CHARMED MESONS ($C = \pm 1$)

$D^+ = c\overline{d}$, $D^0 = c\overline{u}$, $\overline{D}^0 = \overline{c}u$, $D^- = \overline{c}d$, similarly for D^*'s

$D^\pm$

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

Mass $m = 1869.62 \pm 0.15$ MeV (S = 1.1)
Mean life $\tau = (1040 \pm 7) \times 10^{-15}$ s
$c\tau = 311.8$ μm

c-quark decays

$\Gamma(c \to \ell^+ \text{anything})/\Gamma(c \to \text{anything}) = 0.096 \pm 0.004$ [a]
$\Gamma(c \to D^*(2010)^+ \text{anything})/\Gamma(c \to \text{anything}) = 0.255 \pm 0.017$

CP-violation decay-rate asymmetries

$A_{CP}(\mu^\pm\nu) = (8 \pm 8)\%$
$A_{CP}(K^0_S\pi^\pm) = (-0.54 \pm 0.14)\%$
$A_{CP}(K^\mp 2\pi^\pm) = (-0.1 \pm 1.0)\%$
$A_{CP}(K^\mp\pi^\pm\pi^\pm\pi^0) = (1.0 \pm 1.3)\%$
$A_{CP}(K^0_S\pi^\pm\pi^0) = (0.3 \pm 0.9)\%$
$A_{CP}(K^0_S\pi^\pm\pi^+\pi^-) = (0.1 \pm 1.3)\%$
$A_{CP}(\pi^\pm\pi^0) = (2.9 \pm 2.9)\%$
$A_{CP}(\pi^\pm\eta) = (1.0 \pm 1.5)\%$ (S = 1.4)
$A_{CP}(\pi^\pm\eta'(958)) = (-0.5 \pm 1.2)\%$ (S = 1.1)
$A_{CP}(K^0_S K^\pm) = (-0.1 \pm 0.6)\%$
$A_{CP}(K^+K^-\pi^\pm) = (0.3 \pm 0.6)\%$
$A_{CP}(K^\pm K^{*0}) = (0.1 \pm 1.3)\%$
$A_{CP}(\phi\pi^\pm) = (0.42 \pm 0.28)\%$
$A_{CP}(K^\pm K^*_0(1430)^0) = (8^{+7}_{-6})\%$
$A_{CP}(K^\pm K^*_2(1430)^0) = (43^{+20}_{-26})\%$
$A_{CP}(K^\pm K^*_0(800)) = (-12^{+18}_{-13})\%$
$A_{CP}(a_0(1450)^0\pi^\pm) = (-19^{+14}_{-16})\%$
$A_{CP}(\phi(1680)\pi^\pm) = (-9 \pm 26)\%$
$A_{CP}(\pi^+\pi^-\pi^\pm) = (-2 \pm 4)\%$
$A_{CP}(K^0_S K^\pm\pi^+\pi^-) = (-4 \pm 7)\%$
$A_{CP}(K^\pm\pi^0) = (-4 \pm 11)\%$

T-violation decay-rate asymmetry

$A_T(K^0_S K^\pm\pi^+\pi^-) = (-12 \pm 11) \times 10^{-3}$ [b]

D^+ form factors

$f_+(0)|V_{cs}|$ in $\overline{K}^0 \ell^+ \nu_\ell = 0.707 \pm 0.013$
$r_1 \equiv a_1/a_0$ in $\overline{K}^0 \ell^+ \nu_\ell = -1.7 \pm 0.5$
$r_2 \equiv a_2/a_0$ in $\overline{K}^0 \ell^+ \nu_\ell = -14 \pm 11$
$f_+(0)|V_{cd}|$ in $\pi^0 \ell^+ \nu_\ell = 0.146 \pm 0.007$
$r_1 \equiv a_1/a_0$ in $\pi^0 \ell^+ \nu_\ell = -1.4 \pm 0.9$
$r_2 \equiv a_2/a_0$ in $\pi^0 \ell^+ \nu_\ell = -4 \pm 5$
$f_+(0)|V_{cd}|$ in $D^+ \to \eta e^+ \nu_e = 0.086 \pm 0.006$
$r_1 \equiv a_1/a_0$ in $D^+ \to \eta e^+ \nu_e = -1.8 \pm 2.2$
$r_v \equiv V(0)/A_1(0)$ in $\overline{K}^*(892)^0 \ell^+ \nu_\ell = 1.51 \pm 0.07$ (S = 2.2)
$r_2 \equiv A_2(0)/A_1(0)$ in $\overline{K}^*(892)^0 \ell^+ \nu_\ell = 0.807 \pm 0.025$
$r_3 \equiv A_3(0)/A_1(0)$ in $\overline{K}^*(892)^0 \ell^+ \nu_\ell = 0.0 \pm 0.4$
Γ_L/Γ_T in $\overline{K}^*(892)^0 \ell^+ \nu_\ell = 1.13 \pm 0.08$
Γ_+/Γ_- in $\overline{K}^*(892)^0 \ell^+ \nu_\ell = 0.22 \pm 0.06$ (S = 1.6)

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 $2\,\Gamma(K^0_S) = \Gamma(\overline{K}^0)$.

D^+ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
Inclusive modes			
e^+ semileptonic	(16.07±0.30) %		–
μ^+ anything	(17.6 ±3.2) %		–
K^- anything	(25.7 ±1.4) %		–
$\overline{K}^0$ anything + K^0 anything	(61 ±5) %		–
K^+ anything	(5.9 ±0.8) %		–
$K^*(892)^-$ anything	(6 ±5) %		–
$\overline{K}^*(892)^0$ anything	(23 ±5) %		–
$K^*(892)^0$ anything	< 6.6 %	CL=90%	–
η anything	(6.3 ±0.7) %		–
η' anything	(1.04±0.18) %		–
ϕ anything	(1.03±0.12) %		–
Leptonic and semileptonic modes			
$e^+ \nu_e$	< 8.8 $\times 10^{-6}$	CL=90%	935
$\mu^+ \nu_\mu$	(3.82±0.33) $\times 10^{-4}$		932
$\tau^+ \nu_\tau$	< 1.2 $\times 10^{-3}$	CL=90%	91
$\overline{K}^0 e^+ \nu_e$	(8.83±0.22) %		869
$\overline{K}^0 \mu^+ \nu_\mu$	(9.2 ±0.6) %		865
$K^- \pi^+ e^+ \nu_e$	(4.00±0.10) %		864

$\overline{K}^*(892)^0 e^+ \nu_e$, $\overline{K}^*(892)^0 \to K^- \pi^+$		(3.68±0.10) %		722
$(K^- \pi^+)_{S-wave} e^+ \nu_e$		(2.32±0.10) × 10^{-3}		–
$\overline{K}^*(1410)^0 e^+ \nu_e$, $\overline{K}^*(1410)^0 \to K^- \pi^+$		< 6 × 10^{-3}	CL=90%	–
$\overline{K}_2^*(1430)^0 e^+ \nu_e$, $\overline{K}_2^*(1430)^0 \to K^- \pi^+$		< 5 × 10^{-4}	CL=90%	–
$K^- \pi^+ e^+ \nu_e$ nonresonant		< 7 × 10^{-3}	CL=90%	864
$K^- \pi^+ \mu^+ \nu_\mu$		(3.8 ±0.4) %		851
$\overline{K}^*(892)^0 \mu^+ \nu_\mu$, $\overline{K}^*(892)^0 \to K^- \pi^+$		(3.52±0.10) %		717
$K^- \pi^+ \mu^+ \nu_\mu$ nonresonant		(2.0 ±0.5) × 10^{-3}		851
$K^- \pi^+ \pi^0 \mu^+ \nu_\mu$		< 1.6 × 10^{-3}	CL=90%	825
$\pi^0 e^+ \nu_e$		(4.05±0.18) × 10^{-3}		930
$\eta e^+ \nu_e$		(1.14±0.10) × 10^{-3}		855
$\rho^0 e^+ \nu_e$		(2.2 ±0.4) × 10^{-3}		774
$\rho^0 \mu^+ \nu_\mu$		(2.4 ±0.4) × 10^{-3}		770
$\omega e^+ \nu_e$		(1.6 $^{+0.7}_{-0.6}$) × 10^{-3}		771
$\eta'(958) e^+ \nu_e$		(2.2 ±0.5) × 10^{-4}		689
$\phi e^+ \nu_e$		< 9 × 10^{-5}	CL=90%	657

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

$\overline{K}^*(892)^0 e^+ \nu_e$		(5.52±0.15) %		722
$\overline{K}^*(892)^0 \mu^+ \nu_\mu$		(5.28±0.15) %		717
$\overline{K}_0^*(1430)^0 \mu^+ \nu_\mu$		< 2.4 × 10^{-4}		380
$\overline{K}^*(1680)^0 \mu^+ \nu_\mu$		< 1.5 × 10^{-3}		105

