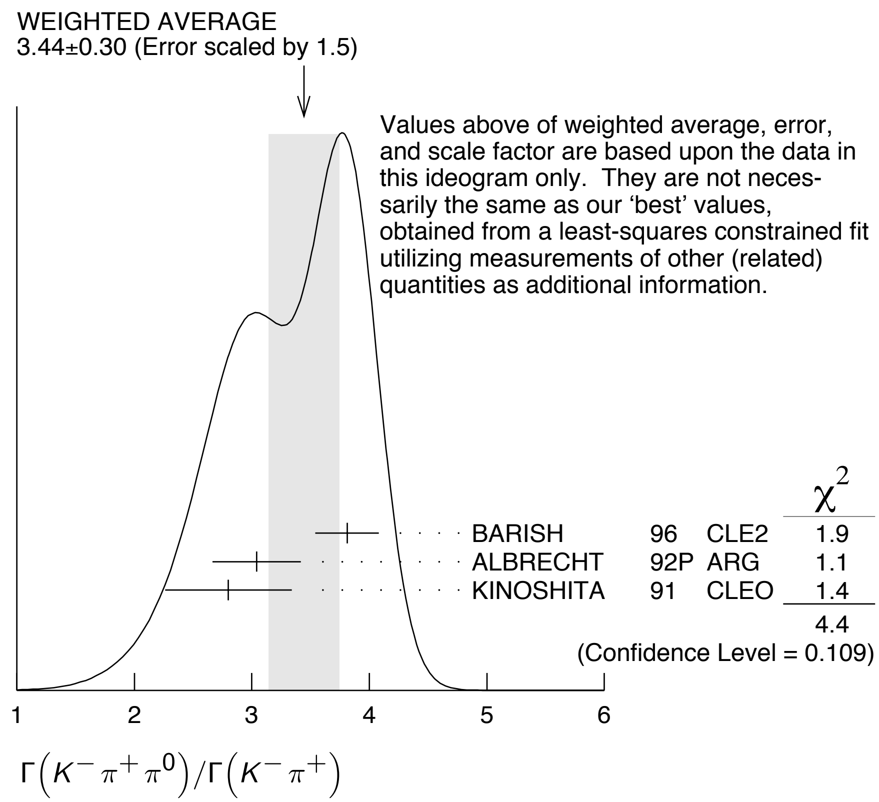
[59] HE 05 uses single- and double-tagged events in an overall fit. The fraction here includes (unobserved) final-state photons.

[60] SCHINDLER 81 (MARK-2) measures $\sigma(e^+e^- \to \psi(3770)) \times$ branching fraction to be 0.68 ± 0.23 nb. We use the MARK-3 (ADLER 88C) value of $\sigma = 5.8 \pm 0.5 \pm 0.6$ nb.

$\Gamma(K^-\pi^+\pi^0)/\Gamma(K^-\pi^+)$ — Γ_{43}/Γ_{29}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
3.71±0.14 OUR FIT	Error includes scale factor of 1.4.				
3.44±0.30 OUR AVERAGE	Error includes scale factor of 1.5. See the ideogram below.				
3.81±0.07±0.26	10k	BARISH	96	CLE2	$e^+e^- \approx \Upsilon(4S)$
3.04±0.16±0.34	931	[61] ALBRECHT	92P	ARG	$e^+e^- \approx$ 10 GeV
2.8 ±0.14±0.52	1050	KINOSHITA	91	CLEO	$e^+e^- \sim$ 10.7 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
4.0 ±0.9 ±1.0	69	ALVAREZ	91B	NA14	Photoproduction
4.2 ±1.4	41	SUMMERS	84	E691	Photoproduction

[61] This value is calculated from numbers in Table 1 of ALBRECHT 92P.



$\Gamma(K^-\rho^+)/\Gamma(K^-\pi^+\pi^0)$ — Γ_{44}/Γ_{43}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.78 ±0.04 OUR AVERAGE				
0.788±0.019±0.048	KOPP	01	CLE2	$e^+e^- \approx$ 10.6 GeV
0.765±0.041±0.054	FRABETTI	94G	E687	γBe, $\overline{E}_\gamma \approx$ 220 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.647±0.039±0.150	ANJOS	93	E691	γBe 90–260 GeV
0.81 ±0.03 ±0.06	ADLER	87	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^-\rho(1700)^+, \rho(1700)^+ \to \pi^+\pi^0)/\Gamma(K^-\pi^+\pi^0)$ — Γ_{45}/Γ_{43}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.057±0.008±0.009	KOPP	01	CLE2	$e^+e^- \approx$ 10.6 GeV

$\Gamma\big(K^*(892)^-\pi^+, K^*(892)^- \to K^-\pi^0\big)/\Gamma\big(K^-\pi^+\pi^0\big)$ — Γ_{46}/Γ_{43}

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

VALUE	DOCUMENT ID		TECN	COMMENT
$0.160^{+0.025}_{-0.013}$ OUR AVERAGE				
$0.161\pm0.007^{+0.027}_{-0.011}$	KOPP	01	CLE2	$e^+e^- \approx$ 10.6 GeV
$0.148\pm0.028\pm0.049$	FRABETTI	94G	E687	γBe, $\overline{E}_\gamma \approx$ 220 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.084\pm0.011\pm0.012$	ANJOS	93	E691	γBe 90–260 GeV
$0.12\pm0.02\pm0.03$	ADLER	87	MRK3	e^+e^- 3.77 GeV

$\Gamma\big(\overline{K}^*(892)^0\pi^0, \overline{K}^*(892)^0 \to K^-\pi^+\big)/\Gamma\big(K^-\pi^+\pi^0\big)$ — Γ_{47}/Γ_{43}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.135 ± 0.016 OUR AVERAGE				
$0.127\pm0.009\pm0.016$	KOPP	01	CLE2	$e^+e^- \approx$ 10.6 GeV
$0.165\pm0.031\pm0.015$	FRABETTI	94G	E687	γBe, $\overline{E}_\gamma \approx$ 220 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.142\pm0.018\pm0.024$	ANJOS	93	E691	γBe 90–260 GeV
$0.13\pm0.02\pm0.03$	ADLER	87	MRK3	e^+e^- 3.77 GeV

$\Gamma\big(K_0^*(1430)^-\pi^+, K_0^*(1430)^- \to K^-\pi^0\big)/\Gamma\big(K^-\pi^+\pi^0\big)$ — Γ_{48}/Γ_{43}

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

VALUE	DOCUMENT ID		TECN	COMMENT
$0.033\pm0.006\pm0.014$	KOPP	01	CLE2	$e^+e^- \approx$ 10.6 GeV

$\Gamma\big(\overline{K}_0^*(1430)^0\pi^0, \overline{K}_0^*(1430)^0 \to K^-\pi^+\big)/\Gamma\big(K^-\pi^+\pi^0\big)$ — Γ_{49}/Γ_{43}

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

VALUE	DOCUMENT ID		TECN	COMMENT
$0.041\pm0.006^{+0.032}_{-0.009}$	KOPP	01	CLE2	$e^+e^- \approx$ 10.6 GeV

$\Gamma\big(K^*(1680)^-\pi^+, K^*(1680)^- \to K^-\pi^0\big)/\Gamma\big(K^-\pi^+\pi^0\big)$ — Γ_{50}/Γ_{43}

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

VALUE	DOCUMENT ID		TECN	COMMENT
$0.013\pm0.003\pm0.004$	KOPP	01	CLE2	$e^+e^- \approx$ 10.6 GeV

$\Gamma\big(K^-\pi^+\pi^0$ nonresonant$\big)/\Gamma\big(K^-\pi^+\pi^0\big)$ — Γ_{51}/Γ_{43}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.080^{+0.038}_{-0.014}$ OUR AVERAGE					
$0.075\pm0.009^{+0.056}_{-0.011}$		KOPP	01	CLE2	$e^+e^- \approx$ 10.6 GeV
$0.101\pm0.033\pm0.040$		FRABETTI	94G	E687	γBe, $\overline{E}_\gamma \approx$ 220 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.036\pm0.004\pm0.018$		ANJOS	93	E691	γBe 90–260 GeV
$0.09\pm0.02\pm0.04$		ADLER	87	MRK3	e^+e^- 3.77 GeV
0.51 ± 0.22	21	SUMMERS	84	E691	Photoproduction

$\Gamma(\overline{K}^*(892)^0\pi^0, \overline{K}^*(892)^0 \to K^0_S\pi^0)/\Gamma(K^0_S\pi^0)$ — Γ_{53}/Γ_{30}

VALUE	DOCUMENT ID		TECN	COMMENT
$0.55^{+0.13}_{-0.10}\pm0.07$	PROCARIO	93B	CLE2	Dalitz plot fit, 122 evts

$\Gamma(K^0_S\pi^0\pi^0$ nonresonant$)/\Gamma(K^0_S\pi^0)$ — Γ_{54}/Γ_{30}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.37±0.08±0.04	76	PROCARIO	93B	CLE2	Dalitz plot fit, 122 evts

$\Gamma(K^-\pi^+\pi^+\pi^-)/\Gamma_{total}$ — Γ_{55}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
7.72±0.28 OUR FIT Error includes scale factor of 1.3.					
8.0 ±0.4 OUR AVERAGE Error includes scale factor of 1.3. See the ideogram below.					
8.3 ±0.2 ±0.3	15k ±130	[62] HE	05	CLEO	e^+e^- at $\psi(3770)$
7.9 ±1.5 ±0.9		[63] ALBRECHT	94	ARG	$e^+e^- \approx \Upsilon(4S)$
6.80±0.27±0.57	1430 ± 52	[64] ALBRECHT	94F	ARG	$e^+e^- \approx \Upsilon(4S)$
9.1 ±0.8 ±0.8	992	ADLER	88C	MRK3	e^+e^- 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
11.7 ±2.5	185	[65] SCHINDLER	81	MRK2	e^+e^- 3.771 GeV
6.2 ±1.9	44	[66] PERUZZI	77	MRK1	e^+e^- 3.77 GeV

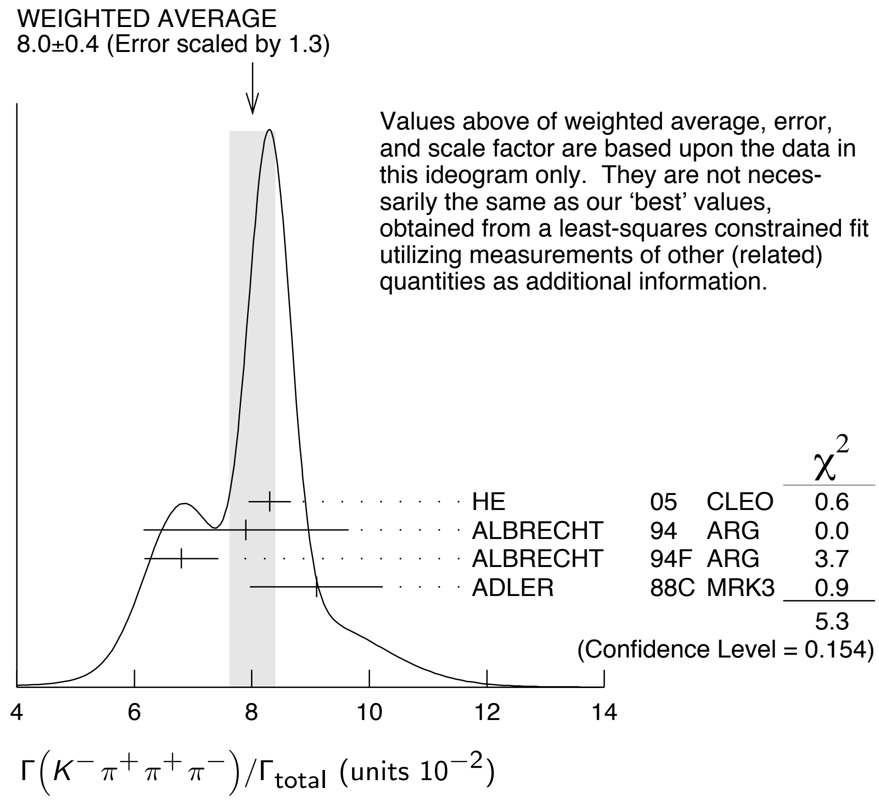
[62] HE 05 uses single- and double-tagged events in an overall fit. The fraction here includes (unobserved) final-state photons.

[63] ALBRECHT 94 uses D^0 mesons from $\overline{B}^0 \to D^{*+}\ell^-\overline{\nu}_\ell$ decays. This is a different set of events than used by ALBRECHT 94F.

[64] See the footnote on the ALBRECHT 94F measurement of $\Gamma(K^-\pi^+)/\Gamma_{total}$ for the method used.

[65] SCHINDLER 81 (MARK-2) measures $\sigma(e^+e^- \to \psi(3770)) \times$ branching fraction to be 0.68 ± 0.11 nb. We use the MARK-3 (ADLER 88C) value of $\sigma = 5.8 \pm 0.5 \pm 0.6$ nb.

[66] PERUZZI 77 (MARK-1) measures $\sigma(e^+e^- \to \psi(3770)) \times$ branching fraction to be 0.36 ± 0.10 nb. We use the MARK-3 (ADLER 88C) value of $\sigma = 5.8 \pm 0.5 \pm 0.6$ nb.



$\Gamma(K^-\pi^+\pi^+\pi^-)/\Gamma(K^-\pi^+)$ $\quad\Gamma_{55}/\Gamma_{29}$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
2.03±0.07 OUR FIT Error includes scale factor of 1.5.					
1.97±0.09 OUR AVERAGE					
$1.94\pm0.07^{+0.09}_{-0.11}$		JUN	00	SELX	Σ^- nucleus, 600 GeV
$1.7\ \pm0.2\ \pm0.2$	1745	ANJOS	92C	E691	γ Be 90–260 GeV
$1.90\pm0.25\pm0.20$	337	ALVAREZ	91B	NA14	Photoproduction
$2.12\pm0.16\pm0.09$		BORTOLETTO	88	CLEO	e^+e^- 10.55 GeV
$2.17\pm0.28\pm0.23$		ALBRECHT	85F	ARG	e^+e^- 10 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$2.0\ \pm0.9$	48	BAILEY	86	ACCM	π^- Be fixed target
$2.0\ \pm1.0$	10	BAILEY	83B	SPEC	π^- Be $\to D^0$
$2.2\ \pm0.8$	214	PICCOLO	77	MRK1	e^+e^- 4.03, 4.41 GeV

$\Gamma(K^-\pi^+\rho^0\text{total})/\Gamma(K^-\pi^+\pi^+\pi^-)$ $\quad\Gamma_{56}/\Gamma_{55}$

This includes $K^- a_1(1260)^+$, $\overline{K}^*(892)^0\rho^0$, etc. The next entry gives the specifically 3-body fraction. We rely on the MARK III and E691 full amplitude analyses of the $K^-\pi^+\pi^+\pi^-$ channel for values of the resonant substructure.

VALUE	DOCUMENT ID		TECN	COMMENT
0.835±0.035 OUR AVERAGE				
$0.80\ \pm0.03\ \pm0.05$	ANJOS	92C	E691	γ Be 90–260 GeV
$0.855\pm0.032\pm0.030$	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.98\ \pm0.12\ \pm0.10$	ALVAREZ	91B	NA14	Photoproduction

$\Gamma(K^- \pi^+ \rho^0 \text{ 3-body})/\Gamma(K^- \pi^+ \pi^+ \pi^-)$ — Γ_{57}/Γ_{55}

We rely on the MARK III and E691 full amplitude analyses of the $K^- \pi^+ \pi^+ \pi^-$ channel for values of the resonant substructure.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.063±0.028 OUR AVERAGE					
0.05 ±0.03 ±0.02		ANJOS	92C	E691	γ Be 90–260 GeV
0.084±0.022±0.04		COFFMAN	92B	MRK3	$e^+ e^-$ 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.77 ±0.06 ±0.06		[67] ALVAREZ	91B	NA14	Photoproduction
0.85 $^{+0.11}_{-0.22}$	180	PICCOLO	77	MRK1	$e^+ e^-$ 4.03, 4.41 GeV

[67] This value is for ρ^0 $(K^- \pi^+)$-nonresonant. ALVAREZ 91B cannot determine what fraction of this is $K^- a_1(1260)^+$.

