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 $m = 1869.65 \pm 0.05$ MeV
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

$A_{CP}(\mu^\pm\nu) = (8 \pm 8)\%$
$A_{CP}(K^0_L e^\pm\nu) = (-0.6 \pm 1.6)\%$
$A_{CP}(K^0_S\pi^\pm) = (-0.41 \pm 0.09)\%$
$A_{CP}(K^0_L K^\pm)$ in $D^\pm \to \ K^0_L K^\pm = (-4.2 \pm 3.4) \times 10^{-2}$
$A_{CP}(K^\mp 2\pi^\pm) = (-0.18 \pm 0.16)\%$
$A_{CP}(K^\mp\pi^\pm\pi^\pm\pi^0) = (-0.3 \pm 0.7)\%$
$A_{CP}(K^0_S\pi^\pm\pi^0) = (-0.1 \pm 0.7)\%$
$A_{CP}(K^0_S\pi^\pm\pi^+\pi^-) = (0.0 \pm 1.2)\%$
$A_{CP}(\pi^\pm\pi^0) = (2.4 \pm 1.2)\%$
$A_{CP}(\pi^\pm\eta) = (1.0 \pm 1.5)\%$ (S = 1.4)
$A_{CP}(\pi^\pm\eta'(958)) = (-0.6 \pm 0.7)\%$
$A_{CP}(\overline{K}^0/K^0 K^\pm) = (0.11 \pm 0.17)\%$
$A_{CP}(K^0_S K^\pm) = (-0.01 \pm 0.07)\%$
$A_{CP}(K^0_S K^\pm\pi^0)$ in $D^\pm \to \ K^0_S K^\pm\pi^0 = (1 \pm 4) \times 10^{-2}$
$A_{CP}(K^0_L K^\pm\pi^0)$ in $D^\pm \to \ K^0_L K^\pm\pi^0 = (-1 \pm 4) \times 10^{-2}$
$A_{CP}(K^+K^-\pi^\pm) = (0.37 \pm 0.29)\%$
$A_{CP}(K^\pm K^{*0}) = (-0.3 \pm 0.4)\%$
$A_{CP}(\phi\pi^\pm) = (0.01 \pm 0.09)\%$ (S = 1.8)
$A_{CP}(K^\pm K^*_0(1430)^0) = (8^{+7}_{-6})\%$
$A_{CP}(K^\pm K^*_2(1430)^0) = (43^{+20}_{-26})\%$
$A_{CP}(K^\pm K^*_0(700)) = (-12^{+18}_{-13})\%$
$A_{CP}(a_0(1450)^0\pi^\pm) = (-19^{+14}_{-16})\%$
$A_{CP}(\phi(1680)\pi^\pm) = (-9 \pm 26)\%$
$A_{CP}(\pi^+\pi^-\pi^\pm) = (-2 \pm 4)\%$
$A_{CP}(K^0_S K^\pm\pi^+\pi^-) = (-4 \pm 7)\%$
$A_{CP}(K^\pm\pi^0) = (-4 \pm 11)\%$

χ^2 tests of *CP*-violation (*CPV*)

Local *CPV* in $D^\pm \to \pi^+\pi^-\pi^\pm = 78.1\%$
Local *CPV* in $D^\pm \to K^+K^-\pi^\pm = 31\%$