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

$K_S^0 \pi^+$		(1.47±0.07) %	S=2.0	863
$K_L^0 \pi^+$		(1.46±0.05) %		863
$K^- 2\pi^+$	[c]	(9.13±0.19) %		846
$(K^- \pi^+)_{S-\text{wave}} \pi^+$		(7.32±0.19) %		846
$\overline{K}_0^*(1430)^0 \pi^+$, $\overline{K}_0^*(1430)^0 \to K^- \pi^+$	[d]	(1.21±0.06) %		382
$\overline{K}^*(892)^0 \pi^+$, $\overline{K}^*(892)^0 \to K^- \pi^+$		(1.01±0.11) %		714
$\overline{K}^*(1410)^0 \pi^+$, $\overline{K}^{*0} \to K^- \pi^+$		not seen		381
$\overline{K}_2^*(1430)^0 \pi^+$, $\overline{K}_2^*(1430)^0 \to K^- \pi^+$	[d]	(2.2 ±0.7) × 10^{-4}		371
$\overline{K}^*(1680)^0 \pi^+$, $\overline{K}^*(1680)^0 \to K^- \pi^+$	[d]	(2.1 ±1.1) × 10^{-4}		58

$K^-(2\pi^+)_{I=2}$		(1.41±0.26) %		–
$K^0_S\pi^+\pi^0$	[c]	(6.99±0.27) %		845
$K^0_S\rho^+$		(4.8 ±1.0) %		677
$\overline{K}^*(892)^0\pi^+$, $\overline{K}^*(892)^0 \to K^0_S\pi^0$		(1.3 ±0.6) %		714
$K^0_S\pi^+\pi^0$ nonresonant		(9 ±7) × 10^{-3}		845
$K^-2\pi^+\pi^0$	[e]	(5.99±0.18) %		816
$K^0_S2\pi^+\pi^-$	[e]	(3.12±0.11) %		814
$K^-3\pi^+\pi^-$	[c]	(5.6 ±0.5) × 10^{-3}	S=1.1	772
$\overline{K}^*(892)^02\pi^+\pi^-$, $\overline{K}^*(892)^0 \to K^-\pi^+$		(1.2 ±0.4) × 10^{-3}		645
$\overline{K}^*(892)^0\rho^0\pi^+$, $\overline{K}^*(892)^0 \to K^-\pi^+$		(2.2 ±0.4) × 10^{-3}		239
$\overline{K}^*(892)^0a_1(1260)^+$	[f]	(9.0 ±1.8) × 10^{-3}		†
$K^-\rho^02\pi^+$		(1.68±0.27) × 10^{-3}		524
$K^-3\pi^+\pi^-$ nonresonant		(3.9 ±2.9) × 10^{-4}		772
$K^+2K^0_S$		(4.5 ±2.0) × 10^{-3}		545
$K^+K^-K^0_S\pi^+$		(2.4 ±0.6) × 10^{-4}		436

Pionic modes

$\pi^+\pi^0$		(1.19±0.06) × 10^{-3}		925
$2\pi^+\pi^-$		(3.18±0.18) × 10^{-3}		909
$\rho^0\pi^+$		(8.1 ±1.5) × 10^{-4}		767
$\pi^+(\pi^+\pi^-)_{S-\text{wave}}$		(1.78±0.16) × 10^{-3}		909
$\sigma\pi^+$, $\sigma \to \pi^+\pi^-$		(1.34±0.12) × 10^{-3}		–
$f_0(980)\pi^+$, $f_0(980) \to \pi^+\pi^-$		(1.52±0.33) × 10^{-4}		669
$f_0(1370)\pi^+$, $f_0(1370) \to \pi^+\pi^-$		(8 ±4) × 10^{-5}		–
$f_2(1270)\pi^+$, $f_2(1270) \to \pi^+\pi^-$		(4.9 ±0.9) × 10^{-4}		485
$\rho(1450)^0\pi^+$, $\rho(1450)^0 \to \pi^+\pi^-$		< 8 × 10^{-5}	CL=95%	338
$f_0(1500)\pi^+$, $f_0(1500) \to \pi^+\pi^-$		(1.1 ±0.4) × 10^{-4}		–
$f_0(1710)\pi^+$, $f_0(1710) \to \pi^+\pi^-$		< 5 × 10^{-5}	CL=95%	–
$f_0(1790)\pi^+$, $f_0(1790) \to \pi^+\pi^-$		< 6 × 10^{-5}	CL=95%	–
$(\pi^+\pi^+)_{S-\text{wave}}\pi^-$		< 1.2 × 10^{-4}	CL=95%	909
$2\pi^+\pi^-$ nonresonant		< 1.1 × 10^{-4}	CL=95%	909
$\pi^+2\pi^0$		(4.6 ±0.4) × 10^{-3}		910
$2\pi^+\pi^-\pi^0$		(1.13±0.08) %		883

$\eta\pi^+$, $\eta \to \pi^+\pi^-\pi^0$		$(\ 8.0\ \pm 0.5\ ) \times 10^{-4}$		848
$\omega\pi^+$, $\omega \to \pi^+\pi^-\pi^0$		$< 3 \times 10^{-4}$	CL=90%	763
$3\pi^+ 2\pi^-$		$(\ 1.61 \pm 0.16) \times 10^{-3}$		845

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

$\eta\pi^+$		$(\ 3.53 \pm 0.21) \times 10^{-3}$		848
$\eta\pi^+\pi^0$		$(\ 1.38 \pm 0.35) \times 10^{-3}$		830
$\omega\pi^+$		$< 3.4 \times 10^{-4}$	CL=90%	764
$\eta'(958)\pi^+$		$(\ 4.67 \pm 0.29) \times 10^{-3}$		681
$\eta'(958)\pi^+\pi^0$		$(\ 1.6\ \pm 0.5\ ) \times 10^{-3}$		654

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

$K^+ K^0_S$		$(\ 2.83 \pm 0.16) \times 10^{-3}$	S=2.2	793
$K^+ K^-\pi^+$	[c]	$(\ 9.54 \pm 0.26) \times 10^{-3}$	S=1.1	744
$\phi\pi^+$, $\phi \to K^+ K^-$		$(\ 2.65^{+0.08}_{-0.09}) \times 10^{-3}$		647
$K^+\overline{K}^*(892)^0$, $\overline{K}^*(892)^0 \to K^-\pi^+$		$(\ 2.45^{+0.09}_{-0.14}) \times 10^{-3}$		613
$K^+\overline{K}^*_0(1430)^0$, $\overline{K}^*_0(1430)^0 \to K^-\pi^+$		$(\ 1.79 \pm 0.34) \times 10^{-3}$		–
$K^+\overline{K}^*_2(1430)^0$, $\overline{K}^*_2 \to K^-\pi^+$		$(\ 1.6\ ^{+1.2}_{-0.8}\ ) \times 10^{-4}$		–
$K^+\overline{K}^*_0(800)$, $\overline{K}^*_0 \to K^-\pi^+$		$(\ 6.7\ ^{+3.4}_{-2.1}\ ) \times 10^{-4}$		–
$a_0(1450)^0\pi^+$, $a^0_0 \to K^+ K^-$		$(\ 4.4\ ^{+7.0}_{-1.8}\ ) \times 10^{-4}$		–
$\phi(1680)\pi^+$, $\phi \to K^+ K^-$		$(\ 4.9\ ^{+4.0}_{-1.9}\ ) \times 10^{-5}$		–
$K^+ K^-\pi^+$ nonresonant		not seen		744
$K^+ K^0_S \pi^+\pi^-$		$(\ 1.75 \pm 0.18) \times 10^{-3}$		678
$K^0_S K^- 2\pi^+$		$(\ 2.40 \pm 0.18) \times 10^{-3}$		678
$K^+ K^- 2\pi^+\pi^-$		$(\ 2.2\ \pm 1.2\ ) \times 10^{-4}$		600

A few poorly measured branching fractions:

$\phi\pi^+\pi^0$		$(\ 2.3\ \pm 1.0\ )\ \%$		619
$\phi\rho^+$		$< 1.5\ \%$	CL=90%	259
$K^+ K^-\pi^+\pi^0$ non-ϕ		$(\ 1.5\ ^{+0.7}_{-0.6}\ )\ \%$		682
$K^*(892)^+ K^0_S$		$(\ 1.6\ \pm 0.7\ )\ \%$		612