$\Gamma(\overline{K}^*(892)^0 \rho^0)/\Gamma(K^- \pi^+ \pi^+ \pi^-)$ — Γ_{94}/Γ_{55}

Unseen decay modes of the $\overline{K}^*(892)^0$ are included. We rely on the MARK III and E691 full amplitude analyses of the $K^- \pi^+ \pi^+ \pi^-$ channel for values of the resonant substructure.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.195±0.03±0.03		ANJOS	92C	E691	γ Be 90–260 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.34 ±0.09±0.09		ALVAREZ	91B	NA14	Photoproduction
0.75 ±0.3	5	BAILEY	83B	SPEC	π Be $\rightarrow$ D^0
0.15 $^{+0.16}_{-0.15}$	20	PICCOLO	77	MRK1	$e^+ e^-$ 4.03, 4.41 GeV

$\Gamma(\overline{K}^*(892)^0 \rho^0 \text{ transverse})/\Gamma(K^- \pi^+ \pi^+ \pi^-)$ — Γ_{95}/Γ_{55}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.20 ±0.07 OUR FIT				
0.213±0.024±0.075	COFFMAN	92B	MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\overline{K}^*(892)^0 \rho^0 \text{ S-wave})/\Gamma(K^- \pi^+ \pi^+ \pi^-)$ — Γ_{96}/Γ_{55}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.375±0.045±0.06	ANJOS	92C	E691	γ Be 90–260 GeV

$\Gamma(\overline{K}^*(892)^0 \rho^0 \text{ S-wave long.})/\Gamma_{\text{total}}$ — Γ_{97}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.003	90	COFFMAN	92B	MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\overline{K}^*(892)^0 \rho^0 \text{ P-wave})/\Gamma_{\text{total}}$ — Γ_{98}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.003	90	COFFMAN	92B	MRK3	$e^+ e^-$ 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.009	90	ANJOS	92C	E691	γ Be 90–260 GeV

$\Gamma(\overline{K}^*(892)^0 \rho^0 \; D\text{-wave})/\Gamma(K^- \pi^+ \pi^+ \pi^-)$ — Γ_{99}/Γ_{55}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.255±0.045±0.06	ANJOS	92C	E691	γ Be 90–260 GeV

$\Gamma(K^- \pi^+ f_0(980))/\Gamma_{total}$ — Γ_{104}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.011	90	ANJOS	92C	E691	γ Be 90–260 GeV

$\Gamma(\overline{K}^*(892)^0 f_0(980))/\Gamma_{total}$ — Γ_{105}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.007	90	ANJOS	92C	E691	γ Be 90–260 GeV

$\Gamma(K^- a_1(1260)^+)/\Gamma(K^- \pi^+ \pi^+ \pi^-)$ — Γ_{89}/Γ_{55}

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
0.97 ±0.14 OUR AVERAGE				
0.94 ±0.13 ±0.20	ANJOS	92C	E691	γ Be 90–260 GeV
0.984±0.048±0.16	COFFMAN	92B	MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(K^- a_2(1320)^+)/\Gamma_{total}$ — Γ_{91}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.002	90	ANJOS	92C	E691	γ Be 90–260 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.006	90	COFFMAN	92B	MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(K_1(1270)^- \pi^+)/\Gamma(K^- \pi^+ \pi^+ \pi^-)$ — Γ_{106}/Γ_{55}

Unseen decay modes of the $K_1(1270)^-$ are included. The MARK3 and E691 experiments disagree considerably here.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
0.15 ±0.04 OUR FIT					
0.194±0.056±0.088		COFFMAN	92B	MRK3	$e^+ e^-$ 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.013	90	ANJOS	92C	E691	γ Be 90–260 GeV

$\Gamma(K_1(1400)^- \pi^+)/\Gamma_{total}$ — Γ_{107}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.012	90	COFFMAN	92B	MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(K^*(1410)^- \pi^+)/\Gamma_{total}$ — Γ_{109}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.012	90	COFFMAN	92B	MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\overline{K}^*(892)^0\pi^+\pi^-\text{total})/\Gamma(K^-\pi^+\pi^+\pi^-)$ — Γ_{92}/Γ_{55}

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

VALUE	DOCUMENT ID	TECN	COMMENT
0.30±0.06±0.03	ANJOS 92C	E691	γBe 90–260 GeV

$\Gamma(\overline{K}^*(892)^0\pi^+\pi^-\text{3-body})/\Gamma(K^-\pi^+\pi^+\pi^-)$ — Γ_{93}/Γ_{55}

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

VALUE	DOCUMENT ID	TECN	COMMENT
0.19 ±0.04 OUR FIT			
0.18 ±0.04 OUR AVERAGE			
0.165±0.03 ±0.045	ANJOS 92C	E691	γBe 90–260 GeV
0.210±0.027±0.06	COFFMAN 92B	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^-\pi^+\pi^+\pi^-\text{nonresonant})/\Gamma(K^-\pi^+\pi^+\pi^-)$ — Γ_{63}/Γ_{55}

VALUE	DOCUMENT ID	TECN	COMMENT
0.233±0.032 OUR AVERAGE			
0.23 ±0.02 ±0.03	ANJOS 92C	E691	γBe 90–260 GeV
0.242±0.025±0.06	COFFMAN 92B	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^0_S\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$ — Γ_{64}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
5.3±0.6 OUR FIT				
5.2±1.1±1.2	140	COFFMAN 92B	MRK3	e^+e^- 3.77 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$6.7^{+1.6}_{-1.7}$		[68] BARLAG 92C	ACCM	π^- Cu 230 GeV

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

$\Gamma(K^0_S\pi^+\pi^-\pi^0)/\Gamma(K^0_S\pi^+\pi^-)$ — Γ_{64}/Γ_{31}

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
1.83±0.20 OUR FIT				
1.86±0.23 OUR AVERAGE				
1.80±0.20±0.21	190	[69] ALBRECHT 92P	ARG	$e^+e^- \approx$ 10 GeV
2.8 ±0.8 ±0.8	46	ANJOS 92C	E691	γBe 90–260 GeV
1.85±0.26±0.30	158	KINOSHITA 91	CLEO	$e^+e^- \sim$ 10.7 GeV

[69] This value is calculated from numbers in Table 1 of ALBRECHT 92P.

$\Gamma(K^0_S\eta)/\Gamma(K^0_S\pi^0)$ — Γ_{86}/Γ_{30}

Unseen decay modes of the η are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.33±0.04 OUR FIT				
0.32±0.04±0.03	225 ± 30	PROCARIO 93B	CLE2	$\eta \to \gamma\gamma$

$\Gamma(K^0_S\eta)/\Gamma(K^0_S\pi^+\pi^-)$ — Γ_{86}/Γ_{31}

Unseen decay modes of the η are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.131±0.018 OUR FIT				
0.14 ±0.02 ±0.02	80 ± 12	PROCARIO 93B	CLE2	$\eta \to \pi^+\pi^-\pi^0$

$\Gamma(K^0_S\omega)/\Gamma(K^-\pi^+)$ — Γ_{87}/Γ_{29}

Unseen decay modes of the ω are included.

VALUE	DOCUMENT ID		TECN	COMMENT
0.29±0.05 OUR FIT				
0.50±0.18±0.10	ALBRECHT	89D	ARG	e^+e^- 10 GeV

$\Gamma(K^0_S\omega)/\Gamma(K^0_S\pi^+\pi^-)$ — Γ_{87}/Γ_{31}

Unseen decay modes of the ω are included.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.38±0.07 OUR FIT					
0.33±0.09 OUR AVERAGE Error includes scale factor of 1.1.					
0.29±0.08±0.05	16	[70] ALBRECHT	92P	ARG	$e^+e^- \approx$ 10 GeV
0.54±0.14±0.16	40	KINOSHITA	91	CLEO	$e^+e^- \sim$ 10.7 GeV

[70] This value is calculated from numbers in Table 1 of ALBRECHT 92P.

$\Gamma(K^0_S\omega)/\Gamma(K^0_S\pi^+\pi^-\pi^0)$ — Γ_{87}/Γ_{64}

Unseen decay modes of the ω are included.

VALUE	DOCUMENT ID		TECN	COMMENT
0.21 ±0.04 OUR FIT				
0.220±0.048±0.0116	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^0_S\eta'(958))/\Gamma(K^0_S\pi^+\pi^-)$ — Γ_{88}/Γ_{31}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.32±0.04 OUR AVERAGE					
0.31±0.02±0.04	594	PROCARIO	93B	CLE2	$\eta' \to \eta\pi^+\pi^-$, $\rho^0\gamma$
0.37±0.13±0.06	18	[71] ALBRECHT	92P	ARG	$e^+e^- \approx$ 10 GeV

[71] This value is calculated from numbers in Table 1 of ALBRECHT 92P.

$\Gamma(K^*(892)^-\rho^+)/\Gamma(K^0_S\pi^+\pi^-\pi^0)$ — Γ_{100}/Γ_{64}

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

VALUE	DOCUMENT ID		TECN	COMMENT
1.212±0.376±0.252	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^*(892)^-\rho^+ \text{ longitudinal})/\Gamma(K^0_S\pi^+\pi^-\pi^0)$ — Γ_{101}/Γ_{64}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.580±0.222	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^*(892)^-\rho^+ \text{ transverse})/\Gamma(K^0_S\pi^+\pi^-\pi^0)$ — Γ_{102}/Γ_{64}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.634±0.360	COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

$\Gamma(K^*(892)^-\rho^+ \text{ P-wave})/\Gamma_{total}$ — Γ_{103}/Γ

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.015	90	[72] COFFMAN	92B	MRK3	e^+e^- 3.77 GeV

[72] Obtained using other $\overline{K}^*(892)\rho$ P-wave limits and isospin relations.

$\Gamma(\overline{K}^*(892)^0 \rho^0 \text{transverse})/\Gamma(K^0_S \pi^+ \pi^- \pi^0)$ — Γ_{95}/Γ_{64}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.30 ±0.11 OUR FIT				
0.252±0.222	COFFMAN	92B	MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\overline{K}^0 a_1(1260)^0)/\Gamma_{total}$ — Γ_{90}/Γ

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 $(\pi\pi)_{I=1}$ π].

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.019	90	COFFMAN	92B	MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(K_1(1270)^- \pi^+)/\Gamma(K^0_S \pi^+ \pi^- \pi^0)$ — Γ_{106}/Γ_{64}

Unseen decay modes of the $K_1(1270)^-$ are included.

VALUE	DOCUMENT ID		TECN	COMMENT
0.21±0.06 OUR FIT				
0.20±0.06	COFFMAN	92B	MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\overline{K}_1(1400)^0 \pi^0)/\Gamma_{total}$ — Γ_{108}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.037	90	COFFMAN	92B	MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\overline{K}^*(892)^0 \pi^+ \pi^- \text{3-body})/\Gamma(K^0_S \pi^+ \pi^- \pi^0)$ — Γ_{93}/Γ_{64}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.28 ±0.07 OUR FIT Error includes scale factor of 1.1.				
0.382±0.210	COFFMAN	92B	MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(K^0_S \pi^+ \pi^- \pi^0 \text{nonresonant})/\Gamma(K^0_S \pi^+ \pi^- \pi^0)$ — Γ_{70}/Γ_{64}

VALUE	DOCUMENT ID		TECN	COMMENT
0.210±0.147±0.150	COFFMAN	92B	MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(K^- \pi^+ \pi^0 \pi^0)/\Gamma_{total}$ — Γ_{71}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.177±0.029		[73] BARLAG	92C	ACCM	π^- Cu 230 GeV
0.149±0.037±0.030	24	[74] ADLER	88C	MRK3	$e^+ e^-$ 3.77 GeV
$0.209^{+0.074}_{-0.043}\pm0.012$	9	[73] AGUILAR-...	87F	HYBR	πp, $p p$ 360, 400 GeV

[73] AGUILAR-BENITEZ 87F and BARLAG 92C compute the branching fraction using topological normalization. They do not distinguish the presence of a third π^0, and thus are not included in the average.

[74] ADLER 88C uses an absolute normalization method finding this decay channel opposite a detected $\overline{D}^0 \rightarrow K^+ \pi^-$ in pure $D\overline{D}$ events.

$\Gamma(K^- \pi^+ \pi^+ \pi^- \pi^0)/\Gamma(K^- \pi^+)$ — Γ_{72}/Γ_{29}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.08±0.10 OUR FIT					
0.98±0.11±0.11	225	[75] ALBRECHT	92P	ARG	$e^+ e^- \approx$ 10 GeV

[75] This value is calculated from numbers in Table 1 of ALBRECHT 92P.

$\Gamma(K^-\pi^+\pi^+\pi^-\pi^0)/\Gamma(K^-\pi^+\pi^+\pi^-)$ — Γ_{72}/Γ_{55}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.53±0.05 OUR FIT					
0.56±0.07 OUR AVERAGE					
$0.55\pm0.07^{+0.12}_{-0.09}$	167	KINOSHITA	91	CLEO	$e^+e^- \sim 10.7$ GeV
0.57±0.06±0.05	180	ANJOS	90D	E691	Photoproduction

$\Gamma(\overline{K}^*(892)^0\pi^+\pi^-\pi^0)/\Gamma(K^-\pi^+\pi^+\pi^-\pi^0)$ — Γ_{110}/Γ_{72}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.45±0.15±0.15	ANJOS	90D	E691	Photoproduction

$\Gamma(\overline{K}^*(892)^0\eta)/\Gamma(K^-\pi^+)$ — Γ_{111}/Γ_{29}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.58\pm0.19^{+0.24}_{-0.28}$	46	KINOSHITA	91	CLEO	$e^+e^- \sim 10.7$ GeV

$\Gamma(\overline{K}^*(892)^0\eta)/\Gamma(K^-\pi^+\pi^0)$ — Γ_{111}/Γ_{43}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.13±0.02±0.03	214	PROCARIO	93B	CLE2	$\overline{K}^{*0}\eta \to K^-\pi^+/\gamma\gamma$

$\Gamma(K^0_S\eta\pi^0)/\Gamma(K^0_S\pi^0)$ — Γ_{76}/Γ_{30}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.46±0.07±0.06	155 ± 22	[76] RUBIN	04	CLEO	$e^+e^- \approx 10$ GeV

[76] The η here is detected in its $\gamma\gamma$ mode, but other η modes are included in the value given.

$\Gamma(K^0_S a_0(980),\ a_0(980)\to\eta\pi^0)/\Gamma(K^0_S\eta\pi^0)$ — Γ_{77}/Γ_{76}

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

VALUE	DOCUMENT ID		TECN	COMMENT
1.19±0.09±0.26	[77] RUBIN	04	CLEO	Dalitz fit, 155 evts

[77] In addition to $K^0_S a_0(980)$ and $\overline{K}^*(892)^0\eta$ modes, RUBIN 04 finds a fit fraction of 0.246 ± 0.092 ± 0.091 for other, undetermined modes.

$\Gamma(\overline{K}^*(892)^0\eta,\ \overline{K}^*(892)^0\to K^0_S\pi^0)/\Gamma(K^0_S\eta\pi^0)$ — Γ_{78}/Γ_{76}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.293±0.062±0.035	[78] RUBIN	04	CLEO	Dalitz fit, 155 evts

[78] See the note on RUBIN 04 in the preceding data block.

$\Gamma(K^-\pi^+\omega)/\Gamma(K^-\pi^+)$ — Γ_{112}/Γ_{29}

Unseen decay modes of the ω are included.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.78±0.12±0.10	99	[79] ALBRECHT	92P	ARG	$e^+e^- \approx 10$ GeV

[79] This value is calculated from numbers in Table 1 of ALBRECHT 92P.

$\Gamma(\overline{K}^*(892)^0 \omega)/\Gamma(K^- \pi^+)$ — Γ_{113}/Γ_{29}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.28±0.11±0.04	17	[80] ALBRECHT	92P	ARG	$e^+ e^- \approx$ 10 GeV

[80] This value is calculated from numbers in Table 1 of ALBRECHT 92P.

$\Gamma(K^- \pi^+ \eta'(958))/\Gamma(K^- \pi^+ \pi^+ \pi^-)$ — Γ_{114}/Γ_{55}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.093±0.014±0.019	286	PROCARIO	93B	CLE2	$\eta' \rightarrow \eta \pi^+ \pi^-$, $\rho^0 \gamma$

$\Gamma(\overline{K}^*(892)^0 \eta'(958))/\Gamma(K^- \pi^+ \eta'(958))$ — $\Gamma_{115}/\Gamma_{114}$

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

VALUE	CL%	DOCUMENT ID		TECN
<0.15	90	PROCARIO	93B	CLE2

$\Gamma(K^0_S 2\pi^+ 2\pi^-)/\Gamma(K^0_S \pi^+ \pi^-)$ — Γ_{79}/Γ_{31}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.095±0.005±0.007	1283 ± 57	LINK	04D	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.07 ±0.02 ±0.01	11	[81] ALBRECHT	92P	ARG	$e^+ e^- \approx$ 10 GeV
0.149±0.026	56	AMMAR	91	CLEO	$e^+ e^- \approx$ 10.5 GeV
0.18 ±0.07 ±0.04	6	ANJOS	90D	E691	Photoproduction

[81] This value is calculated from numbers in Table 1 of ALBRECHT 92P.