CP violating asymmetries of *P*-odd (*T*-odd) moments

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

D^+ form factors

$f_+(0)|V_{cs}|$ in $\overline{K}^0 \ell^+ \nu_\ell = 0.719 \pm 0.011$ (S = 1.6)
$r_1 \equiv a_1/a_0$ in $\overline{K}^0 \ell^+ \nu_\ell = -2.13 \pm 0.14$
$r_2 \equiv a_2/a_0$ in $\overline{K}^0 \ell^+ \nu_\ell = -3 \pm 12$ (S = 1.5)
$f_+(0)|V_{cd}|$ in $\pi^0 \ell^+ \nu_\ell = 0.1407 \pm 0.0025$
$r_1 \equiv a_1/a_0$ in $\pi^0 \ell^+ \nu_\ell = -2.00 \pm 0.13$
$r_2 \equiv a_2/a_0$ in $\pi^0 \ell^+ \nu_\ell = -4 \pm 5$
$f_+(0)|V_{cd}|$ in $D^+ \to \eta e^+ \nu_e = (8.3 \pm 0.5) \times 10^{-2}$
$r_1 \equiv a_1/a_0$ in $D^+ \to \eta e^+ \nu_e = -5.3 \pm 2.7$ (S = 1.9)
$r_v \equiv V(0)/A_1(0)$ in $D^+ \to \omega e^+ \nu_e = 1.24 \pm 0.11$
$r_2 \equiv A_2(0)/A_1(0)$ in $D^+ \to \omega e^+ \nu_e = 1.06 \pm 0.16$
$r_v \equiv V(0)/A_1(0)$ in $D^+,D^0 \to \rho e^+ \nu_e = 1.64 \pm 0.10$ (S = 1.2)
$r_2 \equiv A_2(0)/A_1(0)$ in $D^+,D^0 \to \rho e^+ \nu_e = 0.84 \pm 0.06$
$r_v \equiv V(0)/A_1(0)$ in $\overline{K}^*(892)^0 \ell^+ \nu_\ell = 1.49 \pm 0.05$ (S = 2.1)
$r_2 \equiv A_2(0)/A_1(0)$ in $\overline{K}^*(892)^0 \ell^+ \nu_\ell = 0.802 \pm 0.021$
$r_3 \equiv A_3(0)/A_1(0)$ 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	(1.12 ± 0.04) %			–

Leptonic and semileptonic modes

$e^+\nu_e$	< 8.8	$\times 10^{-6}$	CL=90%	935
$\gamma e^+\nu_e$	< 3.0	$\times 10^{-5}$	CL=90%	935
$\mu^+\nu_\mu$	(3.74 ± 0.17)	$\times 10^{-4}$		932
$\tau^+\nu_\tau$	(1.20 ± 0.27)	$\times 10^{-3}$		90
$\overline{K}^0 e^+\nu_e$	(8.73 ± 0.10) %			869
$\overline{K}^0\mu^+\nu_\mu$	(8.76 ± 0.19) %			865
$K^-\pi^+e^+\nu_e$	(4.02 ± 0.18) %		S=3.2	864
$\overline{K}^*(892)^0 e^+\nu_e$, $\overline{K}^*(892)^0 \to K^-\pi^+$	(3.77 ± 0.17) %			722
$(K^-\pi^+)_{\text{[0.8–1.0]GeV}}\, e^+\nu_e$	(3.39 ± 0.09) %			864
$(K^-\pi^+)_{S-wave}\, e^+\nu_e$	(2.28 ± 0.11)	$\times 10^{-3}$		–
$\overline{K}^*(1410)^0 e^+\nu_e$, $\overline{K}^*(1410)^0 \to K^-\pi^+$	< 6	$\times 10^{-3}$	CL=90%	–
$\overline{K}_2^*(1430)^0 e^+\nu_e$, $\overline{K}_2^*(1430)^0 \to K^-\pi^+$	< 5	$\times 10^{-4}$	CL=90%	–
$K^-\pi^+e^+\nu_e$ nonresonant	< 7	$\times 10^{-3}$	CL=90%	864
$\overline{K}^*(892)^0 e^+\nu_e$	(5.40 ± 0.10) %		S=1.1	722
$K^-\pi^+\mu^+\nu_\mu$	(3.65 ± 0.34) %			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	(1.9 ± 0.5)	$\times 10^{-3}$		851
$\overline{K}^*(892)^0\mu^+\nu_\mu$	(5.27 ± 0.15) %			717
$K^-\pi^+\pi^0\mu^+\nu_\mu$	< 1.5	$\times 10^{-3}$	CL=90%	825
$\overline{K}_1(1270)^0 e^+\nu_e$, $\overline{K}_1^0 \to K^-\pi^+\pi^0$	(1.06 ± 0.15)	$\times 10^{-3}$		–
$\overline{K}_0^*(1430)^0\mu^+\nu_\mu$	< 2.3	$\times 10^{-4}$	CL=90%	380
$\overline{K}^*(1680)^0\mu^+\nu_\mu$	< 1.5	$\times 10^{-3}$	CL=90%	105
$\pi^0 e^+\nu_e$	(3.72 ± 0.17)	$\times 10^{-3}$	S=2.0	930
$\pi^0\mu^+\nu_\mu$	(3.50 ± 0.15)	$\times 10^{-3}$		927
$\eta e^+\nu_e$	(1.11 ± 0.07)	$\times 10^{-3}$		855
$\pi^-\pi^+e^+\nu_e$	(2.45 ± 0.10)	$\times 10^{-3}$		924
$f_0(500)^0 e^+\nu_e$, $f_0(500)^0 \to \pi^+\pi^-$	(6.3 ± 0.5)	$\times 10^{-4}$		–
$\rho^0 e^+\nu_e$	(2.18 $^{+\ 0.17}_{-\ 0.25}$)	$\times 10^{-3}$		774
$\rho^0\mu^+\nu_\mu$	(2.4 ± 0.4)	$\times 10^{-3}$		770