Doubly Cabibbo-suppressed modes

$K^+\pi^0$		$(\ 1.83\pm0.26)\times10^{-4}$	S=1.4	864
$K^+\eta$		$(\ 1.08\pm0.17)\times10^{-4}$		776
$K^+\eta'(958)$		$(\ 1.76\pm0.22)\times10^{-4}$		571
$K^+\pi^+\pi^-$		$(\ 5.27\pm0.23)\times10^{-4}$		846
$K^+\rho^0$		$(\ 2.0\ \pm0.5\ )\times10^{-4}$		679
$K^*(892)^0\pi^+$, $K^*(892)^0\to K^+\pi^-$		$(\ 2.5\ \pm0.4\ )\times10^{-4}$		714
$K^+ f_0(980)$, $f_0(980)\to\pi^+\pi^-$		$(\ 4.7\ \pm2.8\ )\times10^{-5}$		–
$K_2^*(1430)^0\pi^+$, $K_2^*(1430)^0\to K^+\pi^-$		$(\ 4.2\ \pm2.9\ )\times10^{-5}$		–
$K^+\pi^+\pi^-$ nonresonant		not seen		846
$2K^+K^-$		$(\ 8.7\ \pm2.0\ )\times10^{-5}$		550

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

$\pi^+e^+e^-$	*C1*	$<\ 1.1\times10^{-6}$	CL=90%	930
$\pi^+\phi$, $\phi\to\ e^+e^-$	[g]	$(\ 1.7\ ^{+1.4}_{-0.9}\ )\times10^{-6}$		–
$\pi^+\mu^+\mu^-$	*C1*	$<\ 3.9\times10^{-6}$	CL=90%	918
$\pi^+\phi,\ \phi\to\ \mu^+\mu^-$	[g]	$(\ 1.8\ \pm0.8\ )\times10^{-6}$		–
$\rho^+\mu^+\mu^-$	*C1*	$<\ 5.6\times10^{-4}$	CL=90%	757
$K^+e^+e^-$	[h]	$<\ 1.0\times10^{-6}$	CL=90%	870
$K^+\mu^+\mu^-$	[h]	$<\ 4.3\times10^{-6}$	CL=90%	856
$\pi^+e^+\mu^-$	*LF*	$<\ 2.9\times10^{-6}$	CL=90%	927
$\pi^+e^-\mu^+$	*LF*	$<\ 3.6\times10^{-6}$	CL=90%	927
$K^+e^+\mu^-$	*LF*	$<\ 1.2\times10^{-6}$	CL=90%	866
$K^+e^-\mu^+$	*LF*	$<\ 2.8\times10^{-6}$	CL=90%	866
π^-2e^+	*L*	$<\ 1.1\times10^{-6}$	CL=90%	930
$\pi^-2\mu^+$	*L*	$<\ 2.0\times10^{-6}$	CL=90%	918
$\pi^-e^+\mu^+$	*L*	$<\ 2.0\times10^{-6}$	CL=90%	927
$\rho^-2\mu^+$	*L*	$<\ 5.6\times10^{-4}$	CL=90%	757
K^-2e^+	*L*	$<\ 9\times10^{-7}$	CL=90%	870
$K^-2\mu^+$	*L*	$<\ 1.0\times10^{-5}$	CL=90%	856
$K^-e^+\mu^+$	*L*	$<\ 1.9\times10^{-6}$	CL=90%	866
$K^*(892)^-2\mu^+$	*L*	$<\ 8.5\times10^{-4}$	CL=90%	703

D^0

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

Mass $m = 1864.86 \pm 0.13$ MeV
$m_{D^\pm} - m_{D^0} = 4.76 \pm 0.10$ MeV (S = 1.1)
Mean life $\tau = (410.1 \pm 1.5) \times 10^{-15}$ s
$c\tau = 122.9$ μm
$\left|m_{D_1^0} - m_{D_2^0}\right| = (1.44^{+0.48}_{-0.50}) \times 10^{10}$ $\hbar$ s^{-1}
$(\Gamma_{D_1^0} - \Gamma_{D_2^0})/\Gamma = 2y = (1.60^{+0.25}_{-0.26}) \times 10^{-2}$
$\left|q/p\right| = 0.88^{+0.16}_{-0.15}$
$A_\Gamma = (0.26 \pm 2.31) \times 10^{-3}$
$K^+\pi^-$ relative strong phase: $\cos\delta = 1.03^{+0.32}_{-0.18}$
$K^-\pi^+\pi^0$ coherence factor $R_{K\pi\pi^0} = 0.78^{+0.11}_{-0.25}$
$K^-\pi^+\pi^0$ average relative strong phase $\delta^{K\pi\pi^0} = (239^{+32}_{-28})^\circ$
$K^-\pi^-2\pi^+$ coherence factor $R_{K3\pi} = 0.36^{+0.24}_{-0.30}$
$K^-\pi^-2\pi^+$ average relative strong phase $\delta^{K3\pi} = (118^{+60}_{-50})^\circ$

CP-violation decay-rate asymmetries (labeled by the D^0 decay)

$A_{CP}(K^+K^-) = (-0.21 \pm 0.17)\%$
$A_{CP}(2K_S^0) = (-23 \pm 19)\%$
$A_{CP}(\pi^+\pi^-) = (0.22 \pm 0.21)\%$
$A_{CP}(2\pi^0) = (0 \pm 5)\%$
$A_{CP}(\pi^+\pi^-\pi^0) = (0.3 \pm 0.4)\%$
$A_{CP}(\rho(770)^+\pi^- \to \pi^+\pi^-\pi^0) = (1.2 \pm 0.9)\%$ [i]
$A_{CP}(\rho(770)^0\pi^0 \to \pi^+\pi^-\pi^0) = (-3.1 \pm 3.0)\%$ [i]
$A_{CP}(\rho(770)^-\pi^+ \to \pi^+\pi^-\pi^0) = (-1.0 \pm 1.7)\%$ [i]
$A_{CP}(\rho(1450)^+\pi^- \to \pi^+\pi^-\pi^0) = (0 \pm 70)\%$ [i]
$A_{CP}(\rho(1450)^0\pi^0 \to \pi^+\pi^-\pi^0) = (-20 \pm 40)\%$ [i]
$A_{CP}(\rho(1450)^-\pi^+ \to \pi^+\pi^-\pi^0) = (6 \pm 9)\%$ [i]
$A_{CP}(\rho(1700)^+\pi^- \to \pi^+\pi^-\pi^0) = (-5 \pm 14)\%$ [i]
$A_{CP}(\rho(1700)^0\pi^0 \to \pi^+\pi^-\pi^0) = (13 \pm 9)\%$ [i]
$A_{CP}(\rho(1700)^-\pi^+ \to \pi^+\pi^-\pi^0) = (8 \pm 11)\%$ [i]
$A_{CP}(f_0(980)\pi^0 \to \pi^+\pi^-\pi^0) = (0 \pm 35)\%$ [i]
$A_{CP}(f_0(1370)\pi^0 \to \pi^+\pi^-\pi^0) = (25 \pm 18)\%$ [i]
$A_{CP}(f_0(1500)\pi^0 \to \pi^+\pi^-\pi^0) = (0 \pm 18)\%$ [i]
$A_{CP}(f_0(1710)\pi^0 \to \pi^+\pi^-\pi^0) = (0 \pm 24)\%$ [i]
$A_{CP}(f_2(1270)\pi^0 \to \pi^+\pi^-\pi^0) = (-4 \pm 6)\%$ [i]
$A_{CP}(\sigma(400)\pi^0 \to \pi^+\pi^-\pi^0) = (6 \pm 8)\%$ [i]
$A_{CP}(\text{nonresonant } \pi^+\pi^-\pi^0) = (-13 \pm 23)\%$ [i]
$A_{CP}(K^+K^-\pi^0) = (-1.0 \pm 1.7)\%$
$A_{CP}(K^*(892)^+K^- \to K^+K^-\pi^0) = (-0.9 \pm 1.3)\%$ [i]