$\Gamma(K^0_S \rho^0 \pi^+ \pi^-, \text{no}\, K^*(892)^-)/\Gamma(K^0_S 2\pi^+ 2\pi^-)$ — Γ_{80}/Γ_{79}

VALUE	DOCUMENT ID		TECN	COMMENT
0.40±0.24±0.07	LINK	04D	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^*(892)^- \pi^+ \pi^+ \pi^-, K^*(892)^- \rightarrow K^0_S \pi^-, \text{no}\, \rho^0)/\Gamma(K^0_S 2\pi^+ 2\pi^-)$ — Γ_{81}/Γ_{79}

VALUE	DOCUMENT ID		TECN	COMMENT
0.17±0.28±0.02	LINK	04D	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^*(892)^- \rho^0 \pi^+, K^*(892)^- \rightarrow K^0_S \pi^-)/\Gamma(K^0_S 2\pi^+ 2\pi^-)$ — Γ_{82}/Γ_{79}

VALUE	DOCUMENT ID		TECN	COMMENT
0.60±0.21±0.09	LINK	04D	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^0_S 2\pi^+ 2\pi^- \text{nonresonant})/\Gamma(K^0_S 2\pi^+ 2\pi^-)$ — Γ_{83}/Γ_{79}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.46	90	LINK	04D	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^- 3\pi^+ 2\pi^-)/\Gamma(K^- \pi^+ \pi^+ \pi^-)$ — Γ_{85}/Γ_{55}

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
2.70±0.58±0.38	48 ± 10	LINK	04B	FOCS	γA, $\overline{E}_\gamma \approx$ 180 GeV

Hadronic modes with three K's

$\Gamma(K^0_S K^+ K^-)/\Gamma(K^0_S \pi^+ \pi^-)$ — Γ_{116}/Γ_{31}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.158±0.001±0.005	14k±116	AUBERT,B	05J	BABR	$e^+e^- \approx \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.20 ±0.05 ±0.04	47	FRABETTI	92B	E687	γ Be, $\overline{E}_\gamma$= 221 GeV
0.170±0.022	136	AMMAR	91	CLEO	$e^+e^- \approx$ 10.5 GeV
0.24 ±0.08		BEBEK	86	CLEO	e^+e^- near $\Upsilon(4S)$
0.185±0.055	52	ALBRECHT	85B	ARG	e^+e^- 10 GeV

$\Gamma(K^0_S a_0(980)^0, a^0_0 \to K^+ K^-)/\Gamma(K^0_S K^+ K^-)$ — $\Gamma_{117}/\Gamma_{116}$

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.664±0.016±0.070	AUBERT,B	05J	BABR	Dalitz fit, 12540 ± 112 evts

$\Gamma(K^- a_0(980)^+, a^+_0 \to K^+ K^0_S)/\Gamma(K^0_S K^+ K^-)$ — $\Gamma_{118}/\Gamma_{116}$

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.134±0.011±0.037	AUBERT,B	05J	BABR	Dalitz fit, 12540 ± 112 evts

$\Gamma(K^+ a_0(980)^-, a^-_0 \to K^- K^0_S)/\Gamma(K^0_S K^+ K^-)$ — $\Gamma_{119}/\Gamma_{116}$

This is a doubly Cabibbo-suppressed mode.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.025	95	AUBERT,B	05J	BABR	Dalitz fit, 12540 ± 112 evts

$\Gamma(K^0_S f_0(980), f_0 \to K^+ K^-)/\Gamma(K^0_S K^+ K^-)$ — $\Gamma_{120}/\Gamma_{116}$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.021	95	AUBERT,B	05J	BABR	Dalitz fit, 12540 ± 112 evts

$\Gamma(K^0_S \phi, \phi \to K^+ K^-)/\Gamma(K^0_S K^+ K^-)$ — $\Gamma_{121}/\Gamma_{116}$

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.459±0.007±0.007	AUBERT,B	05J	BABR	Dalitz fit, 12540 ± 112 evts

$\Gamma(K^0_S f_0(1400), f_0 \to K^+ K^-)/\Gamma(K^0_S K^+ K^-)$ — $\Gamma_{122}/\Gamma_{116}$

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.038±0.007±0.023	AUBERT,B	05J	BABR	Dalitz fit, 12540 ± 112 evts

$\Gamma(3K^0_S)/\Gamma(K^0_S \pi^+ \pi^-)$ — Γ_{123}/Γ_{31}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
3.2 ±0.4 OUR AVERAGE					
3.58±0.54±0.52	170 ± 26	LINK	05A	FOCS	γBe, $\overline{E}_\gamma \approx$ 180 GeV
2.78±0.38±0.48	61	ASNER	96B	CLE2	$e^+e^- \approx \Upsilon(4S)$
7.0 ±2.4 ±1.2	10 ± 3	FRABETTI	94J	E687	γBe, $\overline{E}_\gamma$=220 GeV
3.2 ±1.0	22	AMMAR	91	CLEO	$e^+e^- \approx$ 10.5 GeV
3.4 ±1.4 ±1.0	5	ALBRECHT	90C	ARG	$e^+e^- \approx$ 10 GeV

$\Gamma(K^+K^-K^-\pi^+)/\Gamma(K^-\pi^+\pi^+\pi^-)$ — Γ_{124}/Γ_{55}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0027 ±0.0004 OUR AVERAGE		Error includes scale factor of 1.1.			
0.00257±0.00034±0.00024	143	LINK	03G	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV
0.0054 ±0.0016 ±0.0008	18	AITALA	01D	E791	π^- A, 500 GeV
0.0028 ±0.0007 ±0.0001	20	FRABETTI	95C	E687	γ Be, $\overline{E}_\gamma \approx$ 200 GeV

$\Gamma(\phi\overline{K}^*(892)^0, \phi\to K^+K^-, \overline{K}^*(892)^0\to K^-\pi^+)/\Gamma(K^+K^-K^-\pi^+)$ — $\Gamma_{127}/\Gamma_{124}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.48±0.06±0.01	LINK	03G	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^-\pi^+\phi, \phi\to K^+K^-)/\Gamma(K^+K^-K^-\pi^+)$ — $\Gamma_{126}/\Gamma_{124}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.18±0.06±0.04	LINK	03G	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^+K^-\overline{K}^*(892)^0, \overline{K}^*(892)^0\to K^-\pi^+)/\Gamma(K^+K^-K^-\pi^+)$ — $\Gamma_{125}/\Gamma_{124}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.20±0.07±0.02	LINK	03G	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^+K^-K^-\pi^+$ nonresonant$)/\Gamma(K^+K^-K^-\pi^+)$ — $\Gamma_{128}/\Gamma_{124}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.15±0.06±0.02	LINK	03G	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^0_S K^0_S K^\pm\pi^\mp)/\Gamma(K^0_S\pi^+\pi^-)$ — Γ_{129}/Γ_{31}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
2.12±0.38±0.20	57 ± 10	LINK	05A	FOCS	γ Be, $\overline{E}_\gamma \approx$ 180 GeV

Pionic modes

$\Gamma(\pi^+\pi^-)/\Gamma(K^-\pi^+)$ — Γ_{130}/Γ_{29}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
3.59 ±0.05 OUR AVERAGE					
3.62 ±0.10 ±0.08	2085 ± 54	RUBIN	06	CLEO	e^+e^- at $\psi(3770)$
3.594±0.054±0.040	7334 ± 97	ACOSTA	05C	CDF	$p\overline{p}$, $\sqrt{s}$ = 1.96 TeV
3.53 ±0.12 ±0.06	3453	LINK	03	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV
3.51 ±0.16 ±0.17	710	CSORNA	02	CLE2	$e^+e^- \approx \Upsilon(4S)$
4.0 ±0.2 ±0.3	2043	AITALA	98C	E791	π^- A, 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3.4 ±0.7 ±0.1	76 ± 15	ABLIKIM	05F	BES	$e^+e^- \approx \psi(3770)$
4.3 ±0.7 ±0.3	177	FRABETTI	94C	E687	γBe $\overline{E}_\gamma$= 220 GeV
3.48 ±0.30 ±0.23	227	SELEN	93	CLE2	$e^+e^- \approx \Upsilon(4S)$
5.5 ±0.8 ±0.5	120	ANJOS	91D	E691	Photoproduction
5.0 ±0.7 ±0.5	110	ALEXANDER	90	CLEO	e^+e^- 10.5–11 GeV

$\Gamma(\pi^0\pi^0)/\Gamma(K^-\pi^+)$ — Γ_{131}/Γ_{29}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
2.07±0.19 OUR AVERAGE					
2.05±0.13±0.16	499 ± 32	RUBIN	06	CLEO	e^+e^- at $\psi(3770)$
2.2 ±0.4 ±0.4	40	SELEN	93	CLE2	$e^+e^- \approx \Upsilon(4S)$

$\Gamma(\pi^+\pi^-\pi^0)/\Gamma(K^-\pi^+)$ — Γ_{132}/Γ_{29}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
34.4±0.5±1.2	11k±164	RUBIN	06	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(\rho^+\pi^-)/\Gamma(\pi^+\pi^-\pi^0)$ — $\Gamma_{133}/\Gamma_{132}$

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.763±0.019±0.025	CRONIN-HEN...	05	CLEO	$e^+e^- \approx$ 10 GeV

$\Gamma(\rho^0\pi^0)/\Gamma(\pi^+\pi^-\pi^0)$ — $\Gamma_{134}/\Gamma_{132}$

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.244±0.020±0.021	CRONIN-HEN...	05	CLEO	$e^+e^- \approx$ 10 GeV

$\Gamma(\rho^-\pi^+)/\Gamma(\pi^+\pi^-\pi^0)$ — $\Gamma_{135}/\Gamma_{132}$

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.345±0.024±0.013	CRONIN-HEN...	05	CLEO	$e^+e^- \approx$ 10 GeV

$\Gamma(f_0(980)\pi^0,\ f_0(980) \to \pi^+\pi^-)/\Gamma(\pi^+\pi^-\pi^0)$ — $\Gamma_{136}/\Gamma_{132}$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.6 × 10^{-4}	95	[82] CRONIN-HEN...	05	CLEO	$e^+e^- \approx$ 10 GeV

[82] The CRONIN-HENNESSY 05 fit here includes, in addition to the three $\rho\pi$ charged states, only the $f_0(980)\pi^0$ mode. See also the next entries for limits obtained in the same way for the $f_0(600)\pi^0$ mode and for an S-wave $\pi^+\pi^-$ parametrized using a K-matrix. Our $\rho\pi$ branching ratios, given above, use the fit with the K-matrix S wave.

$\Gamma(f_0(600)\pi^0,\ f_0(600) \to \pi^+\pi^-)/\Gamma(\pi^+\pi^-\pi^0)$ — $\Gamma_{137}/\Gamma_{132}$

The $f_0(600)$ is the σ.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.1 × 10^{-3}	95	[83] CRONIN-HEN...	05	CLEO	$e^+e^- \approx$ 10 GeV

[83] See the note on CRONIN-HENNESSY 05 in the proceeding data block.

$\Gamma((\pi^+\pi^-)_{S-\text{wave}}\pi^0)/\Gamma(\pi^+\pi^-\pi^0)$ — $\Gamma_{138}/\Gamma_{132}$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.019	95	[84] CRONIN-HEN...	05	CLEO	$e^+e^- \approx$ 10 GeV

[84] See the note on CRONIN-HENNESSY 05 two data blocks up.

$\Gamma(3\pi^0)/\Gamma_{\text{total}}$ — Γ_{139}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.5 × 10^{-4}	90	RUBIN	06	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(2\pi^+2\pi^-)/\Gamma(K^-\pi^+)$ — Γ_{140}/Γ_{29}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
19.2±0.6 OUR FIT					
19.1±0.4±0.6	7331 ± 130	RUBIN	06	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(2\pi^+2\pi^-)/\Gamma(K^-\pi^+\pi^+\pi^-)$ — Γ_{140}/Γ_{55}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.095±0.004 OUR FIT Error includes scale factor of 1.2.					
0.096±0.005 OUR AVERAGE					
0.079±0.018±0.005	162	ABLIKIM	05F	BES	$e^+e^- \approx \psi(3770)$
0.095±0.007±0.002	814	FRABETTI	95C	E687	γBe, $\overline{E}_\gamma \approx 200$ GeV
0.115±0.023±0.016	64	ADAMOVICH	92	OMEG	π^- 340 GeV
0.108±0.024±0.008	79	FRABETTI	92	E687	γBe
0.102±0.013	345	[85] AMMAR	91	CLEO	$e^+e^- \approx 10.5$ GeV
0.096±0.018±0.007	66	ANJOS	91	E691	γBe 80–240 GeV

[85] AMMAR 91 finds 1.25 ± 0.25 ± 0.25 ρ^0's per $\pi^+\pi^+\pi^-\pi^-$ decay, but can't untangle the resonant substructure ($\rho^0\rho^0$, $a_1^\pm\pi^\mp$, $\rho^0\pi^+\pi^-$).

$\Gamma(\pi^+\pi^-2\pi^0)/\Gamma(K^-\pi^+)$ — Γ_{141}/Γ_{29}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
25.8±1.5±1.8	2724 ± 166	RUBIN	06	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(\eta\pi^0)/\Gamma(K^-\pi^+)$ — Γ_{142}/Γ_{29}

Unseen decay modes of the η are included.

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.47±0.34±0.11	62 ± 14	RUBIN	06	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(\omega\pi^0)/\Gamma_{total}$ — Γ_{143}/Γ

Unseen decay modes of the ω are included.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.6\times10^{-4}$	90	RUBIN	06	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(2\pi^+2\pi^-\pi^0)/\Gamma(K^-\pi^+)$ — Γ_{144}/Γ_{29}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
10.7±1.2±0.5	1614 ± 171	RUBIN	06	CLEO	e^+e^- at $\psi(3770)$

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

Unseen decay modes of the η are included.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.9\times10^{-3}$	90	RUBIN	06	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(\omega\pi^+\pi^-)/\Gamma(K^-\pi^+)$ — Γ_{146}/Γ_{29}

Unseen decay modes of the ω are included.

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
4.1±1.2±0.4	472 ± 132	RUBIN	06	CLEO	e^+e^- at $\psi(3770)$

$\Gamma(3\pi^+3\pi^-)/\Gamma(K^-\pi^+\pi^+\pi^-)$ — Γ_{147}/Γ_{55}

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
5.23±0.59±1.35	149 ± 17	LINK	04B	FOCS	γA, $\overline{E}_\gamma \approx 180$ GeV

$\Gamma(3\pi^+ 3\pi^-)/\Gamma(K^- 3\pi^+ 2\pi^-)$ — Γ_{147}/Γ_{85}

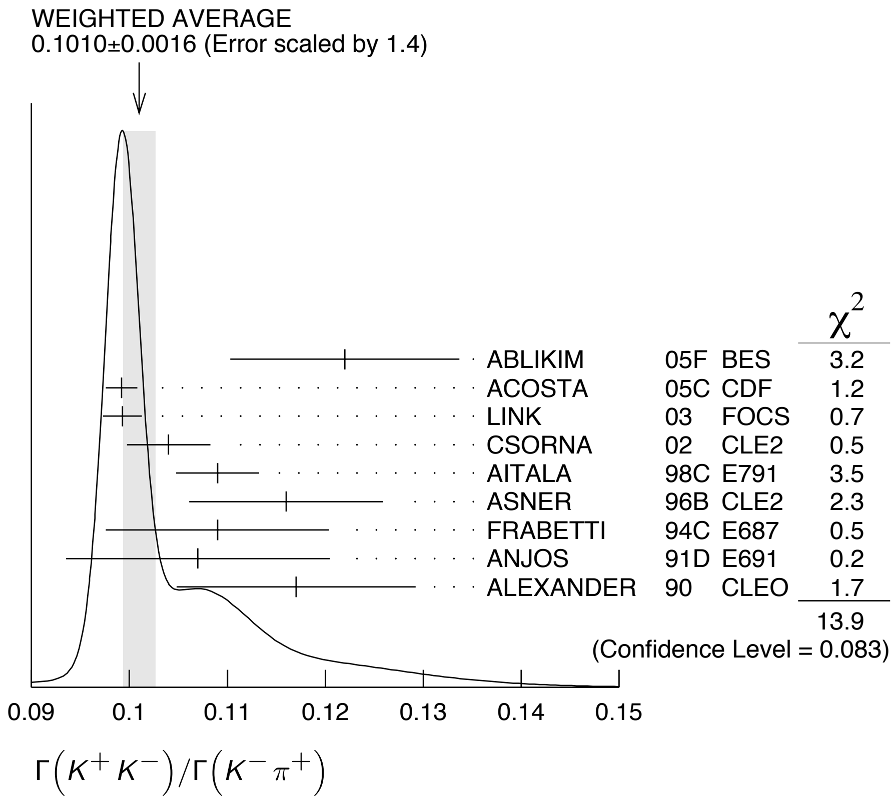
VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.93±047±0.48	[86] LINK	04B	FOCS	γA, $\overline{E}_\gamma \approx$ 180 GeV

[86] This LINK 04B result is not independent of other results in these Listings.