$\omega e^+ \nu_e$		$(1.69 \pm 0.11) \times 10^{-3}$		771
$\eta'(958) e^+ \nu_e$		$(2.0 \pm 0.4) \times 10^{-4}$		690
$a(980)^0 e^+ \nu_e$, $a(980)^0 \to \eta \pi^0$		$(1.7 \,^{+\,0.8}_{-\,0.7}) \times 10^{-4}$		–
$\phi e^+ \nu_e$		$< 1.3 \times 10^{-5}$	CL=90%	657
$D^0 e^+ \nu_e$		$< 1.0 \times 10^{-4}$	CL=90%	5

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

$K^0_S \pi^+$		(1.562± 0.031) %	S=1.7	863
$K^0_L \pi^+$		(1.46 ± 0.05) %		863
$K^- 2\pi^+$	[c]	(9.38 ± 0.16) %	S=1.6	846
$(K^- \pi^+)_{S-\text{wave}} \pi^+$		(7.52 ± 0.17) %		846
$\overline{K}^*_0(1430)^0 \pi^+$, $\overline{K}^*_0(1430)^0 \to K^- \pi^+$	[d]	(1.25 ± 0.06) %		382
$\overline{K}^*(892)^0 \pi^+$, $\overline{K}^*(892)^0 \to K^- \pi^+$		(1.04 ± 0.12) %		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]	(2.3 ± 0.7) $\times 10^{-4}$		371
$\overline{K}^*(1680)^0 \pi^+$, $\overline{K}^*(1680)^0 \to K^- \pi^+$	[d]	(2.2 ± 1.1) $\times 10^{-4}$		58
$K^- (2\pi^+)_{I=2}$		(1.45 ± 0.26) %		–
$K^0_S \pi^+ \pi^0$	[c]	(7.36 ± 0.21) %		845
$K^0_S \rho^+$		$(6.14 \,^{+\,0.60}_{-\,0.35})$ %		677
$K^0_S \rho(1450)^+$, $\rho^+ \to \pi^+ \pi^0$		$(1.5 \,^{+\,1.2}_{-\,1.4}) \times 10^{-3}$		–
$\overline{K}^*(892)^0 \pi^+$, $\overline{K}^*(892)^0 \to K^0_S \pi^0$		(2.64 ± 0.32) $\times 10^{-3}$		714
$\overline{K}^*_0(1430)^0 \pi^+$, $\overline{K}^{*0}_0 \to K^0_S \pi^0$		(2.7 ± 0.9) $\times 10^{-3}$		–
$\overline{K}^*_0(1680)^0 \pi^+$, $\overline{K}^{*0}_0 \to K^0_S \pi^0$		$(10 \,^{+\,7}_{-10}) \times 10^{-4}$		–
$\overline{\kappa}^0 \pi^+$, $\overline{\kappa}^0 \to K^0_S \pi^0$		$(6 \,^{+\,5}_{-\,4}) \times 10^{-3}$		–
$K^0_S \pi^+ \pi^0$ nonresonant		(3 ± 4) $\times 10^{-3}$		845
$K^0_S \pi^+ \pi^0$ nonresonant and $\overline{\kappa}^0 \pi^+$		$(1.37 \,^{+\,0.21}_{-\,0.40})$ %		–
$(K^0_S \pi^0)_{S-\text{wave}} \pi^+$		$(1.27 \,^{+\,0.27}_{-\,0.33})$ %		845
$K^0_S \pi^+ \eta'(958)$		(1.90 ± 0.21) $\times 10^{-3}$		481
$K^- 2\pi^+ \pi^0$	[e]	(6.25 ± 0.18) %		816
$K^0_S 2\pi^+ \pi^-$	[e]	(3.10 ± 0.09) %		814