$A_{CP}(K^*(1410)^+ K^- \to K^+ K^- \pi^0) = (-21 \pm 24)\%$ [i]
$A_{CP}((K^+\pi^0)_S K^- \to K^+ K^- \pi^0) = (7 \pm 15)\%$ [i]
$A_{CP}(\phi(1020)\pi^0 \to K^+ K^- \pi^0) = (1.1 \pm 2.2)\%$ [i]
$A_{CP}(f_0(980)\pi^0 \to K^+ K^- \pi^0) = (-3 \pm 19)\%$ [i]
$A_{CP}(a_0(980)^0\pi^0 \to K^+ K^- \pi^0) = (-5 \pm 16)\%$ [i]
$A_{CP}(f_2'(1525)\pi^0 \to K^+ K^- \pi^0) = (0 \pm 160)\%$ [i]
$A_{CP}(K^*(892)^- K^+ \to K^+ K^- \pi^0) = (-5 \pm 4)\%$ [i]
$A_{CP}(K^*(1410)^- K^+ \to K^+ K^- \pi^0) = (-17 \pm 29)\%$ [i]
$A_{CP}((K^-\pi^0)_{S-wave} K^+ \to K^+ K^- \pi^0) = (-10 \pm 40)\%$ [i]
$A_{CP}(K^0_S\pi^0) = (-0.27 \pm 0.21)\%$
$A_{CP}(K^0_S\eta) = (0.5 \pm 0.5)\%$
$A_{CP}(K^0_S\eta') = (1.0 \pm 0.7)\%$
$A_{CP}(K^0_S\phi) = (-3 \pm 9)\%$
$A_{CP}(K^-\pi^+) = (0.1 \pm 0.7)\%$
$A_{CP}(K^+\pi^-) = (2.2 \pm 3.2)\%$
$A_{CP}(K^-\pi^+\pi^0) = (0.2 \pm 0.9)\%$
$A_{CP}(K^+\pi^-\pi^0) = (0 \pm 5)\%$
$A_{CP}(K^0_S\pi^+\pi^-) = (-0.9^{+2.6}_{-6.0})\%$
$A_{CP}(K^*(892)^-\pi^+ \to K^0_S\pi^+\pi^-) < 3.5 \times 10^{-4}$, CL = 95%
$A_{CP}(K^*(892)^+\pi^- \to K^0_S\pi^+\pi^-) < 7.8 \times 10^{-4}$, CL = 95%
$A_{CP}(\overline{K}^0\rho^0 \to K^0_S\pi^+\pi^-) < 4.8 \times 10^{-4}$, CL = 95%
$A_{CP}(\overline{K}^0\omega \to K^0_S\pi^+\pi^-) < 9.2 \times 10^{-4}$, CL = 95%
$A_{CP}(\overline{K}^0 f_0(980) \to K^0_S\pi^+\pi^-) < 6.8 \times 10^{-4}$, CL = 95%
$A_{CP}(\overline{K}^0 f_2(1270) \to K^0_S\pi^+\pi^-) < 13.5 \times 10^{-4}$, CL = 95%
$A_{CP}(\overline{K}^0 f_0(1370) \to K^0_S\pi^+\pi^-) < 25.5 \times 10^{-4}$, CL = 95%
$A_{CP}(K^*_0(1430)^-\pi^+ \to K^0_S\pi^+\pi^-) < 9.0 \times 10^{-4}$, CL = 95%
$A_{CP}(K^*_2(1430)^-\pi^+ \to K^0_S\pi^+\pi^-) < 6.5 \times 10^{-4}$, CL = 95%
$A_{CP}(K^*(1680)^-\pi^+ \to K^0_S\pi^+\pi^-) < 28.4 \times 10^{-4}$, CL = 95%
$A_{CP}(K^-\pi^+\pi^+\pi^-) = (0.7 \pm 1.0)\%$
$A_{CP}(K^+\pi^-\pi^+\pi^-) = (-2 \pm 4)\%$
$A_{CP}(K^+K^-\pi^+\pi^-) = (-8 \pm 7)\%$
$\Delta A_{CP} = A_{CP}(K^+K^-) - A_{CP}(\pi^+\pi^-) = (-0.65 \pm 0.18)\%$

T-violation decay-rate asymmetry

$A_T(K^+K^-\pi^+\pi^-) = (1 \pm 7) \times 10^{-3}$ [b]

CPT-violation decay-rate asymmetry

$A_{CPT}(K^\mp\pi^\pm) = 0.008 \pm 0.008$

Form factors

$r_V \equiv V(0)/A_1(0)$ in $D^0 \to K^*(892)^- \ell^+ \nu_\ell = 1.7 \pm 0.8$
$r_2 \equiv A_2(0)/A_1(0)$ in $D^0 \to K^*(892)^- \ell^+ \nu_\ell = 0.9 \pm 0.4$
$f_+(0)$ in $D^0 \to K^- \ell^+ \nu_\ell = 0.727 \pm 0.011$
$f_+(0)|V_{cs}|$ in $D^0 \to K^- \ell^+ \nu_\ell = 0.726 \pm 0.009$
$r_1 \equiv a_1/a_0$ in $D^0 \to K^- \ell^+ \nu_\ell = -2.65 \pm 0.35$
$r_2 \equiv a_1/a_0$ in $D^0 \to K^- \ell^+ \nu_\ell = 13 \pm 9$
$f_+(0)|V_{cd}|$ in $D^0 \to \pi^- \ell^+ \nu_\ell = 0.152 \pm 0.005$
$r_1 \equiv a_1/a_0$ in $D^0 \to \pi^- \ell^+ \nu_\ell = -2.8 \pm 0.5$
$r_2 \equiv a_1/a_0$ in $D^0 \to \pi^- \ell^+ \nu_\ell = 6 \pm 3.0$

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 $2\,\Gamma(K^0_S) = \Gamma(\overline{K}^0)$.

D^0 DECAY MODES		Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
Topological modes				
0-prongs	[j]	(15 ± 6) %		–
2-prongs		(70 ± 6) %		–
4-prongs	[k]	(14.5 ± 0.5) %		–
6-prongs	[l]	(6.4 ± 1.3) $\times 10^{-4}$		–
Inclusive modes				
e^+ anything	[m]	(6.49 ± 0.11) %		–
μ^+ anything		(6.7 ± 0.6) %		–
K^- anything		(54.7 ± 2.8) %	S=1.3	–
$\overline{K}^0$ anything + K^0 anything		(47 ± 4) %		–
K^+ anything		(3.4 ± 0.4) %		–
$K^*(892)^-$ anything		(15 ± 9) %		–
$\overline{K}^*(892)^0$ anything		(9 ± 4) %		–
$K^*(892)^+$ anything		< 3.6 %	CL=90%	–
$K^*(892)^0$ anything		(2.8 ± 1.3) %		–
η anything		(9.5 ± 0.9) %		–
η' anything		(2.48 ± 0.27) %		–
ϕ anything		(1.05 ± 0.11) %		–

Semileptonic modes

$K^- e^+ \nu_e$		(3.55 ± 0.04) %	S=1.2	867
$K^- \mu^+ \nu_\mu$		(3.30 ± 0.13) %		864
$K^*(892)^- e^+ \nu_e$		(2.16 ± 0.16) %		719
$K^*(892)^- \mu^+ \nu_\mu$		(1.90 ± 0.24) %		714
$K^- \pi^0 e^+ \nu_e$		(1.6 $^{+\ 1.3}_{-\ 0.5}$) %		861
$\overline{K}^0 \pi^- e^+ \nu_e$		(2.7 $^{+\ 0.9}_{-\ 0.7}$) %		860
$K^- \pi^+ \pi^- e^+ \nu_e$		(2.8 $^{+\ 1.4}_{-\ 1.1}$) $\times 10^{-4}$		843
$K_1(1270)^- e^+ \nu_e$		(7.6 $^{+\ 4.0}_{-\ 3.1}$) $\times 10^{-4}$		498
$K^- \pi^+ \pi^- \mu^+ \nu_\mu$		< 1.2 $\times 10^{-3}$	CL=90%	821
$(\overline{K}^*(892)\pi)^- \mu^+ \nu_\mu$		< 1.4 $\times 10^{-3}$	CL=90%	692
$\pi^- e^+ \nu_e$		(2.89 ± 0.08) $\times 10^{-3}$	S=1.1	927
$\pi^- \mu^+ \nu_\mu$		(2.37 ± 0.24) $\times 10^{-3}$		924
$\rho^- e^+ \nu_e$		(1.9 ± 0.4) $\times 10^{-3}$		771

Hadronic modes with one $\overline{K}$

$K^- \pi^+$		(3.88 ± 0.05) %	S=1.2	861
$K^0_S \pi^0$		(1.19 ± 0.04) %		860
$K^0_L \pi^0$		(10.0 ± 0.7) $\times 10^{-3}$		860
$K^0_S \pi^+ \pi^-$	[c]	(2.82 ± 0.19) %	S=1.1	842
$K^0_S \rho^0$		(6.3 $^{+\ 0.7}_{-\ 0.8}$) $\times 10^{-3}$		674
$K^0_S \omega$, $\omega \to \pi^+ \pi^-$		(2.0 ± 0.6) $\times 10^{-4}$		670
$K^0_S (\pi^+ \pi^-)_{S-\text{wave}}$		(3.4 ± 0.8) $\times 10^{-3}$		842
$K^0_S f_0(980)$, $f_0(980) \to \pi^+ \pi^-$		(1.21 $^{+\ 0.40}_{-\ 0.24}$) $\times 10^{-3}$		549
$K^0_S f_0(1370)$, $f_0(1370) \to \pi^+ \pi^-$		(2.8 $^{+\ 0.9}_{-\ 1.3}$) $\times 10^{-3}$		†
$K^0_S f_2(1270)$, $f_2(1270) \to \pi^+ \pi^-$		(9 $^{+10}_{-\ 6}$) $\times 10^{-5}$		262
$K^*(892)^- \pi^+$, $K^*(892)^- \to K^0_S \pi^-$		(1.66 $^{+\ 0.15}_{-\ 0.17}$) %		711
$K^*_0(1430)^- \pi^+$, $K^*_0(1430)^- \to K^0_S \pi^-$		(2.69 $^{+\ 0.40}_{-\ 0.33}$) $\times 10^{-3}$		378
$K^*_2(1430)^- \pi^+$, $K^*_2(1430)^- \to K^0_S \pi^-$		(3.4 $^{+\ 1.9}_{-\ 1.0}$) $\times 10^{-4}$		367
$K^*(1680)^- \pi^+$, $K^*(1680)^- \to K^0_S \pi^-$		(4 ± 4) $\times 10^{-4}$		46