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

$\Gamma(K^+ K^-)/\Gamma(K^- \pi^+)$ — Γ_{148}/Γ_{29}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.1010±0.0016 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below.					
0.122 ±0.011 ±0.004	242 ± 20	ABLIKIM	05F	BES	$e^+ e^- \approx \psi(3770)$
0.0992±0.0011±0.0012	16k±200	ACOSTA	05C	CDF	$p\overline{p}$, $\sqrt{s}$=1.96 TeV
0.0993±0.0014±0.0014	11k	LINK	03	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV
0.1040±0.0033±0.0027	1900	CSORNA	02	CLE2	$e^+ e^- \approx \Upsilon(4S)$
0.109 ±0.003 ±0.003	3317	AITALA	98C	E791	π^- nucleus, 500 GeV
0.116 ±0.007 ±0.007	1102	ASNER	96B	CLE2	$e^+ e^- \approx \Upsilon(4S)$
0.109 ±0.007 ±0.009	581	FRABETTI	94C	E687	γBe $\overline{E}_\gamma$= 220 GeV
0.107 ±0.010 ±0.009	193	ANJOS	91D	E691	Photoproduction
0.117 ±0.010 ±0.007	249	ALEXANDER	90	CLEO	$e^+ e^-$ 10.5–11 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.107 ±0.029 ±0.015	103	ADAMOVICH	92	OMEG	π^- 340 GeV
0.138 ±0.027 ±0.010	155	FRABETTI	92	E687	γBe
0.16 ±0.05	34	ALVAREZ	91B	NA14	Photoproduction
0.10 ±0.02 ±0.01	131	ALBRECHT	90C	ARG	$e^+ e^- \approx$ 10 GeV
0.122 ±0.018 ±0.012	118	BALTRUSAIT...	85E	MRK3	$e^+ e^-$ 3.77 GeV
0.113 ±0.030		ABRAMS	79D	MRK2	$e^+ e^-$ 3.77 GeV



$\Gamma(K^+K^-)/\Gamma(\pi^+\pi^-)$ $\Gamma_{148}/\Gamma_{130}$

The unused results here are redundant with $\Gamma(K^+K^-)/\Gamma(K^-\pi^+)$ and $\Gamma(\pi^+\pi^-)/\Gamma(K^-\pi^+)$ measurements by the same experiments.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2.760±0.040±0.034	7334	ACOSTA	05C	CDF	$p\overline{p}$, $\sqrt{s}$=1.96 TeV
2.81 ±0.10 ±0.06		LINK	03	FOCS	γ nucleus, $\overline{E}_\gamma$ ≈ 180 GeV
2.96 ±0.16 ±0.15	710	CSORNA	02	CLE2	e^+e^- ≈ $\Upsilon(4S)$
2.75 ±0.15 ±0.16		AITALA	98C	E791	π^- nucleus, 500 GeV
2.53 ±0.46 ±0.19		FRABETTI	94C	E687	γBe $\overline{E}_\gamma$= 220 GeV
2.23 ±0.81 ±0.46		ADAMOVICH	92	OMEG	π^- 340 GeV
1.95 ±0.34 ±0.22		ANJOS	91D	E691	Photoproduction
2.5 ±0.7		ALBRECHT	90C	ARG	e^+e^- ≈ 10 GeV
2.35 ±0.37 ±0.28		ALEXANDER	90	CLEO	e^+e^- 10.5–11 GeV

$\Gamma(2K^0_S)/\Gamma(K^0_S\pi^+\pi^-)$ Γ_{149}/Γ_{31}

This is the same as $\Gamma(K^0\overline{K}^0)$ / $\Gamma(\overline{K}^0\pi^+\pi^-)$ because $D^0 \to K^0_S K^0_L$ is forbidden by *CP* conservation.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0126±0.0022 OUR AVERAGE					
0.0144±0.0032±0.0016	79 ± 17	LINK	05A	FOCS	γ Be, $\overline{E}_\gamma$ ≈ 180 GeV
0.0101±0.0022±0.0016	26	ASNER	96B	CLE2	e^+e^- ≈ $\Upsilon(4S)$
0.039 ±0.013 ±0.013	20 ± 7	FRABETTI	94J	E687	γBe $\overline{E}_\gamma$=220 GeV
0.021 $^{+0.011}_{-0.008}$ ±0.002	5	ALEXANDER	90	CLEO	e^+e^- 10.5–11 GeV

$\Gamma(K^0_S K^- \pi^+)/\Gamma(K^- \pi^+)$ Γ_{150}/Γ_{29}

VALUE	DOCUMENT ID		TECN	COMMENT
0.089±0.014 OUR FIT Error includes scale factor of 1.1.				
0.08 ±0.03	[87] ANJOS	91	E691	γ Be 80–240 GeV

[87] The factor 100 at the top of column 2 of Table I of ANJOS 91 should be omitted.

$\Gamma(K^0_S K^- \pi^+)/\Gamma(K^0_S \pi^+ \pi^-)$ Γ_{150}/Γ_{31}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.117±0.017 OUR FIT Error includes scale factor of 1.1.					
0.119±0.021 OUR AVERAGE Error includes scale factor of 1.3.					
0.108±0.019	61	AMMAR	91	CLEO	$e^+ e^- \approx$ 10.5 GeV
0.16 ±0.03 ±0.02	39	ALBRECHT	90C	ARG	$e^+ e^- \approx$ 10 GeV

$\Gamma(\overline{K}^*(892)^0 K^0_S)/\Gamma(K^0_S \pi^+ \pi^-)$ Γ_{174}/Γ_{31}

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.029	90	AMMAR	91	CLEO	$e^+ e^- \approx$ 10.5 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.03	90	ALBRECHT	90C	ARG	$e^+ e^- \approx$ 10 GeV

$\Gamma(K^*(892)^+ K^-)/\Gamma(K^- \pi^+)$ Γ_{175}/Γ_{29}

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.097±0.021 OUR FIT				
0.16 $^{+0.08}_{-0.06}$	[88] ANJOS	91	E691	γ Be 80–240 GeV

[88] The factor 100 at the top of column 2 of Table I of ANJOS 91 should be omitted.

$\Gamma(K^*(892)^+ K^-)/\Gamma(K^0_S \pi^+ \pi^-)$ Γ_{175}/Γ_{31}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.127±0.027 OUR FIT					
0.117±0.028 OUR AVERAGE					
0.128±0.036	23	AMMAR	91	CLEO	$e^+ e^- \approx$ 10.5 GeV
0.10 ±0.04 ±0.02	15	ALBRECHT	90C	ARG	$e^+ e^- \approx$ 10 GeV

$\Gamma(K^0_S K^- \pi^+ \text{ nonresonant})/\Gamma(K^- \pi^+)$ Γ_{153}/Γ_{29}

VALUE	DOCUMENT ID		TECN	COMMENT
0.03±0.03	[89] ANJOS	91	E691	γ Be 80–240 GeV

[89] The factor 100 at the top of column 2 of Table I of ANJOS 91 should be omitted.

$\Gamma(K^0_S K^+ \pi^-)/\Gamma(K^- \pi^+)$ Γ_{154}/Γ_{29}

VALUE	DOCUMENT ID		TECN	COMMENT
0.068±0.013 OUR FIT				
0.05 ±0.025	[90] ANJOS	91	E691	γ Be 80–240 GeV

[90] The factor 100 at the top of column 2 of Table I of ANJOS 91 should be omitted.

$\Gamma(K^0_S K^+ \pi^-)/\Gamma(K^0_S \pi^+ \pi^-)$ Γ_{154}/Γ_{31}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.089±0.017 OUR FIT					
0.098±0.020	55	AMMAR	91	CLEO	$e^+ e^- \approx$ 10.5 GeV

$\Gamma(K^*(892)^0 K^0_S)/\Gamma(K^0_S \pi^+ \pi^-)$ — Γ_{176}/Γ_{31}

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.015	90	AMMAR	91	CLEO	$e^+e^- \approx$ 10.5 GeV

$\Gamma(K^*(892)^- K^+)/\Gamma(K^0_S \pi^+ \pi^-)$ — Γ_{177}/Γ_{31}

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.068±0.038	12	AMMAR	91	CLEO	$e^+e^- \approx$ 10.5 GeV

$\Gamma(K^0_S K^+ \pi^-$ nonresonant$)/\Gamma(K^- \pi^+)$ — Γ_{157}/Γ_{29}

VALUE	DOCUMENT ID		TECN	COMMENT
$0.05^{+0.03}_{-0.02}$	[91] ANJOS	91	E691	γBe 80–240 GeV

[91] The factor 100 at the top of column 2 of Table I of ANJOS 91 should be omitted.

$\Gamma(K^+ K^- \pi^0)/\Gamma(K^- \pi^+ \pi^0)$ — Γ_{158}/Γ_{43}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0095±0.0026	151	ASNER	96B	CLE2	$e^+e^- \approx \Upsilon(4S)$

$\Gamma(K^0_S K^0_S \pi^0)/\Gamma_{\rm total}$ — Γ_{159}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
<0.00059	ASNER	96B	CLE2	$e^+e^- \approx \Upsilon(4S)$

$\Gamma(\phi\pi^0)/\Gamma_{\rm total}$ — Γ_{178}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0014	90	ALBRECHT	94I	ARG	$e^+e^- \approx$ 10 GeV

$\Gamma(\phi\pi^0)/\Gamma(K^+ K^-)$ — $\Gamma_{178}/\Gamma_{148}$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.194±0.006±0.009	1254	TAJIMA	04	BELL	e^+e^- at $\Upsilon(4S)$

$\Gamma(\phi\eta)/\Gamma(K^+ K^-)$ — $\Gamma_{179}/\Gamma_{148}$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
3.59±1.14±0.18	31	TAJIMA	04	BELL	e^+e^- at $\Upsilon(4S)$

$\Gamma(\phi\omega)/\Gamma_{\rm total}$ — Γ_{180}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0021	90	ALBRECHT	94I	ARG	$e^+e^- \approx$ 10 GeV

$\Gamma(K^+ K^- \pi^+ \pi^-)/\Gamma(K^- \pi^+ \pi^+ \pi^-)$ — Γ_{160}/Γ_{55}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
3.00±0.13 OUR AVERAGE					
2.95±0.11±0.08	2669 ± 101	[92] LINK	05G	FOCS	γBe, $\overline{E}_\gamma \approx$ 180 GeV
3.13±0.37±0.36	136 ± 15	AITALA	98D	E791	π^- nucleus, 500 GeV
3.5 ±0.4 ±0.2	244 ± 26	FRABETTI	95C	E687	γBe, $\overline{E}_\gamma \approx$ 200 GeV

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

4.4 ±1.8 ±0.5	19 ± 8	ABLIKIM	05F	BES	$e^+e^- \approx \psi(3770)$
4.1 ±0.7 ±0.5	114 ± 20	ALBRECHT	94I	ARG	$e^+e^- \approx$ 10 GeV
3.14±1.0	89 ± 29	AMMAR	91	CLEO	$e^+e^- \approx$ 10.5 GeV
2.8 $^{+0.8}_{-0.7}$		ANJOS	91	E691	γBe 80–240 GeV

[92] LINK 05G uses a smaller, cleaner subset of 1279 ± 48 events for the amplitude analysis that gives the results in the next data blocks.

$\Gamma(\phi\pi^+\pi^-$ 3-body, $\phi \to K^+K^-)/\Gamma(K^+K^-\pi^+\pi^-)$ — $\Gamma_{161}/\Gamma_{160}$

This is the fraction from a coherent amplitude analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.01±0.01	LINK	05G	FOCS	1279 ± 48 $K^+K^-\pi^+\pi^-$ evts.

$\Gamma(\phi\rho^0, \phi \to K^+K^-)/\Gamma(K^+K^-\pi^+\pi^-)$ — $\Gamma_{162}/\Gamma_{160}$

This is the fraction from a coherent amplitude analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.29±0.02 ±0.01	LINK	05G	FOCS	1279 ± 48 $K^+K^-\pi^+\pi^-$ evts.

$\Gamma(K^+K^-\rho^0$ 3-body$)/\Gamma(K^+K^-\pi^+\pi^-)$ — $\Gamma_{163}/\Gamma_{160}$

This is the fraction from a coherent amplitude analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.02±0.02 ±0.02	LINK	05G	FOCS	1279 ± 48 $K^+K^-\pi^+\pi^-$ evts.

$\Gamma(f_0(980)\pi^+\pi^-, f_0 \to K^+K^-)/\Gamma(K^+K^-\pi^+\pi^-)$ — $\Gamma_{164}/\Gamma_{160}$

This is the fraction from a coherent amplitude analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.15±0.03±0.02	LINK	05G	FOCS	1279 ± 48 $K^+K^-\pi^+\pi^-$ evts.

$\Gamma(K^*(892)^0K^\mp\pi^\pm$ 3-body, $K^{*0} \to K^\pm\pi^\mp)/\Gamma(K^+K^-\pi^+\pi^-)$ — $\Gamma_{165}/\Gamma_{160}$

This is the fraction from a coherent amplitude analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.11±0.02 ±0.01	LINK	05G	FOCS	1279 ± 48 $K^+K^-\pi^+\pi^-$ evts.

$\Gamma(K^*(892)^0\overline{K}^*(892)^0, K^{*0} \to K^\pm\pi^\mp)/\Gamma(K^+K^-\pi^+\pi^-)$ — $\Gamma_{166}/\Gamma_{160}$

This is the fraction from a coherent amplitude analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.03±0.02 ±0.01	LINK	05G	FOCS	1279 ± 48 $K^+K^-\pi^+\pi^-$ evts.

$\Gamma(K_1(1270)^\pm K^\mp, K_1(1270)^\pm \to K^\pm\pi^+\pi^-)/\Gamma(K^+K^-\pi^+\pi^-)$ — $\Gamma_{167}/\Gamma_{160}$

This is the fraction from a coherent amplitude analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.33±0.06±0.04	[93] LINK	05G	FOCS	1279 ± 48 $K^+K^-\pi^+\pi^-$ evts.

[93] This LINK 05G value includes $K_1(1270)^\pm \to \rho^0 K^\pm$, $\to K_0^*(1430)^0\pi^\pm$, and $K^*(892)^0\pi^\pm$.

$\Gamma(K_1(1400)^\pm K^\mp, K_1(1400)^\pm \to K^\pm\pi^+\pi^-)/\Gamma(K^+K^-\pi^+\pi^-)$ — $\Gamma_{168}/\Gamma_{160}$

This is the fraction from a coherent amplitude analysis.

VALUE	DOCUMENT ID		TECN	COMMENT
0.22±0.03±0.04	LINK	05G	FOCS	1279 ± 48 $K^+K^-\pi^+\pi^-$ evts.