$K^-3\pi^+\pi^-$	[c]	$(\ 5.7 \pm 0.5\ )\times10^{-3}$	S=1.1	772
$\overline{K}^*(892)^0 2\pi^+\pi^-$,		$(\ 1.2 \pm 0.4\ )\times10^{-3}$		645
$\overline{K}^*(892)^0 \to K^-\pi^+$				
$\overline{K}^*(892)^0\rho^0\pi^+$,		$(\ 2.3 \pm 0.4\ )\times10^{-3}$		239
$\overline{K}^*(892)^0 \to K^-\pi^+$				
$\overline{K}^*(892)^0 a_1(1260)^+$	[f]	$(\ 9.3 \pm 1.9\ )\times10^{-3}$		†
$K^-\rho^0 2\pi^+$		$(\ 1.72 \pm 0.28\ )\times10^{-3}$		524
$K^-3\pi^+\pi^-$ nonresonant		$(\ 4.0 \pm 2.9\ )\times10^{-4}$		772
$K^+2K^0_S$		$(\ 2.54 \pm 0.13\ )\times10^{-3}$		545
$K^+K^-K^0_S\pi^+$		$(\ 2.4 \pm 0.5\ )\times10^{-4}$		436

Pionic modes

$\pi^+\pi^0$		$(\ 1.247\pm 0.033)\times10^{-3}$		925
$2\pi^+\pi^-$		$(\ 3.27 \pm 0.18\ )\times10^{-3}$		909
$\rho^0\pi^+$		$(\ 8.3 \pm 1.5\ )\times10^{-4}$		767
$\pi^+(\pi^+\pi^-)_{S-\text{wave}}$		$(\ 1.83 \pm 0.16\ )\times10^{-3}$		909
$\sigma\pi^+$, $\sigma\to\pi^+\pi^-$		$(\ 1.38 \pm 0.12\ )\times10^{-3}$		–
$f_0(980)\pi^+$,		$(\ 1.56 \pm 0.33\ )\times10^{-4}$		669
$f_0(980)\to\pi^+\pi^-$				
$f_0(1370)\pi^+$,		$(\ 8 \pm 4\ )\times10^{-5}$		–
$f_0(1370)\to\pi^+\pi^-$				
$f_2(1270)\pi^+$,		$(\ 5.0 \pm 0.9\ )\times10^{-4}$		485
$f_2(1270)\to\pi^+\pi^-$				
$\rho(1450)^0\pi^+$,		$< 8 \times10^{-5}$	CL=95%	338
$\rho(1450)^0\to\pi^+\pi^-$				
$f_0(1500)\pi^+$,		$(\ 1.1 \pm 0.4\ )\times10^{-4}$		–
$f_0(1500)\to\pi^+\pi^-$				
$f_0(1710)\pi^+$,		$< 5 \times10^{-5}$	CL=95%	–
$f_0(1710)\to\pi^+\pi^-$				
$f_0(1790)\pi^+$,		$< 7 \times10^{-5}$	CL=95%	–
$f_0(1790)\to\pi^+\pi^-$				
$(\pi^+\pi^+)_{S-\text{wave}}\pi^-$		$< 1.2 \times10^{-4}$	CL=95%	909
$2\pi^+\pi^-$ nonresonant		$< 1.1 \times10^{-4}$	CL=95%	909
$\pi^+2\pi^0$		$(\ 4.7 \pm 0.4\ )\times10^{-3}$		910
$2\pi^+\pi^-\pi^0$		$(\ 1.16 \pm 0.08\ )\ \%$		883
$3\pi^+2\pi^-$		$(\ 1.66 \pm 0.16\ )\times10^{-3}$	S=1.1	845
$\eta\pi^+$		$(\ 3.77 \pm 0.09\ )\times10^{-3}$		848
$\eta\pi^+\pi^0$		$(\ 1.38 \pm 0.35\ )\times10^{-3}$		831
$\omega\pi^+$		$(\ 2.8 \pm 0.6\ )\times10^{-4}$		764
$\eta'(958)\pi^+$		$(\ 4.97 \pm 0.19\ )\times10^{-3}$		681
$\eta'(958)\pi^+\pi^0$		$(\ 1.6 \pm 0.5\ )\times10^{-3}$		654