$K^*(892)^+\pi^-$, $K^*(892)^+ \to K^0_S\pi^+$	[n]	$(1.13 \ ^{+\ 0.60}_{-\ 0.34}) \times 10^{-4}$			711
$K^*_0(1430)^+\pi^-$, $K^*_0(1430)^+ \to K^0_S\pi^+$	[n]	< 1.4	$\times 10^{-5}$	CL=95%	–
$K^*_2(1430)^+\pi^-$, $K^*_2(1430)^+ \to K^0_S\pi^+$	[n]	< 3.4	$\times 10^{-5}$	CL=95%	–
$K^0_S\pi^+\pi^-$ nonresonant		$(2.5 \ ^{+\ 6.0}_{-\ 1.6}) \times 10^{-4}$			842
$K^-\pi^+\pi^0$	[c]	(13.9 ± 0.5) %		S=1.7	844
$K^-\rho^+$		(10.8 ± 0.7) %			675
$K^-\rho(1700)^+$, $\rho(1700)^+ \to \pi^+\pi^0$		$(7.9 \pm 1.7) \times 10^{-3}$			†
$K^*(892)^-\pi^+$, $K^*(892)^- \to K^-\pi^0$		$(2.22 \ ^{+\ 0.40}_{-\ 0.19})$ %			711
$\overline{K}^*(892)^0\pi^0$, $\overline{K}^*(892)^0 \to K^-\pi^+$		(1.88 ± 0.23) %			711
$K^*_0(1430)^-\pi^+$, $K^*_0(1430)^- \to K^-\pi^0$		$(4.6 \pm 2.1) \times 10^{-3}$			378
$\overline{K}^*_0(1430)^0\pi^0$, $\overline{K}^*_0(1430)^0 \to K^-\pi^+$		$(5.7 \ ^{+\ 5.0}_{-\ 1.5}) \times 10^{-3}$			379
$K^*(1680)^-\pi^+$, $K^*(1680)^- \to K^-\pi^0$		$(1.8 \pm 0.7) \times 10^{-3}$			46
$K^-\pi^+\pi^0$ nonresonant		$(1.11 \ ^{+\ 0.50}_{-\ 0.19})$ %			844
$K^0_S 2\pi^0$		$(9.1 \pm 1.1) \times 10^{-3}$		S=2.2	843
$K^0_S(2\pi^0)$-S-wave		$(2.6 \pm 0.7) \times 10^{-3}$			–
$\overline{K}^*(892)^0\pi^0$, $\overline{K}^*(892)^0 \to K^0_S\pi^0$		$(7.8 \pm 0.7) \times 10^{-3}$			711
$\overline{K}^*(1430)^0\pi^0$, $\overline{K}^{*0} \to K^0_S\pi^0$		$(4 \pm 23) \times 10^{-5}$			–
$\overline{K}^*(1680)^0\pi^0$, $\overline{K}^{*0} \to K^0_S\pi^0$		$(1.0 \pm 0.4) \times 10^{-3}$			–
$K^0_S f_2(1270)$, $f_2 \to 2\pi^0$		$(2.3 \pm 1.1) \times 10^{-4}$			–
$2K^0_S$, one $K^0_S \to 2\pi^0$		$(3.2 \pm 1.1) \times 10^{-4}$			–
$K^-2\pi^+\pi^-$	[c]	$(8.07 \ ^{+\ 0.21}_{-\ 0.19})$ %		S=1.3	813
$K^-\pi^+\rho^0$ total		(6.74 ± 0.33) %			609
$K^-\pi^+\rho^0$ 3-body		$(5.1 \pm 2.3) \times 10^{-3}$			609
$\overline{K}^*(892)^0\rho^0$, $\overline{K}^*(892)^0 \to K^-\pi^+$		(1.05 ± 0.23) %			416
$K^- a_1(1260)^+$, $a_1(1260)^+ \to 2\pi^+\pi^-$		(3.6 ± 0.6) %			327

$\overline{K}^*(892)^0\pi^+\pi^-$ total,		(1.6 ± 0.4) %		685
$\overline{K}^*(892)^0 \to K^-\pi^+$				
$\overline{K}^*(892)^0\pi^+\pi^-$ 3-body,		(9.9 ± 2.3) $\times 10^{-3}$		685
$\overline{K}^*(892)^0 \to K^-\pi^+$				
$K_1(1270)^-\pi^+$,	[o]	(2.9 ± 0.3) $\times 10^{-3}$		484
$K_1(1270)^- \to K^-\pi^+\pi^-$				
$K^-2\pi^+\pi^-$ nonresonant		(1.88 ± 0.26) %		813
$K^0_S\pi^+\pi^-\pi^0$	[p]	(5.2 ± 0.6) %		813
$K^0_S\eta$, $\eta \to \pi^+\pi^-\pi^0$		(1.02 ± 0.09) $\times 10^{-3}$		772
$K^0_S\omega$, $\omega \to \pi^+\pi^-\pi^0$		(9.9 ± 0.5) $\times 10^{-3}$		670
$K^-2\pi^+\pi^-\pi^0$		(4.2 ± 0.4) %		771
$\overline{K}^*(892)^0\pi^+\pi^-\pi^0$,		(1.3 ± 0.6) %		643
$\overline{K}^*(892)^0 \to K^-\pi^+$				
$K^-\pi^+\omega$, $\omega \to \pi^+\pi^-\pi^0$		(2.7 ± 0.5) %		605
$\overline{K}^*(892)^0\omega$,		(6.5 ± 3.0) $\times 10^{-3}$		410
$\overline{K}^*(892)^0 \to K^-\pi^+$,				
$\omega \to \pi^+\pi^-\pi^0$				
$K^0_S\eta\pi^0$		(5.5 ± 1.1) $\times 10^{-3}$		721
$K^0_S a_0(980)$, $a_0(980) \to \eta\pi^0$		(6.5 ± 2.0) $\times 10^{-3}$		–
$\overline{K}^*(892)^0\eta$,		(1.6 ± 0.5) $\times 10^{-3}$		–
$\overline{K}^*(892)^0 \to K^0_S\pi^0$				
$K^0_S 2\pi^+2\pi^-$		(2.68 ± 0.30) $\times 10^{-3}$		768
$K^0_S\rho^0\pi^+\pi^-$, no $K^*(892)^-$		(1.1 ± 0.7) $\times 10^{-3}$		–
$K^*(892)^-2\pi^+\pi^-$,		(5 ± 8) $\times 10^{-4}$		642
$K^*(892)^- \to K^0_S\pi^-$,				
no ρ^0				
$K^*(892)^-\rho^0\pi^+$,		(1.6 ± 0.6) $\times 10^{-3}$		230
$K^*(892)^- \to K^0_S\pi^-$				
$K^0_S 2\pi^+2\pi^-$ nonresonant		< 1.2 $\times 10^{-3}$	CL=90%	768
$K^-3\pi^+2\pi^-$		(2.2 ± 0.6) $\times 10^{-4}$		713

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.)