$\Gamma(K^0_S K^0_S \pi^+ \pi^-)/\Gamma(K^0_S \pi^+ \pi^-)$ — Γ_{171}/Γ_{31}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
4.3 ±0.8 OUR AVERAGE					
4.16±0.70±0.42	113 ± 21	LINK	05A	FOCS	γ Be, $\overline{E}_\gamma \approx$ 180 GeV
6.2 ±2.0 ±1.6	25	ALBRECHT	94I	ARG	$e^+ e^- \approx$ 10 GeV

$\Gamma(K^0_S K^- \pi^+ \pi^+ \pi^-)/\Gamma(K^0_S 2\pi^+ 2\pi^-)$ — Γ_{172}/Γ_{79}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.054	90	LINK	04D	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

$\Gamma(K^+ K^- \pi^+ \pi^- \pi^0)/\Gamma_{total}$ — Γ_{173}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.0031±0.0020	[94] BARLAG	92C	ACCM	π^- Cu 230 GeV

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

Radiative modes

$\Gamma(\rho^0 \gamma)/\Gamma_{total}$ — Γ_{181}/Γ

VALUE	CL%	DOCUMENT ID		TECN
<2.4 × 10^−4	90	ASNER	98	CLE2

$\Gamma(\omega \gamma)/\Gamma_{total}$ — Γ_{182}/Γ

VALUE	CL%	DOCUMENT ID		TECN
<2.4 × 10^−4	90	ASNER	98	CLE2

$\Gamma(\phi \gamma)/\Gamma_{total}$ — Γ_{183}/Γ

VALUE	CL%	DOCUMENT ID		TECN
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<1.9 \times 10^{-4}$	90	ASNER	98	CLE2

$\Gamma(\phi \gamma)/\Gamma(K^+ K^-)$ — $\Gamma_{183}/\Gamma_{148}$

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
$6.31^{+1.70+0.30}_{-1.48-0.36}$	28	TAJIMA	04	BELL	$e^+ e^-$ at $\Upsilon(4S)$

$\Gamma(\overline{K}^*(892)^0 \gamma)/\Gamma_{total}$ — Γ_{184}/Γ

VALUE	CL%	DOCUMENT ID		TECN
<7.6 × 10^−4	90	ASNER	98	CLE2

Doubly Cabibbo-suppressed / Mixing modes

$\Gamma(K^+ \ell^- \overline{\nu}_\ell (\text{via } \overline{D}^0))/\Gamma(K^- \ell^+ \nu_\ell)$ — Γ_{185}/Γ_{14}

This is a limit on R_M without the complications of possible doubly-Cabibbo-suppressed decays that occur when using hadronic modes. For the limits on $|m_1 - m_2|$ and $(\Gamma_1 - \Gamma_2)/\Gamma$ that come from the best mixing limit, see near the beginning of these D^0 Listings.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.005	90	[95] AITALA	96C	E791	π^- nucleus, 500 GeV

[95] AITALA 96C uses $D^{*+} \rightarrow D^0 \pi^+$ (and charge conjugate) decays to identify the charm at production and $D^0 \rightarrow K^- \ell^+ \nu_\ell$ (and charge conjugate) decays to identify the charm at decay.

$\Gamma(K^+ \text{or} K^*(892)^+ e^- \overline{\nu}_e (\text{via} \overline{D}^0)) / [\Gamma(K^- e^+ \nu_e) + \Gamma(K^*(892)^- e^+ \nu_e)]$ $\Gamma_{186}/(\Gamma_{15}+\Gamma_{17})$

This is a limit on R_M without the complications of possible doubly-Cabibbo-suppressed decays that occur when using hadronic modes. For the limits on $|m_1 - m_2|$ and $(\Gamma_1 - \Gamma_2)/\Gamma$ that come from the best mixing limit, see near the beginning of these D^0 Listings.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.001	90	[96] BITENC	05	BELL	$e^+ e^- \approx$ 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0078	90	[96] CAWLFIELD	05	CLEO	$e^+ e^- \approx$ 10.6 GeV
<0.0042	90	[96] AUBERT,B	04Q	BABR	$e^+ e^- \approx \Upsilon(4S)$

[96] AUBERT,B 04Q, CAWLFIELD 05, and BITENC 05 use $D^{*+} \rightarrow D^0 \pi^+$ (and charge conjugate) decays to identify the charm at production and the charge of the e to identify the charm at decay. These limits do not allow CP violation.

$\Gamma(K^+ \pi^-)/\Gamma(K^- \pi^+)$ Γ_{187}/Γ_{29}

This is R_D in the note on "D^0-$\overline{D}^0$ Mixing," near the start of the D^0 Listings. The experiments here use the charge of the pion in $D^*(2010)^\pm \rightarrow (D^0 \text{ or } \overline{D}^0)\, \pi^\pm$ decay to tell whether a D^0 or a $\overline{D}^0$ was born. The $D^0 \rightarrow K^+ \pi^-$ decay can occur directly by doubly Cabibbo-suppressed (DCS) decay, or indirectly by $D^0 \rightarrow \overline{D}^0$ mixing followed by $\overline{D}^0 \rightarrow K^+ \pi^-$ decay. Some of the experiments can use the decay-time information to disentangle the two mechanisms. Here, we list the experimental branching ratio, which if there is no mixing is the DCS ratio. See the next data block for limits on the mixing ratio R_M, see the section on CP-violating asymmetries near the end of this D^0 Listing for values of A_D, and see the note on "D^0-$\overline{D}^0$ Mixing" for limits on x' and y'.

Some early limits have been omitted from this Listing; see our 1998 edition (EPJ **C3** 1).

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
3.76±0.09 OUR AVERAGE						
$3.77 \pm 0.08 \pm 0.05$		4024 ± 88	[97] ZHANG	06	BELL	$e^+ e^-$
$4.29^{+0.63}_{-0.61} \pm 0.27$		234	[98] LINK	05H	FOCS	γ nucleus
$3.59 \pm 0.20 \pm 0.27$			[99] AUBERT	03Z	BABR	$e^+ e^-$, 10.6 GeV
$3.32^{+0.63}_{-0.65} \pm 0.40$		45	[100] GODANG	00	CLE2	$e^+ e^-$
$6.8 \ ^{+3.4}_{-3.3} \ \pm 0.7$		34	[101] AITALA	98	E791	π^- nucl., 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$3.81 \pm 0.17 ^{+0.08}_{-0.16}$		845 ± 40	[102] LI	05A	BELL	See ZHANG 06
$4.04 \pm 0.85 \pm 0.25$		149	[103] LINK	01	FOCS	γ nucleus
$18.4 \ \pm 5.9 \ \pm 3.4$		19	[104] BARATE	98W	ALEP	$e^+ e^-$ at Z^0
$7.7 \ \pm 2.5 \ \pm 2.5$		19	[105] CINABRO	94	CLE2	$e^+ e^- \approx \Upsilon(4S)$
< 11	90		[105] AMMAR	91	CLEO	$e^+ e^- \approx$ 10.5 GeV
< 15	90	1 ± 6	[106] ANJOS	88C	E691	Photoproduction
< 14	90		[105] ALBRECHT	87K	ARG	$e^+ e^-$ 10 GeV

[97] This ZHANG 06 result assumes no mixing. If mixing but no CP violation is allowed, $R_D = (3.64 \pm 0.17) \times 10^{-3}$.

[98] This LINK 05H result assumes no mixing or CP violation. Allowing CP violation but no mixing, $R_D = (4.29 \pm 0.63 \pm 0.28) \times 10^{-3}$ — negligibly different. Allowing mixing but no CP violation, $R_D = (3.81^{+1.67}_{-1.63} \pm 0.92) \times 10^{-3}$. Allowing mixing and CP violation, $R_D = (5.17^{+1.47}_{-1.58} \pm 0.76) \times 10^{-3}$.

[99] This AUBERT 03Z result is for no mixing or CP violation. If CP violation but no mixing is allowed, R_D=0.00357 ± 0.00022 ± 0.00027. If only mixing is allowed, the 95% confidence-level interval is $(2.4 < R_D < 4.9)\times10^{-3}$. If both mixing and CP violation are allowed, this interval becomes $(2.3 < R_D < 5.2)\times10^{-3}$.

[100] This GODANG 00 result assumes no D^0-$\overline{D}^0$ mixing (R_M=0 in the note on "D^0-$\overline{D}^0$ Mixing" near the start of the D^0 Listings) but allows CP violation. The DCS ratio becomes 0.0048 ± 0.0012 ± 0.0004 when mixing is allowed.

[101] This AITALA 98 result assumes no CP violation or mixing (R_M=0 in the note on "D^0-$\overline{D}^0$ Mixing" near the start of the D^0 Listings). The DCS ratio becomes $0.0090^{+0.0120}_{-0.0109} \pm 0.0044$ when mixing is allowed.

[102] This LI 05A result assumes no mixing or CP violation. If mixing but no CP violation is allowed, $R_D = (2.87 \pm 0.37) \times 10^{-3}$.

[103] This LINK 01 result assumes no mixing or CP violation; see Fig. 4 of the paper for the DCS value as a function of the (unknown) mixing parameters x' and y'. See also the note on "D^0-$\overline{D}^0$ Mixing" near the start of the D^0 Listings for results on x' and y' from FOCUS and other experiments.

[104] BARATE 98W gets $0.0177^{+0.0060}_{-0.0056} \pm 0.0031$ for the DCS ratio when mixing is allowed, assuming no interference between the DCS and mixing amplitudes ($y' = 0$ in the note on "D^0-$\overline{D}^0$ Mixing" near the start of the D^0 Listings).

[105] CINABRO 94, AMMAR 91, and ALBRECHT 87K cannot distinguish between doubly Cabibbo-suppressed decay and D^0-$\overline{D}^0$ mixing.

[106] ANJOS 88C allows mixing but assumes no interference between the DCS and mixing amplitudes ($y' = 0$ in the note on "D^0-$\overline{D}^0$ Mixing" near the start of the D^0 Listings). When interference is allowed, the limit degrades to 0.049.

$\Gamma(K^+\pi^-(\text{via } \overline{D}^0))/\Gamma(K^-\pi^+)$ Γ_{188}/Γ_{29}

This is R_M in the note on "D^0-$\overline{D}^0$ Mixing" near the start of the D^0 Listings. The experiments here (1) use the charge of the pion in $D^*(2010)^\pm \to (D^0 \text{ or } \overline{D}^0)\,\pi^\pm$ decay to tell whether a D^0 or a $\overline{D}^0$ was born; and (2) use the decay-time distribution to disentangle doubly Cabibbo-suppressed decay and mixing. For the limits on $|m_1 - m_2|$ and $(\Gamma_1 - \Gamma_2)/\Gamma$ that come from the best mixing limit, see near the beginning of these D^0 Listings.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.00040	95		[107] ZHANG	06	BELL	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.00046	95		[108] LI	05A	BELL	See ZHANG 06
<0.0063	95		[109] LINK	05H	FOCS	γ nucleus
<0.0013	95		[110] AUBERT	03Z	BABR	e^+e^-, 10.6 GeV
<0.00041	95		[111] GODANG	00	CLE2	e^+e^-
<0.0092	95		[112] BARATE	98W	ALEP	e^+e^- at Z^0
<0.005	90	1 ± 4	[113] ANJOS	88C	E691	Photoproduction

[107] This ZHANG 06 result allows CP violation, but the result does not change if CP violation is not allowed.

[108] This LI 05A result allows CP violation. The limit becomes $<$ 0.00042 (95% CL) if CP violation is not allowed.

[109] LINK 05H obtains the same result whether or not CP violation is allowed.

[110] This AUBERT 03Z result allows CP violation and assumes that the strong phase between $D^0 \rightarrow K^+\pi^-$ and $\overline{D}^0 \rightarrow K^+\pi^-$ is small, and limits only $D^0 \rightarrow \overline{D}^0$ transitions via off-shell intermediate states. The limit on transitions via on-shell intermediate states is 0.0016.

[111] This GODANG 00 result allows CP violation and assumes that the strong phase between $D^0 \rightarrow K^+\pi^-$ and $\overline{D}^0 \rightarrow K^+\pi^-$ is small, and limits only $D^0 \rightarrow \overline{D}^0$ transitions via off-shell intermediate states. The limit on transitions via on-shell intermediate states is 0.0017.

[112] This BARATE 98W result assumes no interference between the DCS and mixing amplitudes ($y' = 0$ in the note on "D^0-$\overline{D}^0$ Mixing" near the start of the D^0 Listings). When interference is allowed, the limit degrades to 0.036 (95%CL).

[113] This ANJOS 88C result assumes no interference between the DCS and mixing amplitudes ($y' = 0$ in the note on "D^0-$\overline{D}^0$ Mixing" near the start of the D^0 Listings). When interference is allowed, the limit degrades to 0.019.

$\Gamma(K^0_S\pi^+\pi^-(\text{in } D^0 \rightarrow \overline{D}^0))/\Gamma(K^0_S\pi^+\pi^-)$ Γ_{189}/Γ_{31}

This is R_M in the note on "D^0-$\overline{D}^0$ Mixing" near the start of the D^0 Listings. The experiments here (1) use the charge of the pion in $D^*(2010)^\pm \rightarrow (D^0$ or $\overline{D}^0)\ \pi^\pm$ decay to tell whether a D^0 or a $\overline{D}^0$ was born; and (2) use the decay-time distribution to disentangle doubly Cabibbo-suppressed decay and mixing. For the limits on $|m_1 - m_2|$ and $(\Gamma_1 - \Gamma_2)/\Gamma$ that come from the best mixing limit, see near the beginning of these D^0 Listings.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0063	95	[114] ASNER	05	CLEO	$e^+e^- \approx$ 10 GeV

[114] This ASNER 05 limit allows CP violation. If CP violation is not allowed, the limit is 0.0042 at 95% CL.

$\Gamma(K^+\pi^-\pi^0)/\Gamma(K^-\pi^+\pi^0)$ Γ_{191}/Γ_{43}

The experiments here use the charge of the pion in $D^*(2010)^\pm \rightarrow (D^0$ or $\overline{D}^0)\ \pi^\pm$ decay to tell whether a D^0 or a $\overline{D}^0$ was born. The $D^0 \rightarrow K^+\pi^-\pi^0$ decay can occur directly by doubly Cabibbo-suppressed (DCS) decay, or indirectly by $D^0 \rightarrow \overline{D}^0$ mixing followed by $\overline{D}^0 \rightarrow K^+\pi^-\pi^0$ decay.

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
$2.34^{+0.20}_{-0.17}$ OUR AVERAGE					
$2.29 \pm 0.15^{+0.13}_{-0.09}$	1978 $\pm$ 104	TIAN	05	BELL	$e^+e^- \approx \Upsilon(4S)$
$4.3\ ^{+1.1}_{-1.0} \pm 0.7$	38	BRANDENB...	01	CLE2	$e^+e^- \approx \Upsilon(4S)$

$\Gamma(K^+\pi^-\pi^+\pi^-)/\Gamma(K^-\pi^+\pi^+\pi^-)$ Γ_{192}/Γ_{55}

The experiments here use the charge of the pion in $D^*(2010)^\pm \rightarrow (D^0$ or $\overline{D}^0)\ \pi^\pm$ decay to tell whether a D^0 or a $\overline{D}^0$ was born. The $D^0 \rightarrow K^+\pi^-\pi^+\pi^-$ decay can occur directly by doubly Cabibbo-suppressed (DCS) decay, or indirectly by $D^0 \rightarrow \overline{D}^0$ mixing followed by $\overline{D}^0 \rightarrow K^+\pi^-\pi^+\pi^-$ decay. Some of the experiments can use the decay-time information to disentangle the two mechanisms. Here, we list the experimental branching ratio, which if there is no mixing is the DCS ratio; in the next data block we give the limits on the mixing ratio.

Some early limits have been omitted from this Listing; see our 1998 edition (EPJ **C3** 1).

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{3.23^{+0.25}_{-0.22}}$ **OUR AVERAGE**						
$3.20 \pm 0.18^{+0.18}_{-0.13}$		1721 ± 75	[115] TIAN	05	BELL	$e^+e^- \approx \Upsilon(4S)$
$4.4\ ^{+1.3}_{-1.2}\ \pm 0.6$		54	[115] DYTMAN	01	CLE2	$e^+e^- \approx \Upsilon(4S)$
$2.5\ ^{+3.6}_{-3.4}\ \pm 0.3$			[116] AITALA	98	E791	π^- nucl., 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<18	90		[115] AMMAR	91	CLEO	$e^+e^- \approx$ 10.5 GeV
<18	90	5 ± 12	[117] ANJOS	88C	E691	Photoproduction

[115] AMMAR 91 cannot and DYTMAN 01 and TIAN 05 do not distinguish between doubly Cabibbo-suppressed decay and D^0-$\overline{D}^0$ mixing.

[116] This AITALA 98 result assumes no D^0-$\overline{D}^0$ mixing (R_M in the note on "D^0-$\overline{D}^0$ Mixing"). It becomes $-0.0020^{+0.0117}_{-0.0106} \pm 0.0035$ when mixing is allowed and decay-time information is used to distinguish doubly Cabibbo-suppressed decays from mixing.

[117] ANJOS 88C uses decay-time information to distinguish doubly Cabibbo-suppressed (DCS) decays from D^0-$\overline{D}^0$ mixing. However, the result assumes no interference between the DCS and mixing amplitudes ($y' = 0$ in the note on "D^0-$\overline{D}^0$ Mixing" near the start of the D^0 Listings). When interference is allowed, the limit degrades to 0.033.