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

$K^+ K^0_S$		$(3.04 \pm 0.09) \times 10^{-3}$	S=2.2	793
$K^0_L K^+$		$(3.21 \pm 0.16) \times 10^{-3}$		793
$K^0_S K^+ \pi^0$		$(5.07 \pm 0.30) \times 10^{-3}$		744
$K^0_L K^+ \pi^0$		$(5.24 \pm 0.31) \times 10^{-3}$		744
$K^+ K^- \pi^+$	[c]	$(9.68 \pm 0.18) \times 10^{-3}$		744
$\phi\pi^+$		$(5.70 \pm 0.14) \times 10^{-3}$		647
$\phi\pi^+$, $\phi \to K^+ K^-$		$(2.69 \,^{+\,0.07}_{-\,0.08}) \times 10^{-3}$		647
$K^+ \overline{K}^*(892)^0$, $\overline{K}^*(892)^0 \to K^- \pi^+$		$(2.49 \,^{+\,0.08}_{-\,0.13}) \times 10^{-3}$		613
$K^+ \overline{K}^*_0(1430)^0$, $\overline{K}^*_0(1430)^0 \to K^- \pi^+$		$(1.82 \pm 0.35) \times 10^{-3}$		–
$K^+ \overline{K}^*_2(1430)^0$, $\overline{K}^*_2 \to K^- \pi^+$		$(1.6 \,^{+\,1.2}_{-\,0.8}) \times 10^{-4}$		–
$K^+ \overline{K}^*_0(700)$, $\overline{K}^*_0 \to K^- \pi^+$		$(6.8 \,^{+\,3.5}_{-\,2.1}) \times 10^{-4}$		–
$a_0(1450)^0 \pi^+$, $a^0_0 \to K^+ K^-$		$(4.5 \,^{+\,7.0}_{-\,1.8}) \times 10^{-4}$		–
$\phi(1680)\pi^+$, $\phi \to K^+ K^-$		$(4.9 \,^{+\,4.0}_{-\,1.9}) \times 10^{-5}$		–
$K^0_S K^0_S \pi^+$		$(2.70 \pm 0.13) \times 10^{-3}$		741
$K^+ K^0_S \pi^+ \pi^-$		$(1.74 \pm 0.18) \times 10^{-3}$		678
$K^0_S K^- 2\pi^+$		$(2.38 \pm 0.17) \times 10^{-3}$		678
$K^+ K^- 2\pi^+ \pi^-$		$(2.3 \pm 1.2) \times 10^{-4}$		601

A few poorly measured branching fractions:

$\phi\pi^+\pi^0$		(2.3 ± 1.0) %		619
$\phi\rho^+$		< 1.5 %	CL=90%	260
$K^+ K^- \pi^+ \pi^0$ non-ϕ		$(1.5 \,^{+\,0.7}_{-\,0.6})$ %		682
$K^*(892)^+ K^0_S$		(1.7 ± 0.8) %		612

Doubly Cabibbo-suppressed modes

$K^+ \pi^0$		$(2.08 \pm 0.21) \times 10^{-4}$	S=1.4	864
$K^+ \eta$		$(1.25 \pm 0.16) \times 10^{-4}$	S=1.1	776
$K^+ \eta'(958)$		$(1.85 \pm 0.20) \times 10^{-4}$		571
$K^+ \pi^+ \pi^-$		$(4.91 \pm 0.09) \times 10^{-4}$		846
$K^+ \rho^0$		$(1.9 \pm 0.5) \times 10^{-4}$		679
$K^*(892)^0 \pi^+$, $K^*(892)^0 \to K^+ \pi^-$		$(2.3 \pm 0.4) \times 10^{-4}$		714
$K^+ f_0(980)$, $f_0(980) \to \pi^+ \pi^-$		$(4.4 \pm 2.6) \times 10^{-5}$		–

$K_2^*(1430)^0\pi^+$, $K_2^*(1430)^0 \to K^+\pi^-$			$(\ 3.9 \pm 2.7\ ) \times 10^{-5}$	–
$K^+\pi^+\pi^-$ nonresonant			not seen	846
$2K^+K^-$			$(\ 6.14 \pm 0.11\ ) \times 10^{-5}$	550
$\phi(1020)^0 K^+$			$< 2.1 \times 10^{-5}$ CL=90%	–
$K^+\phi(1020)$, $\phi \to K^+K^-$			$(\ 4.4 \pm 0.6\ ) \times 10^{-6}$	–
$K^+(K^+K^-)_{S-wave}$			$(\ 5.77 \pm 0.12\ ) \times 10^{-5}$	550