$K^0_S\eta$		(4.78 ± 0.30) $\times 10^{-3}$		772
$K^0_S\omega$		(1.11 ± 0.06) %		670
$K^0_S\eta'(958)$		(9.4 ± 0.5) $\times 10^{-3}$		565
$K^-a_1(1260)^+$		(7.8 ± 1.1) %		327
$K^-a_2(1320)^+$		< 2 $\times 10^{-3}$	CL=90%	198
$\overline{K}^*(892)^0\pi^+\pi^-$ total		(2.4 ± 0.5) %		685
$\overline{K}^*(892)^0\pi^+\pi^-$ 3-body		(1.48 ± 0.34) %		685
$\overline{K}^*(892)^0\rho^0$		(1.57 ± 0.34) %		417

$\overline{K}^*(892)^0\rho^0$ transverse		(1.7	± 0.6) %			417
$\overline{K}^*(892)^0\rho^0$ S-wave		(3.0	± 0.6) %			417
$\overline{K}^*(892)^0\rho^0$ S-wave long.		< 3		$\times 10^{-3}$	CL=90%	417
$\overline{K}^*(892)^0\rho^0$ P-wave		< 3		$\times 10^{-3}$	CL=90%	417
$\overline{K}^*(892)^0\rho^0$ D-wave		(2.1	± 0.6) %			417
$K_1(1270)^-\pi^+$	[o]	(1.6	± 0.8) %			484
$K_1(1400)^-\pi^+$		< 1.2		%	CL=90%	386
$\overline{K}^*(892)^0\pi^+\pi^-\pi^0$		(1.9	± 0.9) %			644
$K^-\pi^+\omega$		(3.0	± 0.6) %			605
$\overline{K}^*(892)^0\omega$		(1.1	± 0.5) %			410
$K^-\pi^+\eta'(958)$		(7.5	± 1.9)	$\times 10^{-3}$		479
$\overline{K}^*(892)^0\eta'(958)$		< 1.1		$\times 10^{-3}$	CL=90%	120

Hadronic modes with three K's

$K^0_S K^+ K^-$		(4.45	± 0.34)	$\times 10^{-3}$		544
$K^0_S a_0(980)^0$, $a_0^0 \to K^+K^-$		(3.0	± 0.4)	$\times 10^{-3}$		–
$K^- a_0(980)^+$, $a_0^+ \to K^+K^0_S$		(6.0	± 1.8)	$\times 10^{-4}$		–
$K^+ a_0(980)^-$, $a_0^- \to K^-K^0_S$		< 1.1		$\times 10^{-4}$	CL=95%	–
$K^0_S f_0(980)$, $f_0 \to K^+K^-$		< 9		$\times 10^{-5}$	CL=95%	–
$K^0_S\phi$, $\phi \to K^+K^-$		(2.04	± 0.16)	$\times 10^{-3}$		520
$K^0_S f_0(1370)$, $f_0 \to K^+K^-$		(1.7	± 1.1)	$\times 10^{-4}$		–
$3K^0_S$		(9.1	± 1.3)	$\times 10^{-4}$		539
$K^+2K^-\pi^+$		(2.21	± 0.31)	$\times 10^{-4}$		434
$K^+K^-\overline{K}^*(892)^0$, $\overline{K}^*(892)^0 \to K^-\pi^+$		(4.4	± 1.7)	$\times 10^{-5}$		†
$K^-\pi^+\phi$, $\phi \to K^+K^-$		(4.0	± 1.7)	$\times 10^{-5}$		422
$\phi\overline{K}^*(892)^0$, $\phi \to K^+K^-$, $\overline{K}^*(892)^0 \to K^-\pi^+$		(1.06	± 0.20)	$\times 10^{-4}$		†
$K^+2K^-\pi^+$ nonresonant		(3.3	± 1.5)	$\times 10^{-5}$		434
$2K^0_S K^\pm\pi^\mp$		(6.0	± 1.3)	$\times 10^{-4}$		427

Pionic modes

$\pi^+\pi^-$		(1.401	± 0.027)	$\times 10^{-3}$	S=1.1	922
$2\pi^0$		(8.0	± 0.5)	$\times 10^{-4}$		923
$\pi^+\pi^-\pi^0$		(1.43	± 0.06) %		S=1.9	907
$\rho^+\pi^-$		(9.8	± 0.4)	$\times 10^{-3}$		764
$\rho^0\pi^0$		(3.72	± 0.22)	$\times 10^{-3}$		764
$\rho^-\pi^+$		(4.96	± 0.24)	$\times 10^{-3}$		764
$\rho(1450)^+\pi^-$, $\rho(1450)^+ \to \pi^+\pi^0$		(1.6	± 2.0)	$\times 10^{-5}$		–
$\rho(1450)^0\pi^0$, $\rho(1450)^0 \to \pi^+\pi^-$		(4.3	± 1.9)	$\times 10^{-5}$		–
$\rho(1450)^-\pi^+$, $\rho(1450)^- \to \pi^-\pi^0$		(2.6	± 0.4)	$\times 10^{-4}$		–

$\rho(1700)^+\pi^-$, $\rho(1700)^+ \to \pi^+\pi^0$		$(5.9 \pm 1.4) \times 10^{-4}$			–
$\rho(1700)^0\pi^0$, $\rho(1700)^0 \to \pi^+\pi^-$		$(7.2 \pm 1.7) \times 10^{-4}$			–
$\rho(1700)^-\pi^+$, $\rho(1700)^- \to \pi^-\pi^0$		$(4.6 \pm 1.1) \times 10^{-4}$			–
$f_0(980)\pi^0$, $f_0(980) \to \pi^+\pi^-$		$(3.6 \pm 0.8) \times 10^{-5}$			–
$f_0(500)\pi^0$, $f_0(500) \to \pi^+\pi^-$		$(1.18 \pm 0.21) \times 10^{-4}$			–
$f_0(1370)\pi^0$, $f_0(1370) \to \pi^+\pi^-$		$(5.3 \pm 2.0) \times 10^{-5}$			–
$f_0(1500)\pi^0$, $f_0(1500) \to \pi^+\pi^-$		$(5.6 \pm 1.5) \times 10^{-5}$			–
$f_0(1710)\pi^0$, $f_0(1710) \to \pi^+\pi^-$		$(4.4 \pm 1.5) \times 10^{-5}$			–
$f_2(1270)\pi^0$, $f_2(1270) \to \pi^+\pi^-$		$(1.89 \pm 0.20) \times 10^{-4}$			–
$\pi^+\pi^-\pi^0$ nonresonant		$(1.20 \pm 0.35) \times 10^{-4}$			907
$3\pi^0$		$< 3.5 \times 10^{-4}$		CL=90%	908
$2\pi^+2\pi^-$		$(7.42 \pm 0.21) \times 10^{-3}$		S=1.1	880
$a_1(1260)^+\pi^-$, $a_1^+ \to 2\pi^+\pi^-$ total		$(4.45 \pm 0.31) \times 10^{-3}$			–
$a_1(1260)^+\pi^-$, $a_1^+ \to \rho^0\pi^+$ S-wave		$(3.21 \pm 0.25) \times 10^{-3}$			–
$a_1(1260)^+\pi^-$, $a_1^+ \to \rho^0\pi^+$ D-wave		$(1.9 \pm 0.5) \times 10^{-4}$			–
$a_1(1260)^+\pi^-$, $a_1^+ \to \sigma\pi^+$		$(6.2 \pm 0.7) \times 10^{-4}$			–
$2\rho^0$ total		$(1.82 \pm 0.13) \times 10^{-3}$			518
$2\rho^0$, parallel helicities		$(8.2 \pm 3.2) \times 10^{-5}$			–
$2\rho^0$, perpendicular helicities		$(4.7 \pm 0.6) \times 10^{-4}$			–
$2\rho^0$, longitudinal helicities		$(1.25 \pm 0.10) \times 10^{-3}$			–
Resonant $(\pi^+\pi^-)\pi^+\pi^-$ 3-body total		$(1.48 \pm 0.12) \times 10^{-3}$			–
$\sigma\pi^+\pi^-$		$(6.1 \pm 0.9) \times 10^{-4}$			–
$f_0(980)\pi^+\pi^-$, $f_0 \to \pi^+\pi^-$		$(1.8 \pm 0.5) \times 10^{-4}$			–
$f_2(1270)\pi^+\pi^-$, $f_2 \to \pi^+\pi^-$		$(3.6 \pm 0.6) \times 10^{-4}$			–
$\pi^+\pi^-2\pi^0$		$(10.0 \pm 0.9) \times 10^{-3}$			882
$\eta\pi^0$	[q]	$(6.8 \pm 0.7) \times 10^{-4}$			846
$\omega\pi^0$	[q]	$< 2.6 \times 10^{-4}$		CL=90%	761
$2\pi^+2\pi^-\pi^0$		$(4.1 \pm 0.5) \times 10^{-3}$			844
$\eta\pi^+\pi^-$	[q]	$(1.09 \pm 0.16) \times 10^{-3}$			827

$\omega\pi^+\pi^-$	[q]	$(1.6 \pm 0.5) \times 10^{-3}$		738
$3\pi^+3\pi^-$		$(4.2 \pm 1.2) \times 10^{-4}$		795
$\eta'(958)\pi^0$		$(8.9 \pm 1.4) \times 10^{-4}$		678
$\eta'(958)\pi^+\pi^-$		$(4.5 \pm 1.7) \times 10^{-4}$		650
2η		$(1.67 \pm 0.20) \times 10^{-3}$		755
$\eta\eta'(958)$		$(1.05 \pm 0.26) \times 10^{-3}$		537