$\Gamma(K^+\pi^-\pi^+\pi^-\,(\text{via}\ \overline{D}^0))/\Gamma(K^-\pi^+\pi^+\pi^-)$ — Γ_{193}/Γ_{55}

This is a D^0-$\overline{D}^0$ mixing limit. The experiments here (1) use the charge of the pion in $D^*(2010)^\pm \to (D^0$ or $\overline{D}^0)\,\pi^\pm$ decay to tell whether a D^0 or a $\overline{D}^0$ was born; and (2) use the decay-time distribution to disentangle doubly Cabibbo-suppressed decay and mixing. For the limits on $|m_{D^0_1} - m_{D^0_2}|$ and $(\Gamma_{D^0_1} - \Gamma_{D^0_2})/\Gamma_{D^0}$ that come from the best mixing limit, see near the beginning of these D^0 Listings.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.005	90	0 ± 4	[118] ANJOS	88C	E691	Photoproduction

[118] ANJOS 88C uses decay-time information to distinguish doubly Cabibbo-suppressed (DCS) decays from D^0-$\overline{D}^0$ mixing. However, the result assumes no interference between the DCS and mixing amplitudes ($y' = 0$ in the note on "D^0-$\overline{D}^0$ Mixing" near the start of the D^0 Listings). When interference is allowed, the limit degrades to 0.007.

$\Gamma(K^+\pi^-\ \text{or}\ K^+\pi^-\pi^+\pi^-\,(\text{via}\ \overline{D}^0))/\Gamma(K^-\pi^+\ \text{or}\ K^-\pi^+\pi^+\pi^-)$ — Γ_{194}/Γ_0

This is a D^0-$\overline{D}^0$ mixing limit. For the limits on $|m_{D^0_1} - m_{D^0_2}|$ and $(\Gamma_{D^0_1} - \Gamma_{D^0_2})/\Gamma_{D^0}$ that come from the best mixing limit, see near the beginning of these D^0 Listings.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0085	90	[119] AITALA	98	E791	π^- nucleus, 500 GeV
<0.0037	90	[120] ANJOS	88C	E691	Photoproduction

[119] AITALA 98 uses decay-time information to distinguish doubly Cabibbo-suppressed decays from D^0-$\overline{D}^0$ mixing. The fit allows interference between the two amplitudes, and also allows CP violation in this term. The central value obtained is $0.0039^{+0.0036}_{-0.0032} \pm 0.0016$. When interference is disallowed, the result becomes $0.0021 \pm 0.0009 \pm 0.0002$.

[120] This combines results of ANJOS 88C on $K^+\pi^-$ and $K^+\pi^-\pi^+\pi^-$ (via $\overline{D}^0$) reported in the data block above (see footnotes there). It assumes no interference.

$\Gamma(\mu^-$ anything (via $\overline{D}^0$))/$\Gamma(\mu^+$ anything) — Γ_{195}/Γ_6

This is a D^0-$\overline{D}^0$ mixing limit. See the somewhat better limits above.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0056	90	LOUIS	86	SPEC	π^- W 225 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.012	90	BENVENUTI	85	CNTR	μC, 200 GeV
<0.044	90	BODEK	82	SPEC	π^-, pFe → D^0

Rare or forbidden modes

$\Gamma(\gamma\gamma)/\Gamma(\pi^0\pi^0)$ — $\Gamma_{196}/\Gamma_{131}$

$D^0 \rightarrow \gamma\gamma$ is a flavor-changing neutral-current decay, forbidden in the Standard Model at the tree level.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.033	90	COAN	03	CLE2	$e^+e^- \approx \Upsilon(4S)$

$\Gamma(e^+e^-)/\Gamma_{total}$ — Γ_{197}/Γ

A test for the $\Delta C = 1$ weak neutral current. Allowed by first-order weak interaction combined with electromagnetic interaction.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<1.2 × 10^{-6}	90	3	AUBERT,B	04Y	BABR	$e^+e^- \approx \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<8.19 × 10^{-6}	90		PRIPSTEIN	00	E789	p nucleus, 800 GeV
<6.2 × 10^{-6}	90		AITALA	99G	E791	$\pi^- N$ 500 GeV
<1.3 × 10^{-5}	90	0	FREYBERGER	96	CLE2	$e^+e^- \approx \Upsilon(4S)$
<1.3 × 10^{-4}	90		ADLER	88	MRK3	e^+e^- 3.77 GeV
<1.7 × 10^{-4}	90	7	ALBRECHT	88G	ARG	e^+e^- 10 GeV
<2.2 × 10^{-4}	90	8	HAAS	88	CLEO	e^+e^- 10 GeV

$\Gamma(\mu^+\mu^-)/\Gamma_{total}$ — Γ_{198}/Γ

A test for the $\Delta C = 1$ weak neutral current. Allowed by first-order weak interaction combined with electromagnetic interaction.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<1.3 × 10^{-6}	90	1	AUBERT,B	04Y	BABR	$e^+e^- \approx \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<2.0 × 10^{-6}	90		ABT	04	HERB	pA, 920 GeV
<2.5 × 10^{-6}	90		ACOSTA	03F	CDF	$p\overline{p}$, $\sqrt{s}$ = 1.96 TeV
<1.56 × 10^{-5}	90		PRIPSTEIN	00	E789	p nucleus, 800 GeV
<5.2 × 10^{-6}	90		AITALA	99G	E791	$\pi^- N$ 500 GeV
<4.1 × 10^{-6}	90		ADAMOVICH	97	BEAT	π^- Cu, W 350 GeV
<4.2 × 10^{-6}	90		ALEXOPOU...	96	E771	p Si, 800 GeV
<3.4 × 10^{-5}	90	1	FREYBERGER	96	CLE2	$e^+e^- \approx \Upsilon(4S)$

$<7.6 \times 10^{-6}$	90	0	ADAMOVICH	95	BEAT	See ADAMOVICH 97
$<4.4 \times 10^{-5}$	90	0	KODAMA	95	E653	π^- emulsion 600 GeV
$<3.1 \times 10^{-5}$	90		[121] MISHRA	94	E789	-4.1 ± 4.8 events
$<7.0 \times 10^{-5}$	90	3	ALBRECHT	88G	ARG	$e^+ e^-$ 10 GeV
$<1.1 \times 10^{-5}$	90		LOUIS	86	SPEC	π^- W 225 GeV
$<3.4 \times 10^{-4}$	90		AUBERT	85	EMC	Deep inelast. $\mu^- N$

[121] Here MISHRA 94 uses "the statistical approach advocated by the PDG." For an alternate approach, giving a limit of 9×10^{-6} at 90% confidence level, see the paper.

$\Gamma(\pi^0 e^+ e^-)/\Gamma_{total}$ — Γ_{199}/Γ

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<4.5 \times 10^{-5}$	90	0	FREYBERGER	96	CLE2	$e^+ e^- \approx \Upsilon(4S)$

$\Gamma(\pi^0 \mu^+ \mu^-)/\Gamma_{total}$ — Γ_{200}/Γ

A test for the ΔC=1 weak neutral current. Allowed by higher-order electroweak interactions.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<1.8 \times 10^{-4}$	90	2	KODAMA	95	E653	π^- emulsion 600 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<5.4 \times 10^{-4}$	90	3	FREYBERGER	96	CLE2	$e^+ e^- \approx \Upsilon(4S)$

$\Gamma(\eta e^+ e^-)/\Gamma_{total}$ — Γ_{201}/Γ

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<1.1 \times 10^{-4}$	90	0	FREYBERGER	96	CLE2	$e^+ e^- \approx \Upsilon(4S)$

$\Gamma(\eta \mu^+ \mu^-)/\Gamma_{total}$ — Γ_{202}/Γ

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<5.3 \times 10^{-4}$	90	0	FREYBERGER	96	CLE2	$e^+ e^- \approx \Upsilon(4S)$

$\Gamma(\pi^+ \pi^- e^+ e^-)/\Gamma_{total}$ — Γ_{203}/Γ

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<3.73 \times 10^{-4}$	90	9	AITALA	01C	E791	π^- nucleus, 500 GeV

$\Gamma(\rho^0 e^+ e^-)/\Gamma_{total}$ — Γ_{204}/Γ

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<1.0 \times 10^{-4}$	90	2	[122] FREYBERGER	96	CLE2	$e^+ e^- \approx \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<1.24 \times 10^{-4}$	90	1	AITALA	01C	E791	π^- nucleus, 500 GeV
$<4.5 \times 10^{-4}$	90	2	HAAS	88	CLEO	$e^+ e^-$ 10 GeV

[122] This FREYBERGER 96 limit is obtained using a phase-space model. The limit changes to $< 1.8 \times 10^{-4}$ using a photon pole amplitude model.

$\Gamma(\pi^+\pi^-\mu^+\mu^-)/\Gamma_{total}$ — Γ_{205}/Γ

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<3.0 × 10^{-5}	90	2	AITALA	01C	E791	π^- nucleus, 500 GeV

$\Gamma(\rho^0\mu^+\mu^-)/\Gamma_{total}$ — Γ_{206}/Γ

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<2.2 × 10^{-5}	90	0	AITALA	01C	E791	π^- nucleus, 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<4.9 \times 10^{-4}$	90	1	[123] FREYBERGER	96	CLE2	$e^+e^- \approx \Upsilon(4S)$
$<2.3 \times 10^{-4}$	90	0	KODAMA	95	E653	π^- emulsion 600 GeV
$<8.1 \times 10^{-4}$	90	5	HAAS	88	CLEO	e^+e^- 10 GeV

[123] This FREYBERGER 96 limit is obtained using a phase-space model. The limit changes to $< 4.5 \times 10^{-4}$ using a photon pole amplitude model.

$\Gamma(\omega e^+e^-)/\Gamma_{total}$ — Γ_{207}/Γ

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<1.8 × 10^{-4}	90	1	[124] FREYBERGER	96	CLE2	$e^+e^- \approx \Upsilon(4S)$

[124] This FREYBERGER 96 limit is obtained using a phase-space model. The limit changes to $< 2.7 \times 10^{-4}$ using a photon pole amplitude model.

$\Gamma(\omega\mu^+\mu^-)/\Gamma_{total}$ — Γ_{208}/Γ

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<8.3 × 10^{-4}	90	0	[125] FREYBERGER	96	CLE2	$e^+e^- \approx \Upsilon(4S)$

[125] This FREYBERGER 96 limit is obtained using a phase-space model. The limit changes to $< 6.5 \times 10^{-4}$ using a photon pole amplitude model.

$\Gamma(K^-K^+e^+e^-)/\Gamma_{total}$ — Γ_{209}/Γ

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<3.15 × 10^{-4}	90	9	AITALA	01C	E791	π^- nucleus, 500 GeV

$\Gamma(\phi e^+e^-)/\Gamma_{total}$ — Γ_{210}/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 × 10^{-5}	90	2	[126] FREYBERGER	96	CLE2	$e^+e^- \approx \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<5.9 \times 10^{-5}$	90	0	AITALA	01C	E791	π^- nucleus, 500 GeV

[126] This FREYBERGER 96 limit is obtained using a phase-space model. The limit changes to $< 7.6 \times 10^{-5}$ using a photon pole amplitude model.

$\Gamma(K^- K^+ \mu^+ \mu^-)/\Gamma_{total}$ — Γ_{211}/Γ

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<3.3 × 10^−5	90	0	AITALA	01C	E791	π^- nucleus, 500 GeV

$\Gamma(\phi \mu^+ \mu^-)/\Gamma_{total}$ — Γ_{212}/Γ

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<3.1 × 10^−5	90	0	AITALA	01C	E791	π^- nucleus, 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<4.1 \times 10^{-4}$	90	0	[127] FREYBERGER	96	CLE2	$e^+ e^- \approx \Upsilon(4S)$

[127] This FREYBERGER 96 limit is obtained using a phase-space model. The limit changes to $< 2.4 \times 10^{-4}$ using a photon pole amplitude model.

$\Gamma(\overline{K}^0 e^+ e^-)/\Gamma_{total}$ — Γ_{213}/Γ

Not a useful test for ΔC =1 weak neutral current because both quarks must change flavor.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<1.1 × 10^−4	90	0	FREYBERGER	96	CLE2	$e^+ e^- \approx \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<1.7 \times 10^{-3}$	90		ADLER	89C	MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\overline{K}^0 \mu^+ \mu^-)/\Gamma_{total}$ — Γ_{214}/Γ

Not a useful test for ΔC =1 weak neutral current because both quarks must change flavor.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<2.6 × 10^−4	90	2	KODAMA	95	E653	π^- emulsion 600 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<6.7 \times 10^{-4}$	90	1	FREYBERGER	96	CLE2	$e^+ e^- \approx \Upsilon(4S)$

$\Gamma(K^- \pi^+ e^+ e^-)/\Gamma_{total}$ — Γ_{215}/Γ

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<3.85 × 10^−4	90	6	AITALA	01C	E791	π^- nucleus, 500 GeV

$\Gamma(\overline{K}^*(892)^0 e^+ e^-)/\Gamma_{total}$ — Γ_{216}/Γ

Not a useful test for ΔC =1 weak neutral current because both quarks must change flavor.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<4.7 × 10^−5	90	2	AITALA	01C	E791	π^- nucleus, 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<1.4 \times 10^{-4}$	90	1	[128] FREYBERGER	96	CLE2	$e^+ e^- \approx \Upsilon(4S)$

[128] This FREYBERGER 96 limit is obtained using a phase-space model. The limit changes to $< 2.0 \times 10^{-4}$ using a photon pole amplitude model.

$\Gamma(K^-\pi^+\mu^+\mu^-)/\Gamma_{total}$ Γ_{217}/Γ

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<3.59 × 10^−4	90	12	AITALA	01C	E791	π^- nucleus, 500 GeV

$\Gamma(\overline{K}^*(892)^0\mu^+\mu^-)/\Gamma_{total}$ Γ_{218}/Γ

Not a useful test for ΔC =1 weak neutral current because both quarks must change flavor.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<2.4 × 10^−5	90	3	AITALA	01C	E791	π^- nucleus, 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$<1.18 \times 10^{-3}$	90	1	[129] FREYBERGER	96	CLE2	$e^+e^- \approx \Upsilon(4S)$

[129] This FREYBERGER 96 limit is obtained using a phase-space model. The limit changes to $< 1.0 \times 10^{-3}$ using a photon pole amplitude model.

$\Gamma(\pi^+\pi^-\pi^0\mu^+\mu^-)/\Gamma_{total}$ Γ_{219}/Γ

A test for the ΔC=1 weak neutral current. Allowed by higher-order electroweak interactions.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<8.1 × 10^−4	90	1	KODAMA	95	E653	π^- emulsion 600 GeV

$\Gamma(\mu^\pm e^\mp)/\Gamma_{total}$ Γ_{220}/Γ

A test of lepton family number conservation.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
< 8.1 × 10^−7	90	0	AUBERT,B	04Y	BABR	$e^+e^- \approx \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$< 1.72 \times 10^{-5}$	90		PRIPSTEIN	00	E789	p nucleus, 800 GeV
$< 8.1 \times 10^{-6}$	90		AITALA	99G	E791	$\pi^- N$ 500 GeV
$< 1.9 \times 10^{-5}$	90	2	[130] FREYBERGER	96	CLE2	$e^+e^- \approx \Upsilon(4S)$
$< 1.0 \times 10^{-4}$	90	4	ALBRECHT	88G	ARG	e^+e^- 10 GeV
$< 2.7 \times 10^{-4}$	90	9	HAAS	88	CLEO	e^+e^- 10 GeV
$< 1.2 \times 10^{-4}$	90		BECKER	87C	MRK3	e^+e^- 3.77 GeV
$< 9 \times 10^{-4}$	90		PALKA	87	SILI	200 GeV πp
$<21 \times 10^{-4}$	90	0	[131] RILES	87	MRK2	e^+e^- 29 GeV

[130] This is the corrected result given in the erratum to FREYBERGER 96.
[131] RILES 87 assumes B($D \to K\pi$) = 3.0% and has production model dependency.

$\Gamma(\pi^0 e^\pm\mu^\mp)/\Gamma_{total}$ Γ_{221}/Γ

A test of lepton family number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<8.6 × 10^−5	90	2	FREYBERGER	96	CLE2	$e^+e^- \approx \Upsilon(4S)$

$\Gamma(\eta e^\pm\mu^\mp)/\Gamma_{total}$ Γ_{222}/Γ

A test of lepton family number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<1.0 × 10^−4	90	0	FREYBERGER	96	CLE2	$e^+e^- \approx \Upsilon(4S)$

$\Gamma(\pi^+\pi^- e^\pm\mu^\mp)/\Gamma_{total}$ — Γ_{223}/Γ

A test of lepton family-number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<1.5 × 10⁻⁵	90	1	AITALA 01C	E791	π^- nucleus, 500 GeV

$\Gamma(\rho^0 e^\pm\mu^\mp)/\Gamma_{total}$ — Γ_{224}/Γ

A test of lepton family number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<4.9 \times 10^{-5}$	90	0	[132] FREYBERGER 96	CLE2	$e^+e^- \approx \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<6.6 \times 10^{-5}$	90	1	AITALA 01C	E791	π^- nucleus, 500 GeV

[132] This FREYBERGER 96 limit is obtained using a phase-space model. The limit changes to $< 5.0 \times 10^{-5}$ using a photon pole amplitude model.