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

$\pi^+e^+e^-$	*C1*		$< 1.1 \times 10^{-6}$ CL=90%	930
$\pi^+\pi^0e^+e^-$			$< 1.4 \times 10^{-5}$ CL=90%	925
$\pi^+\phi$, $\phi \to e^+e^-$		[*g*]	$(\ 1.7\ ^{+\ 1.4}_{-\ 0.9}\ ) \times 10^{-6}$	–
$\pi^+\mu^+\mu^-$	*C1*		$< 7.3 \times 10^{-8}$ CL=90%	918
$\pi^+\phi$, $\phi \to \mu^+\mu^-$		[*g*]	$(\ 1.8 \pm 0.8\ ) \times 10^{-6}$	–
$\rho^+\mu^+\mu^-$	*C1*		$< 5.6 \times 10^{-4}$ CL=90%	757
$K^+e^+e^-$		[*h*]	$< 1.0 \times 10^{-6}$ CL=90%	870
$K^+\pi^0e^+e^-$			$< 1.5 \times 10^{-5}$ CL=90%	864
$K_S^0\pi^+e^+e^-$			$< 2.6 \times 10^{-5}$ CL=90%	–
$K_S^0K^+e^+e^-$			$< 1.1 \times 10^{-5}$ CL=90%	–
$K^+\mu^+\mu^-$		[*h*]	$< 4.3 \times 10^{-6}$ CL=90%	856
$\pi^+e^+\mu^-$	*LF*		$< 2.9 \times 10^{-6}$ CL=90%	927
$\pi^+e^-\mu^+$	*LF*		$< 3.6 \times 10^{-6}$ CL=90%	927
$K^+e^+\mu^-$	*LF*		$< 1.2 \times 10^{-6}$ CL=90%	866
$K^+e^-\mu^+$	*LF*		$< 2.8 \times 10^{-6}$ CL=90%	866
π^-2e^+	*L*		$< 1.1 \times 10^{-6}$ CL=90%	930
$\pi^-2\mu^+$	*L*		$< 2.2 \times 10^{-8}$ CL=90%	918
$\pi^-e^+\mu^+$	*L*		$< 2.0 \times 10^{-6}$ CL=90%	927
$\rho^-2\mu^+$	*L*		$< 5.6 \times 10^{-4}$ CL=90%	757
K^-2e^+	*L*		$< 9 \times 10^{-7}$ CL=90%	870
$K_S^0\pi^-2e^+$			$< 3.3 \times 10^{-6}$ CL=90%	863
$K^-\pi^02e^+$			$< 8.5 \times 10^{-6}$ CL=90%	864
$K^-2\mu^+$	*L*		$< 1.0 \times 10^{-5}$ CL=90%	856
$K^-e^+\mu^+$	*L*		$< 1.9 \times 10^{-6}$ CL=90%	866
$K^*(892)^-2\mu^+$	*L*		$< 8.5 \times 10^{-4}$ CL=90%	703

D^0

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

Mass $m = 1864.83 \pm 0.05$ MeV
$m_{D^\pm} - m_{D^0} = 4.822 \pm 0.015$ MeV
Mean life $\tau = (410.1 \pm 1.5) \times 10^{-15}$ s
$c\tau = 122.9\ \mu$m

Mixing and related parameters

$|m_{D_1^0} - m_{D_2^0}| = (0.95^{+0.41}_{-0.44}) \times 10^{10}\ \hbar\ \mathrm{s}^{-1}$
$(\Gamma_{D_1^0} - \Gamma_{D_2^0})/\Gamma = 2y = (1.29^{+0.14}_{-0.18}) \times 10^{-2}$
$|q/p| = 0.92^{+0.12}_{-0.09}$
$A_\Gamma = (-0.125 \pm 0.526) \times 10^{-3}$
$\phi^{K^0_S\pi\pi} = -0.09^{+0.10}_{-0.13}$
$K^+\pi^-$ relative strong phase: $\cos\delta = 0.97 \pm 0.11$
$K^-\pi^+\pi^0$ coherence factor $R_{K\pi\pi^0} = 0.82 \pm 0.06$
$K^-\pi^+\pi^0$ average relative strong phase $\delta^{K\pi\pi^0} = (199 \pm 14)^\circ$
$K^-\pi^-2\pi^+$ coherence factor $R_{K3\pi} = 0.53^{+0.18}_{-0.21}$
$K^-\pi^-2\pi^+$ average relative strong phase $\delta^{K3\pi} = (125^{+22}_{-14})^\circ$
$D^0 \to\ K^-\pi^-2\pi^+$, $R_{K3\pi}$ (y $\cos\delta^{K3\pi}$ − x $\sin\delta^{K3\pi}$) $= (-3.0 \pm 0.7) \times 10^{-3}$ TeV^{-1}
$K^0_S K^+\pi^-$ coherence factor $R_{K^0_S K\pi} = 0.70 \pm 0.08$
$K^0_S K^+\pi^-$ average relative strong phase $\delta^{K^0_S K\pi} = (0 \pm 16)^\circ$
K^*K coherence factor $R_{K^*K} = 0.94 \pm 0.12$
K^*K average relative strong phase $\delta^{K^*K} = (-17 \pm 18)^\circ$