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

K^+K^-		$(3.96 \pm 0.08) \times 10^{-3}$	S=1.4	791
$2K^0_S$		$(1.7 \pm 0.4) \times 10^{-4}$	S=2.5	789
$K^0_S K^-\pi^+$		$(3.3 \pm 0.5) \times 10^{-3}$	S=1.1	739
$\overline{K}^*(892)^0 K^0_S$, $\overline{K}^*(892)^0 \to K^-\pi^+$		$< 5 \times 10^{-4}$	CL=90%	608
$K^0_S K^+\pi^-$		$(2.6 \pm 0.5) \times 10^{-3}$		739
$K^*(892)^0 K^0_S$, $K^*(892)^0 \to K^+\pi^-$		$< 2.8 \times 10^{-4}$	CL=90%	608
$K^+K^-\pi^0$		$(3.28 \pm 0.14) \times 10^{-3}$		743
$K^*(892)^+ K^-$, $K^*(892)^+ \to K^+\pi^0$		$(1.46 \pm 0.07) \times 10^{-3}$		–
$K^*(892)^- K^+$, $K^*(892)^- \to K^-\pi^0$		$(5.2 \pm 0.4) \times 10^{-4}$		–
$(K^+\pi^0)_{S-wave} K^-$		$(2.34 \pm 0.17) \times 10^{-3}$		743
$(K^-\pi^0)_{S-wave} K^+$		$(1.3 \pm 0.4) \times 10^{-4}$		743
$f_0(980)\pi^0$, $f_0 \to K^+K^-$		$(3.4 \pm 0.6) \times 10^{-4}$		–
$\phi\pi^0$, $\phi \to K^+K^-$		$(6.4 \pm 0.4) \times 10^{-4}$		–
$2K^0_S\pi^0$		$< 5.9 \times 10^{-4}$		740
$K^+K^-\pi^+\pi^-$	[r]	$(2.43 \pm 0.12) \times 10^{-3}$		677
$\phi\pi^+\pi^-$ 3-body, $\phi \to K^+K^-$		$(2.4 \pm 2.4) \times 10^{-5}$		614
$\phi\rho^0$, $\phi \to K^+K^-$		$(7.0 \pm 0.6) \times 10^{-4}$		250
$K^+K^-\rho^0$ 3-body		$(5 \pm 7) \times 10^{-5}$		302
$f_0(980)\pi^+\pi^-$, $f_0 \to K^+K^-$		$(3.6 \pm 0.9) \times 10^{-4}$		–
$K^*(892)^0 K^\mp\pi^\pm$ 3-body, $K^{*0} \to K^\pm\pi^\mp$	[s]	$(2.7 \pm 0.6) \times 10^{-4}$		531
$K^*(892)^0 \overline{K}^*(892)^0$, $K^{*0} \to K^\pm\pi^\mp$		$(7 \pm 5) \times 10^{-5}$		272
$K_1(1270)^\pm K^\mp$, $K_1(1270)^\pm \to K^\pm\pi^+\pi^-$		$(8.0 \pm 1.8) \times 10^{-4}$		–
$K_1(1400)^\pm K^\mp$, $K_1(1400)^\pm \to K^\pm\pi^+\pi^-$		$(5.3 \pm 1.2) \times 10^{-4}$		–
$2K^0_S\pi^+\pi^-$		$(1.23 \pm 0.23) \times 10^{-3}$		673
$K^0_S K^- 2\pi^+\pi^-$		$< 1.4 \times 10^{-4}$	CL=90%	595
$K^+K^-\pi^+\pi^-\pi^0$		$(3.1 \pm 2.0) \times 10^{-3}$		600

Other $K\overline{K}X$ modes. They include all decay modes of the ϕ, η, and ω.

$\phi\eta$		$(\ 1.4 \pm 0.5\ ) \times 10^{-4}$			489
$\phi\omega$		< 2.1	$\times 10^{-3}$	CL=90%	238

Radiative modes

$\rho^0\gamma$		< 2.4	$\times 10^{-4}$	CL=90%	771
$\omega\gamma$		< 2.4	$\times 10^{-4}$	CL=90%	768
$\phi\gamma$		$(\ 2.70 \pm 0.35\ ) \times 10^{-5}$			654
$\overline{K}^*(892)^0\gamma$		$(\ 3.27 \pm 0.34\ ) \times 10^{-4}$			719

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

$K^+\ell^-\overline{\nu}_\ell$ via $\overline{D}^0$		< 2.2	$\times 10^{-5}$	CL=90%	–
K^+ or $K^*(892)^+ e^-\overline{\nu}_e$ via $\overline{D}^0$		< 6	$\times 10^{-5}$	CL=90%	–
$K^+\pi^-$	*DC*	$(\ 1.47 \pm 0.07\ ) \times 10^{-4}$		S=2.8	861
$K^+\pi^-$ via DCS		$(\ 1.31 \pm 0.08\ ) \times 10^{-4}$			–
$K^+\pi^-$ via $\overline{D}^0$		< 1.6	$\times 10^{-5}$	CL=95%	861
$K^0_S\pi^+\pi^-$ in $D^0 \to \overline{D}^0$		< 1.8	$\times 10^{-4}$	CL=95%	–
$K^*(892)^+\pi^-$, $K^*(892)^+ \to K^0_S\pi^+$	*DC*	$(\ 1.13\ ^{+\ 0.60}_{-\ 0.34}\ ) \times 10^{-4}$			711
$K^*_0(1430)^+\pi^-$, $K^*_0(1430)^+ \to K^0_S\pi^+$	*DC*	< 1.4	$\times 10^{-5}$		–
$K^*_2(1430)^+\pi^-$, $K^*_2(1430)^+ \to K^0_S\pi^+$	*DC*	< 3.4	$\times 10^{-5}$		–
$K^+\pi^-\pi^0$	*DC*	$(\ 3.04 \pm 0.17\ ) \times 10^{-4}$			844
$K^+\pi^-\pi^0$ via $\overline{D}^0$		$(\ 7.3 \pm 0.5\ ) \times 10^{-4}$			–
$K^+\pi^+2\pi^-$	*DC*	$(\ 2.61\ ^{+\ 0.21}_{-\ 0.19}\ ) \times 10^{-4}$			813
$K^+\pi^+2\pi^-$ via $\overline{D}^0$		< 4	$\times 10^{-4}$	CL=90%	812
μ^- anything via $\overline{D}^0$		< 4	$\times 10^{-4}$	CL=90%	–

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

$\gamma\gamma$	*C1*	< 2.6	$\times 10^{-5}$	CL=90%	932
e^+e^-	*C1*	< 7.9	$\times 10^{-8}$	CL=90%	932
$\mu^+\mu^-$	*C1*	< 1.4	$\times 10^{-7}$	CL=90%	926
$\pi^0 e^+e^-$	*C1*	< 4.5	$\times 10^{-5}$	CL=90%	928
$\pi^0\mu^+\mu^-$	*C1*	< 1.8	$\times 10^{-4}$	CL=90%	915
ηe^+e^-	*C1*	< 1.1	$\times 10^{-4}$	CL=90%	852
$\eta\mu^+\mu^-$	*C1*	< 5.3	$\times 10^{-4}$	CL=90%	838
$\pi^+\pi^- e^+e^-$	*C1*	< 3.73	$\times 10^{-4}$	CL=90%	922
$\rho^0 e^+e^-$	*C1*	< 1.0	$\times 10^{-4}$	CL=90%	771
$\pi^+\pi^-\mu^+\mu^-$	*C1*	< 3.0	$\times 10^{-5}$	CL=90%	894