$\Gamma(\omega e^\pm\mu^\mp)/\Gamma_{total}$ — Γ_{225}/Γ

A test of lepton family number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<1.2 \times 10^{-4}$	90	0	[133] FREYBERGER 96	CLE2	$e^+e^- \approx \Upsilon(4S)$

[133] This FREYBERGER 96 limit is obtained using a phase-space model. The same limit is obtained using a photon pole amplitude model.

$\Gamma(K^- K^+ e^\pm\mu^\mp)/\Gamma_{total}$ — Γ_{226}/Γ

A test of lepton family-number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<1.8 \times 10^{-4}$	90	5	AITALA 01C	E791	π^- nucleus, 500 GeV

$\Gamma(\phi e^\pm\mu^\mp)/\Gamma_{total}$ — Γ_{227}/Γ

A test of lepton family number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<3.4 \times 10^{-5}$	90	0	[134] FREYBERGER 96	CLE2	$e^+e^- \approx \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<4.7 \times 10^{-5}$	90	0	AITALA 01C	E791	π^- nucleus, 500 GeV

[134] This FREYBERGER 96 limit is obtained using a phase-space model. The limit changes to $< 3.3 \times 10^{-5}$ using a photon pole amplitude model.

$\Gamma(\overline{K}^0 e^\pm\mu^\mp)/\Gamma_{total}$ — Γ_{228}/Γ

A test of lepton family number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<1.0 \times 10^{-4}$	90	0	FREYBERGER 96	CLE2	$e^+e^- \approx \Upsilon(4S)$

$\Gamma(K^-\pi^+ e^\pm\mu^\mp)/\Gamma_{total}$ — Γ_{229}/Γ

A test of lepton family-number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<5.53 \times 10^{-4}$	90	15	AITALA 01C	E791	π^- nucleus, 500 GeV

$\Gamma(\overline{K}^*(892)^0 e^\pm \mu^\mp)/\Gamma_{total}$ — Γ_{230}/Γ

A test of lepton family number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<8.3 × 10^{-5}	90	9	AITALA	01C	E791	π^- nucleus, 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<1.0 × 10^{-4}	90	0	[135] FREYBERGER	96	CLE2	$e^+ e^- \approx \Upsilon(4S)$

[135] This FREYBERGER 96 limit is obtained using a phase-space model. The same limit is obtained using a photon pole amplitude model.

$\Gamma(\pi^- \pi^- e^+ e^+ + \text{c.c.})/\Gamma_{total}$ — Γ_{231}/Γ

A test of lepton-number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<1.12 × 10^{-4}	90	1	AITALA	01C	E791	π^- nucleus, 500 GeV

$\Gamma(\pi^- \pi^- \mu^+ \mu^+ + \text{c.c.})/\Gamma_{total}$ — Γ_{232}/Γ

A test of lepton-number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<2.9 × 10^{-5}	90	1	AITALA	01C	E791	π^- nucleus, 500 GeV

$\Gamma(K^- \pi^- e^+ e^+ + \text{c.c.})/\Gamma_{total}$ — Γ_{233}/Γ

A test of lepton-number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<2.06 × 10^{-4}	90	2	AITALA	01C	E791	π^- nucleus, 500 GeV

$\Gamma(K^- \pi^- \mu^+ \mu^+ + \text{c.c.})/\Gamma_{total}$ — Γ_{234}/Γ

A test of lepton-number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<3.9 × 10^{-4}	90	14	AITALA	01C	E791	π^- nucleus, 500 GeV

$\Gamma(K^- K^- e^+ e^+ + \text{c.c.})/\Gamma_{total}$ — Γ_{235}/Γ

A test of lepton-number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<1.52 × 10^{-4}	90	2	AITALA	01C	E791	π^- nucleus, 500 GeV

$\Gamma(K^- K^- \mu^+ \mu^+ + \text{c.c.})/\Gamma_{total}$ — Γ_{236}/Γ

A test of lepton-number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<9.4 × 10^{-5}	90	1	AITALA	01C	E791	π^- nucleus, 500 GeV

$\Gamma(\pi^- \pi^- e^+ \mu^+ + \text{c.c.})/\Gamma_{total}$ — Γ_{237}/Γ

A test of lepton-number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<7.9 × 10^{-5}	90	4	AITALA	01C	E791	π^- nucleus, 500 GeV

$\Gamma(K^- \pi^- e^+ \mu^+ + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{238}/Γ

A test of lepton-number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<2.18 \times 10^{-4}$	90	7	AITALA	01C	E791	π^- nucleus, 500 GeV

$\Gamma(K^- K^- e^+ \mu^+ + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{239}/Γ

A test of lepton-number conservation. The value is for the sum of the two charge states.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$<5.7 \times 10^{-5}$	90	0	AITALA	01C	E791	π^- nucleus, 500 GeV

D^0 *CP*-VIOLATING DECAY-RATE ASYMMETRIES

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

This is the difference between D^0 and $\overline{D}^0$ partial widths for these modes divided by the sum of the widths. The D^0 and $\overline{D}^0$ are distinguished by the charge of the parent D^*: $D^{*+} \to D^0 \pi^+$ and $D^{*-} \to \overline{D}^0 \pi^-$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.014±0.010 OUR AVERAGE					
$+0.020 \pm 0.012 \pm 0.006$		[136] ACOSTA	05C	CDF	$p\overline{p}$, $\sqrt{s}$=1.96 TeV
$0.000 \pm 0.022 \pm 0.008$	3023	[136] CSORNA	02	CLE2	$e^+ e^- \approx \Upsilon(4S)$
$-0.001 \pm 0.022 \pm 0.015$	3330	[136] LINK	00B	FOCS	
$-0.010 \pm 0.049 \pm 0.012$	609	[136] AITALA	98C	E791	$-0.093 < A_{CP} < +0.073$ (90% CL)
$+0.080 \pm 0.061$		BARTELT	95	CLE2	$-0.022 < A_{CP} < +0.18$ (90%CL)
$+0.024 \pm 0.084$		[136] FRABETTI	94I	E687	$-0.11 < A_{CP} < +0.16$ (90% CL)

[136] FRABETTI 94I, AITALA 98C, LINK 00B, CSORNA 02, and ACOSTA 05C measure $N(D^0 \to K^+ K^-)/N(D^0 \to K^- \pi^+)$, the ratio of numbers of events observed, and similarly for the $\overline{D}^0$.

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

This is the difference between D^0 and $\overline{D}^0$ partial widths for these modes divided by the sum of the widths. The D^0 and $\overline{D}^0$ are distinguished by the charge of the parent D^*: $D^{*+} \to D^0 \pi^+$ and $D^{*-} \to \overline{D}^0 \pi^-$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
-0.23 ± 0.19	65	BONVICINI	01	CLE2	$e^+ e^- \approx$ 10.6 GeV

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

This is the difference between D^0 and $\overline{D}^0$ partial widths for these modes divided by the sum of the widths. The D^0 and $\overline{D}^0$ are distinguished by the charge of the parent D^*: $D^{*+} \to D^0 \pi^+$ and $D^{*-} \to \overline{D}^0 \pi^-$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.013±0.012 OUR AVERAGE					
$+0.010 \pm 0.013 \pm 0.006$		[137] ACOSTA	05C	CDF	$p\overline{p}$, $\sqrt{s}$=1.96 TeV
$0.019 \pm 0.032 \pm 0.008$	1136	[137] CSORNA	02	CLE2	$e^+ e^- \approx \Upsilon(4S)$
$+0.048 \pm 0.039 \pm 0.025$	1177	[137] LINK	00B	FOCS	
$-0.049 \pm 0.078 \pm 0.030$	343	[137] AITALA	98C	E791	$-0.186 < A_{CP} < +0.088$ (90% CL)

[137] AITALA 98C, LINK 00B, CSORNA 02, and ACOSTA 05C measure $N(D^0 \rightarrow \pi^+\pi^-)/N(D^0 \rightarrow K^-\pi^+)$, the ratio of numbers of events observed, and similarly for the $\overline{D}^0$.

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

This is the difference between D^0 and $\overline{D}^0$ partial widths for these modes divided by the sum of the widths. The D^0 and $\overline{D}^0$ are distinguished by the charge of the parent D^*: $D^{*+} \rightarrow D^0\pi^+$ and $D^{*-} \rightarrow \overline{D}^0\pi^-$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
+0.001±0.048	810	BONVICINI	01	CLE2	$e^+e^- \approx$ 10.6 GeV

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

This is the difference between D^0 and $\overline{D}^0$ partial widths for these modes divided by the sum of the widths. The D^0 and $\overline{D}^0$ are distinguished by the charge of the parent D^*: $D^{*+} \rightarrow D^0\pi^+$ and $D^{*-} \rightarrow \overline{D}^0\pi^-$.

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.01^{+0.09}_{-0.07}\pm0.05}$	CRONIN-HEN...	05	CLEO	$e^+e^- \approx$ 10 GeV

$A_{CP}(K^0_S\phi)$ in D^0, $\overline{D}^0 \rightarrow K^0_S\phi$

This is the difference between D^0 and $\overline{D}^0$ partial widths for these modes divided by the sum of the widths. The D^0 and $\overline{D}^0$ are distinguished by the charge of the parent D^*: $D^{*+} \rightarrow D^0\pi^+$ and $D^{*-} \rightarrow \overline{D}^0\pi^-$.

VALUE	DOCUMENT ID		TECN	COMMENT
−0.028±0.094	BARTELT	95	CLE2	$-0.182 < A_{CP} < +0.126$ (90%CL)

$A_{CP}(K^0_S\pi^0)$ in D^0, $\overline{D}^0 \rightarrow K^0_S\pi^0$

This is the difference between D^0 and $\overline{D}^0$ partial widths for these modes divided by the sum of the widths. The D^0 and $\overline{D}^0$ are distinguished by the charge of the parent D^*: $D^{*+} \rightarrow D^0\pi^+$ and $D^{*-} \rightarrow \overline{D}^0\pi^-$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
+0.001±0.013	9099	BONVICINI	01	CLE2	$e^+e^- \approx$ 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
−0.018±0.030		BARTELT	95	CLE2	See BONVICINI 01

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

This is the difference between D^0 and $\overline{D}^0$ partial widths for these modes divided by the sum of the widths. The D^0 and $\overline{D}^0$ are distinguished by the charge of the parent D^*: $D^{*+} \rightarrow D^0\pi^+$ and $D^{*-} \rightarrow \overline{D}^0\pi^-$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.05 ±0.04 OUR AVERAGE					
+0.023±0.047	4024 ± 88	[138] ZHANG	06	BELL	e^+e^-
+0.18 ±0.14 ±0.04		[139] LINK	05H	FOCS	γ nucleus
+0.095±0.061±0.083		[140] AUBERT	03Z	BABR	e^+e^-, 10.6 GeV
$+0.02\ ^{+0.19}_{-0.20}\ \pm0.01$	45	[141] GODANG	00	CLE2	$-0.43 < A_{CP} < +0.34$ (95%CL)
• • • We do not use the following data for averages, fits, limits, etc. • • •					
−0.080±0.077	845 ± 40	[142] LI	05A	BELL	See ZHANG 06

[138] This ZHANG 06 result allows mixing.

[139] This LINK 05H result assumes no mixing. If mixing is allowed, it becomes $0.13^{+0.33}_{-0.25} \pm 0.10$.

[140] This AUBERT 03Z limit assumes no mixing. If mixing is allowed, the 95% confidence-level interval is $(-2.8 < A_D < 4.9)\times10^{-3}$.

[141] This GODANG 00 result assumes no D^0-$\overline{D}^0$ mixing; it becomes $-0.01^{+0.16}_{-0.17} \pm 0.01$ when mixing is allowed.

[142] This LI 05A result allows mixing.

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

This is the difference between D^0 and $\overline{D}^0$ partial widths for these modes divided by the sum of the widths. The D^0 and $\overline{D}^0$ are distinguished by the charge of the parent D^*: $D^{*+} \to D^0\pi^+$ and $D^{*-} \to \overline{D}^0\pi^-$.

VALUE	DOCUMENT ID	TECN	COMMENT
−0.031±0.086	[143] KOPP 01	CLE2	$e^+e^- \approx$ 10.6 GeV

[143] KOPP 01 fits separately the D^0 and $\overline{D}^0$ Dalitz plots and then calculates the integrated difference of normalized densities divided by the integrated sum.

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

This is the difference between D^0 and $\overline{D}^0$ partial widths for these modes divided by the sum of the widths. The D^0 and $\overline{D}^0$ are distinguished by the charge of the parent D^*: $D^{*+} \to D^0\pi^+$ and $D^{*-} \to \overline{D}^0\pi^-$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.00 ±0.05 OUR AVERAGE				
−0.006±0.053	1978 ± 104	TIAN 05	BELL	$e^+e^- \approx \Upsilon(4S)$
$+0.09^{+0.25}_{-0.22}$	38	BRANDENB... 01	CLE2	$e^+e^- \approx \Upsilon(4S)$

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

This is the difference between D^0 and $\overline{D}^0$ partial widths for these modes divided by the sum of the widths. The D^0 and $\overline{D}^0$ are distinguished by the charge of the parent D^*: $D^{*+} \to D^0\pi^+$ and $D^{*-} \to \overline{D}^0\pi^-$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
$-0.009\pm0.021^{+0.016}_{-0.057}$	4854	[144] ASNER 04A	CLEO	$e^+e^- \approx$ 10 GeV

[144] This is the overall result of ASNER 04A; *CP*-violating limits are also given for each of the 10 resonant submodes found in an amplitude analysis of the D^0 and $\overline{D}^0 \to K^0_S\pi^+\pi^-$ Dalitz plots. These limits range from $< 3.5\times10^{-4}$ to 28.4×10^{-4} at 95% CL.

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

This is the difference between D^0 and $\overline{D}^0$ partial widths for these modes divided by the sum of the widths. The D^0 and $\overline{D}^0$ are distinguished by the charge of the parent D^*: $D^{*+} \to D^0\pi^+$ and $D^{*-} \to \overline{D}^0\pi^-$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
−0.018±0.044	1721 ± 75	TIAN 05	BELL	$e^+e^- \approx \Upsilon(4S)$

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

This is the difference between D^0 and $\overline{D}^0$ partial widths for these modes divided by the sum of the widths. The D^0 and $\overline{D}^0$ are distinguished by the charge of the parent D^*: $D^{*+} \to D^0\pi^+$ and $D^{*-} \to \overline{D}^0\pi^-$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
−0.082±0.056±0.047	828 ± 46	LINK 05E	FOCS	γ A, $\overline{E}_{\gamma}\approx$ 180 GeV

D^0-$\overline{D}^0$ T-VIOLATING DECAY-RATE ASYMMETRIES

D^0 and $\overline{D}^0$ are distinguished by the charge of the parent D^*: $D^{*+} \rightarrow D^0\pi^+$ and $D^{*-} \rightarrow \overline{D}^0\pi^-$.

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

$C_T \equiv \vec{p}_{K^+} \cdot (\vec{p}_{\pi^+} \times \vec{p}_{\pi^-})$ is a T-odd correlation of the K^+, π^+, and π^- momenta for the D^0. $\overline{C}_T \equiv \vec{p}_{K^-} \cdot (\vec{p}_{\pi^-} \times \vec{p}_{\pi^+})$ is the corresponding quantity for the $\overline{D}^0$. $A_T \equiv [\Gamma(C_T > 0) - \Gamma(C_T < 0)] / [\Gamma(C_T > 0) + \Gamma(C_T < 0)]$ would, in the absence of strong phases, test for T violation in D^0 decays (the Γ's are partial widths). With $\overline{A}_T \equiv [\Gamma(-\overline{C}_T > 0) - \Gamma(-\overline{C}_T < 0)] / [\Gamma(-\overline{C}_T > 0) + \Gamma(-\overline{C}_T < 0)]$, the asymmetry $A_{Tviol} \equiv \frac{1}{2}(A_T - \overline{A}_T)$ tests for T violation even with nonzero strong phases.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
+0.010±0.057±0.037	828 ± 46	LINK	05E	FOCS	γ A, $\overline{E}_\gamma \approx$ 180 GeV

D^0 CPT-VIOLATING DECAY-RATE ASYMMETRIES

$A_{CPT}(K^\mp\pi^\pm)$ in $D^0 \rightarrow K^-\pi^+$, $\overline{D}^0 \rightarrow K^+\pi^-$

A_{CPT}(t) is defined in terms of the time-dependent decay probabilities $P(D^0 \rightarrow K^-\pi^+)$ and $\overline{P}(\overline{D}^0 \rightarrow K^+\pi^-)$ by $A_{CPT}(t) = (\overline{P} - P)/(\overline{P} + P)$. For small mixing parameters x $\equiv \Delta m/\Gamma$ and y $\equiv \Delta\Gamma/2\Gamma$ (as is the case), and times t, A_{CPT}(t) reduces to [y $Re\,\xi$ - x $Im\,\xi$] Γt, where ξ is the CPT-violating parameter.

The following is actually y $Re\,\xi$ - x $Im\,\xi$.

VALUE	DOCUMENT ID		TECN	COMMENT
0.0083±0.0065±0.0041	LINK	03B	FOCS	γ nucleus, $\overline{E}_\gamma \approx$ 180 GeV

$D^0 \rightarrow K^*(892)^-\ell^+\nu_\ell$ FORM FACTORS

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

VALUE	DOCUMENT ID		TECN	COMMENT
1.71±0.68±0.34	LINK	05B	FOCS	$K^*(892)^-\mu^+\nu_\mu$

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.91±0.37±0.10	LINK	05B	FOCS	$K^*(892)^-\mu^+\nu_\mu$

D^0 REFERENCES

PDG	06	JPG 33 1	W.-M. Yao et al.	(PDG Collab.)
RUBIN	06	PRL 96 081802	P. Rubin et al.	(CLEO Collab.)
ZHANG	06	PRL 96 151801	L.M. Zhang et al.	(BELLE Collab.)
ABLIKIM	05F	PL B622 6	M. Ablikim et al.	(BEPC BES Collab.)
ABLIKIM	05P	PL B625 196	M. Ablikim et al.	(BEPC BES Collab.)
ACOSTA	05C	PRL 94 122001	D. Acosta et al.	(FNAL CDF Collab.)
ASNER	05	PR D72 012001	D.M. Asner et al.	(CLEO Collab.)
AUBERT,B	05J	PR D72 052008	B. Aubert et al.	(BABAR Collab.)
BITENC	05	PR D72 071101R	U. Bitenc et al.	(BELLE Collab.)
CAWLFIELD	05	PR D71 077101	C. Cawlfield et al.	(CLEO Collab.)
COAN	05	PRL 95 181802	T.E. Coan et al.	(CLEO Collab.)

CRONIN-HEN...	05	PR D72 031102R	D. Cronin-Hennessy et al.	(CLEO Collab.)
HE	05	PRL 95 121801	Q. He et al.	(CLEO Collab.)
HUANG	05	PRL 94 011802	G.S. Huang et al.	(CLEO Collab.)
KAYIS-TOPAK...	05	PL B626 24	A. Kayis-Topaksu et al.	(CERN CHORUS Collab.)
LI	05A	PRL 94 071801	J. Li et al.	(BELLE Collab.)
LINK	05	PL B607 51	J.M. Link et al.	(FNAL FOCUS Collab.)
LINK	05A	PL B607 59	J.M. Link et al.	(FNAL FOCUS Collab.)
LINK	05B	PL B607 67	J.M. Link et al.	(FNAL FOCUS Collab.)
LINK	05E	PL B622 239	J.M. Link et al.	(FNAL FOCUS Collab.)
LINK	05G	PL B610 225	J.M. Link et al.	(FNAL FOCUS Collab.)
LINK	05H	PL B618 23	J.M. Link et al.	(FNAL FOCUS Collab.)
ONENGUT	05	PL B613 105	G. Onengut et al.	(CERN CHORUS Collab.)
TIAN	05	PRL 95 231801	X.C. Tian et al.	(BELLE Collab.)
ABLIKIM	04C	PL B597 39	M. Ablikim et al.	(BEPC BES Collab.)
ABT	04	PL B596 173	I. Abt et al.	(HERA B Collab.)
ASNER	04A	PR D70 091101R	D.M. Asner et al.	(CLEO Collab.)
AUBERT	04Q	PR D69 051101R	B. Aubert et al.	(BABAR Collab.)
AUBERT,B	04Q	PR D70 091102R	B. Aubert et al.	(BaBar Collab.)
AUBERT,B	04Y	PRL 93 191801	B. Aubert et al.	(BaBar Collab)
LINK	04B	PL B586 21	J.M. Link et al.	(FNAL FOCUS Collab.)
LINK	04D	PL B586 191	J.M. Link et al.	(FNAL FOCUS Collab.)
RUBIN	04	PRL 93 111801	P. Rubin et al.	(CLEO Collab.)
TAJIMA	04	PRL 92 101803	O. Tajima et al.	(BELLE Collab.)
ACOSTA	03F	PR D68 091101R	D. Acosta et al.	(CDF Collab.)
AUBERT	03P	PRL 91 121801	B. Aubert et al.	(BaBar Collab.)
AUBERT	03Z	PRL 91 171801	B. Aubert et al.	(BaBar Collab.)
COAN	03	PRL 90 101801	T.E. Coan et al.	(CLEO Collab.)
LINK	03	PL B555 167	J.M. Link et al.	(FNAL FOCUS Collab.)
LINK	03B	PL B556 7	J.M. Link et al.	(FNAL FOCUS Collab.)
LINK	03G	PL B575 190	J.M. Link et al.	(FNAL FOCUS Collab.)
ABE	02I	PRL 88 162001	K. Abe et al.	(KEK BELLE Collab.)
CSORNA	02	PR D65 092001	S.E. Csorna et al.	(CLEO Collab.)
LINK	02F	PL B537 192	J.M. Link et al.	(FNAL FOCUS Collab.)
MURAMATSU	02	PRL 89 251802	H. Muramatsu et al.	(CLEO Collab.)
Also		PRL 90 059901 (erratum)	H. Muramatsu et al.	(CLEO Collab.)
AITALA	01C	PRL 86 3969	E.M. Aitala et al.	(FNAL E791 Collab.)
AITALA	01D	PR D64 112003	E.M. Aitala et al.	(FNAL E791 Collab.)
BONVICINI	01	PR D63 071101R	G. Bonvicini et al.	(CLEO Collab.)
BRANDENB...	01	PRL 87 071802	G. Brandenburg et al.	(CLEO Collab.)
DYTMAN	01	PR D64 111101 (R)	S.A. Dytman et al.	(CLEO Collab.)
KOPP	01	PR D63 092001	S. Kopp et al.	(CLEO Collab.)
KUSHNIR...	01	PRL 86 5243	A. Kushnirenko et al.	(FNAL SELEX Collab.)
LINK	01	PRL 86 2955	J.M. Link et al.	(FNAL FOCUS Collab.)
BAI	00C	PR D62 052001	J.Z. Bai et al.	(BEPC BES Collab.)
GODANG	00	PRL 84 5038	R. Godang et al.	(CLEO Collab.)
JUN	00	PRL 84 1857	S.Y. Jun et al.	(FNAL SELEX Collab.)
LINK	00	PL B485 62	J.M. Link et al.	(FNAL FOCUS Collab.)
LINK	00B	PL B491 232	J.M. Link et al.	(FNAL FOCUS Collab.)
Also		PL B495 443 (erratum)	J.M. Link et al.	(FNAL FOCUS Collab.)
PRIPSTEIN	00	PR D61 032005	D. Pripstein et al.	(FNAL E789 Collab.)
AITALA	99E	PRL 83 32	E.M. Aitala et al.	(FNAL E791 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	98	PR D57 13	E.M. Aitala et al.	(FNAL E791 Collab.)
AITALA	98C	PL B421 405	E.M. Aitala et al.	(FNAL E791 Collab.)
AITALA	98D	PL B423 185	E.M. Aitala et al.	(FNAL E791 Collab.)
ARTUSO	98	PRL 80 3193	M. Artuso et al.	(CLEO Collab.)
ASNER	98	PR D58 092001	D.M. Asner et al.	(CLEO Collab.)
BARATE	98W	PL B436 211	R. Barate et al.	(ALEPH Collab.)
COAN	98	PRL 80 1150	T.E. Coan et al.	(CLEO Collab.)
ADAMOVICH	97	PL B408 469	M.I. Adamovich et al.	(CERN BEATRICE Collab.)
BARATE	97C	PL B403 367	R. Barate et al.	(ALEPH Collab.)
AITALA	96C	PRL 77 2384	E.M. Aitala et al.	(FNAL E791 Collab.)
ALBRECHT	96C	PL B374 249	H. Albrecht et al.	(ARGUS Collab.)
ALEXOPOU...	96	PRL 77 2380	T. Alexopoulos et al.	(FNAL E771 Collab.)
ASNER	96B	PR D54 4211	D.M. Asner et al.	(CLEO Collab.)
BARISH	96	PL B373 334	B.C. Barish et al.	(CLEO Collab.)
FRABETTI	96B	PL B382 312	P.L. Frabetti et al.	(FNAL E687 Collab.)
FREYBERGER	96	PRL 76 3065	A. Freyberger et al.	(CLEO Collab.)
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ADAMOVICH	95	PL B353 563	M.I. Adamovich *et al.*	(CERN BEATRICE Collab.)
BARTELT	95	PR D52 4860	J.E. Bartelt *et al.*	(CLEO Collab.)
BUTLER	95	PR D52 2656	F. Butler *et al.*	(CLEO Collab.)
FRABETTI	95C	PL B354 486	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	95G	PL B364 127	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
KODAMA	95	PL B345 85	K. Kodama *et al.*	(FNAL E653 Collab.)
ALBRECHT	94	PL B324 249	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	94F	PL B340 125	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	94I	ZPHY C64 375	H. Albrecht *et al.*	(ARGUS Collab.)
CINABRO	94	PRL 72 1406	D. Cinabro *et al.*	(CLEO Collab.)
FRABETTI	94C	PL B321 295	P.L. Frabetti *et al.*	(FNAL E687 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.)
FRABETTI	94J	PL B340 254	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
KODAMA	94	PL B336 605	K. Kodama *et al.*	(FNAL E653 Collab.)
MISHRA	94	PR D50 R9	C.S. Mishra *et al.*	(FNAL E789 Collab.)
AKERIB	93	PRL 71 3070	D.S. Akerib *et al.*	(CLEO Collab.)
ALBRECHT	93D	PL B308 435	H. Albrecht *et al.*	(ARGUS 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	93I	PL B315 203	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
KODAMA	93B	PL B313 260	K. Kodama *et al.*	(FNAL E653 Collab.)
PROCARIO	93B	PR D48 4007	M. Procario *et al.*	(CLEO Collab.)
SELEN	93	PRL 71 1973	M.A. Selen *et al.*	(CLEO Collab.)
ADAMOVICH	92	PL B280 163	M.I. Adamovich *et al.*	(CERN WA82 Collab.)
ALBRECHT	92P	ZPHY C56 7	H. Albrecht *et al.*	(ARGUS Collab.)
ANJOS	92B	PR D46 R1	J.C. Anjos *et al.*	(FNAL E691 Collab.)
ANJOS	92C	PR D46 1941	J.C. Anjos *et al.*	(FNAL E691 Collab.)
BARLAG	92C	ZPHY C55 383	S. Barlag *et al.*	(ACCMOR Collab.)
Also		ZPHY C48 29	S. Barlag *et al.*	(ACCMOR Collab.)
COFFMAN	92B	PR D45 2196	D.M. Coffman *et al.*	(Mark III Collab.)
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FRABETTI	92	PL B281 167	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	92B	PL B286 195	P.L. Frabetti *et al.*	(FNAL E687 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	91	PR D43 R635	J.C. Anjos *et al.*	(FNAL-TPS Collab.)
ANJOS	91D	PR D44 R3371	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.)
CRAWFORD	91B	PR D44 3394	G. Crawford *et al.*	(CLEO Collab.)
DECAMP	91J	PL B266 218	D. Decamp *et al.*	(ALEPH Collab.)
FRABETTI	91	PL B263 584	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
KINOSHITA	91	PR D43 2836	K. Kinoshita *et al.*	(CLEO Collab.)
KODAMA	91	PRL 66 1819	K. Kodama *et al.*	(FNAL E653 Collab.)
ALBRECHT	90C	ZPHY C46 9	H. Albrecht *et al.*	(ARGUS Collab.)
ALEXANDER	90	PRL 65 1184	J. Alexander *et al.*	(CLEO Collab.)
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ALVAREZ	90	ZPHY C47 539	M.P. Alvarez *et al.*	(CERN NA14/2 Collab.)
ANJOS	90D	PR D42 2414	J.C. Anjos *et al.*	(FNAL E691 Collab.)
BARLAG	90C	ZPHY C46 563	S. Barlag *et al.*	(ACCMOR Collab.)
ADLER	89	PRL 62 1821	J. Adler *et al.*	(Mark III Collab.)
ADLER	89C	PR D40 906	J. Adler *et al.*	(Mark III Collab.)
ALBRECHT	89D	ZPHY C43 181	H. Albrecht *et al.*	(ARGUS Collab.)
ANJOS	89F	PRL 62 1587	J.C. Anjos *et al.*	(FNAL E691 Collab.)
ABACHI	88	PL B205 411	S. Abachi *et al.*	(HRS Collab.)
ADLER	88	PR D37 2023	J. Adler *et al.*	(Mark III Collab.)
ADLER	88C	PRL 60 89	J. Adler *et al.*	(Mark III Collab.)
ALBRECHT	88G	PL B209 380	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	88I	PL B210 267	H. Albrecht *et al.*	(ARGUS Collab.)
ANJOS	88C	PRL 60 1239	J.C. Anjos *et al.*	(FNAL E691 Collab.)
BORTOLETTO	88	PR D37 1719	D. Bortoletto *et al.*	(CLEO Collab.)
Also		PR D39 1471 (erratum)	D. Bortoletto *et al.*	(CLEO Collab.)
HAAS	88	PRL 60 1614	P. Haas *et al.*	(CLEO 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		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		ZPHY C38 520 (erratum)	M. Aguilar-Benitez *et al.*	(LEBC-EHS Collab.)
ALBRECHT	87K	PL B199 447	H. Albrecht *et al.*	(ARGUS Collab.)
BARLAG	87B	ZPHY C37 17	S. Barlag *et al.*	(ACCMOR Collab.)
BECKER	87C	PL B193 147	J.J. Becker *et al.*	(Mark III Collab.)
Also		PL B198 590 (erratum)	J.J. Becker *et al.*	(Mark III Collab.)
PALKA	87	PL B189 238	H. Palka *et al.*	(ACCMOR Collab.)
RILES	87	PR D35 2914	K. Riles *et al.*	(Mark II Collab.)
BAILEY	86	ZPHY C30 51	R. Bailey *et al.*	(ACCMOR Collab.)
BEBEK	86	PRL 56 1893	C. Bebek *et al.*	(CLEO Collab.)
LOUIS	86	PRL 56 1027	W.C. Louis *et al.*	(PRIN, CHIC, ISU)
ALBRECHT	85B	PL 158B 525	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	85F	PL 150B 235	H. Albrecht *et al.*	(ARGUS Collab.)
AUBERT	85	PL 155B 461	J.J. Aubert *et al.*	(EMC 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.)
BENVENUTI	85	PL 158B 531	A.C. Benvenuti *et al.*	(BCDMS Collab.)
ADAMOVICH	84B	PL 140B 123	M.I. Adamovich *et al.*	(CERN WA58 Collab.)
DERRICK	84	PRL 53 1971	M. Derrick *et al.*	(HRS Collab.)
SUMMERS	84	PRL 52 410	D.J. Summers *et al.*	(UCSB, CARL, COLO+)
BAILEY	83B	PL 132B 237	R. Bailey *et al.*	(ACCMOR Collab.)
BODEK	82	PL 113B 82	A. Bodek *et al.*	(ROCH, CIT, CHIC, FNAL+)
FIORINO	81	LNC 30 166	A. Fiorino *et al.*	
SCHINDLER	81	PR D24 78	R.H. Schindler *et al.*	(Mark II Collab.)
TRILLING	81	PRPL 75 57	G.H. Trilling	(LBL, UCB) J
ASTON	80E	PL 94B 113	D. Aston *et al.*	(BONN, CERN, EPOL, GLAS+)
AVERY	80	PRL 44 1309	P. Avery *et al.*	(ILL, FNAL, COLU)
ZHOLENTZ	80	PL 96B 214	A.A. Zholents *et al.*	(NOVO)
Also		SJNP 34 814	A.A. Zholents *et al.*	(NOVO)
		Translated from YAF 34 1471.		
ABRAMS	79D	PRL 43 481	G.S. Abrams *et al.*	(Mark II Collab.)
ATIYA	79	PRL 43 414	M.S. Atiya *et al.*	(COLU, ILL, FNAL)
BALTAY	78C	PRL 41 73	C. Baltay *et al.*	(COLU, BNL)
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.)
GOLDHABER	76	PRL 37 255	G. Goldhaber *et al.*	(Mark I Collab.)

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