$\rho^0 \mu^+ \mu^-$	*C1*		< 2.2	$\times 10^{-5}$	CL=90%	754
$\omega e^+ e^-$	*C1*		< 1.8	$\times 10^{-4}$	CL=90%	768
$\omega \mu^+ \mu^-$	*C1*		< 8.3	$\times 10^{-4}$	CL=90%	751
$K^- K^+ e^+ e^-$	*C1*		< 3.15	$\times 10^{-4}$	CL=90%	791
$\phi e^+ e^-$	*C1*		< 5.2	$\times 10^{-5}$	CL=90%	654
$K^- K^+ \mu^+ \mu^-$	*C1*		< 3.3	$\times 10^{-5}$	CL=90%	710
$\phi \mu^+ \mu^-$	*C1*		< 3.1	$\times 10^{-5}$	CL=90%	631
$\overline{K}^0 e^+ e^-$		[*h*]	< 1.1	$\times 10^{-4}$	CL=90%	866
$\overline{K}^0 \mu^+ \mu^-$		[*h*]	< 2.6	$\times 10^{-4}$	CL=90%	852
$K^- \pi^+ e^+ e^-$	*C1*		< 3.85	$\times 10^{-4}$	CL=90%	861
$\overline{K}^*(892)^0 e^+ e^-$		[*h*]	< 4.7	$\times 10^{-5}$	CL=90%	719
$K^- \pi^+ \mu^+ \mu^-$	*C1*		< 3.59	$\times 10^{-4}$	CL=90%	829
$\overline{K}^*(892)^0 \mu^+ \mu^-$		[*h*]	< 2.4	$\times 10^{-5}$	CL=90%	700
$\pi^+ \pi^- \pi^0 \mu^+ \mu^-$	*C1*		< 8.1	$\times 10^{-4}$	CL=90%	863
$\mu^\pm e^\mp$	*LF*	[*t*]	< 2.6	$\times 10^{-7}$	CL=90%	929
$\pi^0 e^\pm \mu^\mp$	*LF*	[*t*]	< 8.6	$\times 10^{-5}$	CL=90%	924
$\eta e^\pm \mu^\mp$	*LF*	[*t*]	< 1.0	$\times 10^{-4}$	CL=90%	848
$\pi^+ \pi^- e^\pm \mu^\mp$	*LF*	[*t*]	< 1.5	$\times 10^{-5}$	CL=90%	911
$\rho^0 e^\pm \mu^\mp$	*LF*	[*t*]	< 4.9	$\times 10^{-5}$	CL=90%	767
$\omega e^\pm \mu^\mp$	*LF*	[*t*]	< 1.2	$\times 10^{-4}$	CL=90%	764
$K^- K^+ e^\pm \mu^\mp$	*LF*	[*t*]	< 1.8	$\times 10^{-4}$	CL=90%	754
$\phi e^\pm \mu^\mp$	*LF*	[*t*]	< 3.4	$\times 10^{-5}$	CL=90%	648
$\overline{K}^0 e^\pm \mu^\mp$	*LF*	[*t*]	< 1.0	$\times 10^{-4}$	CL=90%	863
$K^- \pi^+ e^\pm \mu^\mp$	*LF*	[*t*]	< 5.53	$\times 10^{-4}$	CL=90%	848
$\overline{K}^*(892)^0 e^\pm \mu^\mp$	*LF*	[*t*]	< 8.3	$\times 10^{-5}$	CL=90%	714
$2\pi^- 2e^+ +$ c.c.	*L*		< 1.12	$\times 10^{-4}$	CL=90%	922
$2\pi^- 2\mu^+ +$ c.c.	*L*		< 2.9	$\times 10^{-5}$	CL=90%	894
$K^- \pi^- 2e^+ +$ c.c.	*L*		< 2.06	$\times 10^{-4}$	CL=90%	861
$K^- \pi^- 2\mu^+ +$ c.c.	*L*		< 3.9	$\times 10^{-4}$	CL=90%	829
$2K^- 2e^+ +$ c.c.	*L*		< 1.52	$\times 10^{-4}$	CL=90%	791
$2K^- 2\mu^+ +$ c.c.	*L*		< 9.4	$\times 10^{-5}$	CL=90%	710
$\pi^- \pi^- e^+ \mu^+ +$ c.c.	*L*		< 7.9	$\times 10^{-5}$	CL=90%	911
$K^- \pi^- e^+ \mu^+ +$ c.c.	*L*		< 2.18	$\times 10^{-4}$	CL=90%	848
$2K^- e^+ \mu^+ +$ c.c.	*L*		< 5.7	$\times 10^{-5}$	CL=90%	754
$p e^-$	*L,B*	[*u*]	< 1.0	$\times 10^{-5}$	CL=90%	696
$\overline{p} e^+$	*L,B*	[*v*]	< 1.1	$\times 10^{-5}$	CL=90%	696

$D^*(2007)^0$

$I(J^P) = \frac{1}{2}(1^-)$
I, *J*, *P* need confirmation.

Mass $m = 2006.98 \pm 0.15$ MeV
$m_{D^{*0}} - m_{D^0} = 142.12 \pm 0.07$ MeV
Full width $\Gamma < 2.1$ MeV, CL = 90%

$\overline{D}^*(2007)^0$ modes are charge conjugates of modes below.

$D^*(2007)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^0\pi^0$	(61.9±2.9) %	43
$D^0\gamma$	(38.1±2.9) %	137

$D^*(2010)^\pm$

$I(J^P) = \frac{1}{2}(1^-)$
I, J, P need confirmation.

Mass $m = 2010.28 \pm 0.13$ MeV
$m_{D^*(2010)^+} - m_{D^+} = 140.66 \pm 0.10$ MeV (S = 1.1)
$m_{D^*(2010)^+} - m_{D^0} = 145.421 \pm 0.010$ MeV (S = 1.1)
Full width $\Gamma = 96 \pm 22$ keV

$D^*(2010)^-$ modes are charge conjugates of the modes below.

$D^*(2010)^\pm$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^0\pi^+$	(67.7±0.5) %	39
$D^+\pi^0$	(30.7±0.5) %	38
$D^+\gamma$	(1.6±0.4) %	136

$D_0^*(2400)^0$

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

Mass $m = 2318 \pm 29$ MeV (S = 1.7)
Full width $\Gamma = 267 \pm 40$ MeV

$D_0^*(2400)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^+\pi^-$	seen	385

$D_1(2420)^0$

$I(J^P) = \frac{1}{2}(1^+)$
I needs confirmation.

Mass $m = 2421.3 \pm 0.6$ MeV (S = 1.2)
$m_{D_1^0} - m_{D^{*+}} = 411.0 \pm 0.6$ (S = 1.2)
Full width $\Gamma = 27.1 \pm 2.7$ MeV (S = 2.4)

$\overline{D}_1(2420)^0$ modes are charge conjugates of modes below.

$D_1(2420)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^*(2010)^+\pi^-$	seen	354
$D^0\pi^+\pi^-$	seen	425
$D^+\pi^-$	not seen	473
$D^{*0}\pi^+\pi^-$	not seen	279

$D_2^*(2460)^0$

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

$J^P = 2^+$ assignment strongly favored.

Mass $m = 2462.6 \pm 0.7$ MeV (S = 1.3)
$m_{D_2^{*0}} - m_{D^+} = 593.0 \pm 0.7$ MeV (S = 1.3)
$m_{D_2^{*0}} - m_{D^{*+}} = 452.3 \pm 0.7$ MeV (S = 1.3)
Full width $\Gamma = 49.0 \pm 1.4$ MeV (S = 1.7)

$\overline{D}_2^*(2460)^0$ modes are charge conjugates of modes below.

$D_2^*(2460)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^+\pi^-$	seen	507
$D^*(2010)^+\pi^-$	seen	391
$D^0\pi^+\pi^-$	not seen	463
$D^{*0}\pi^+\pi^-$	not seen	326

$D_2^*(2460)^\pm$

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

$J^P = 2^+$ assignment strongly favored.

Mass $m = 2464.4 \pm 1.9$ MeV (S = 1.9)
$m_{D_2^*(2460)^\pm} - m_{D_2^*(2460)^0} = 2.4 \pm 1.7$ MeV
Full width $\Gamma = 37 \pm 6$ MeV (S = 1.4)

$D_2^*(2460)^-$ modes are charge conjugates of modes below.

$D_2^*(2460)^\pm$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^0\pi^+$	seen	512
$D^{*0}\pi^+$	seen	395
$D^+\pi^+\pi^-$	not seen	461
$D^{*+}\pi^+\pi^-$	not seen	325

NOTES

[*a*] This result applies to $Z^0 \to c\overline{c}$ decays only. Here ℓ^+ is an average (not a sum) of e^+ and μ^+ decays.

[*b*] See the Particle Listings for the (complicated) definition of this quantity.

[*c*] 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 in the Particle Listings.

[*d*] These subfractions of the $K^- 2\pi^+$ mode are uncertain: see the Particle Listings.

[*e*] Submodes of the $D^+ \to K^- 2\pi^+ \pi^0$ and $K^0_S 2\pi^+ \pi^-$ modes were studied by ANJOS 92C and COFFMAN 92B, but with at most 142 events for the first mode and 229 for the second – not enough for precise results. With nothing new for 18 years, we refer to our 2008 edition, Physics Letters **B667** 1 (2008), for those results.

[*f*] The unseen decay modes of the resonances are included.

[*g*] This is *not* a test for the ΔC=1 weak neutral current, but leads to the $\pi^+ \ell^+ \ell^-$ final state.

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

[*i*] In the 2010 *Review*, the values for these quantities were given using a measure of the asymmetry that was inconsistent with the usual definition.

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

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

[*l*] This is the sum of our $K^- 3\pi^+ 2\pi^-$ and $3\pi^+ 3\pi^-$ branching fractions.

[*m*] 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 6.19 $\pm$ 0.17 %.

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

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

[*p*] Submodes of the $D^0 \to K^0_S \pi^+ \pi^- \pi^0$ mode with a K^* and/or ρ were studied by COFFMAN 92B, but with only 140 events. With nothing new for 18 years, we refer to our 2008 edition, Physics Letters **B667** 1 (2008), for those results.

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

[*r*] 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.

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

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

[*u*] This limit is for either D^0 or $\overline{D}^0$ to pe^-.

[*v*] This limit is for either D^0 or $\overline{D}^0$ to $\overline{p}e^+$.