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

$A_{CP}(K^+K^-) = (-0.07 \pm 0.11)\%$
$A_{CP}(2K^0_S) = (0.4 \pm 1.4)\%$
$A_{CP}(\pi^+\pi^-) = (0.13 \pm 0.14)\%$
$A_{CP}(\pi^0\pi^0) = (0.0 \pm 0.6)\%$
$A_{CP}(\rho\gamma) = (6 \pm 15) \times 10^{-2}$
$A_{CP}(\phi\gamma) = (-9 \pm 7) \times 10^{-2}$
$A_{CP}(\overline{K}^*(892)^0\gamma) = (-0.3 \pm 2.0) \times 10^{-2}$
$A_{CP}(\pi^+\pi^-\pi^0) = (0.3 \pm 0.4)\%$
$A_{CP}(\rho(770)^+\pi^- \to\ \pi^+\pi^-\pi^0) = (1.2 \pm 0.9)\%$ [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]
$A_{CP}(a_1(1260)^+\pi^- \to 2\pi^+2\pi^-) = (5 \pm 6)\%$
$A_{CP}(a_1(1260)^-\pi^+ \to 2\pi^+2\pi^-) = (14 \pm 18)\%$
$A_{CP}(\pi(1300)^+\pi^- \to 2\pi^+2\pi^-) = (-2 \pm 15)\%$
$A_{CP}(\pi(1300)^-\pi^+ \to 2\pi^+2\pi^-) = (-6 \pm 30)\%$
$A_{CP}(a_1(1640)^+\pi^- \to 2\pi^+2\pi^-) = (9 \pm 26)\%$
$A_{CP}(\pi_2(1670)^+\pi^- \to 2\pi^+2\pi^-) = (7 \pm 18)\%$
$A_{CP}(\sigma f_0(1370) \to 2\pi^+2\pi^-) = (-15 \pm 19)\%$
$A_{CP}(\sigma\rho(770)^0 \to 2\pi^+2\pi^-) = (3 \pm 27)\%$
$A_{CP}(2\rho(770)^0 \to 2\pi^+2\pi^-) = (-6 \pm 6)\%$
$A_{CP}(2f_2(1270) \to 2\pi^+2\pi^-) = (-28 \pm 24)\%$
$A_{CP}(K^+K^-\pi^0) = (-1.0 \pm 1.7)\%$
$A_{CP}(K^*(892)^+K^- \to K^+K^-\pi^0) = (-0.9 \pm 1.3)\%$ [i]
$A_{CP}(K^*(1410)^+K^- \to K^+K^-\pi^0) = (-21 \pm 24)\%$ [i]
$A_{CP}((K^+\pi^0)_{S-wave}K^- \to K^+K^-\pi^0) = (7 \pm 15)\%$ [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]
$A_{CP}(K^0_S\pi^0) = (-0.20 \pm 0.17)\%$
$A_{CP}(K^0_S\eta) = (0.5 \pm 0.5)\%$
$A_{CP}(K^0_S\eta') = (1.0 \pm 0.7)\%$
$A_{CP}(K^0_S\phi) = (-3 \pm 9)\%$
$A_{CP}(K^-\pi^+) = (0.2 \pm 0.5)\%$
$A_{CP}(K^+\pi^-) = (-0.9 \pm 1.4)\%$
$A_{CP}(D_{CP(\pm1)} \to K^\mp\pi^\pm) = (12.7 \pm 1.5)\%$
$A_{CP}(K^-\pi^+\pi^0) = (0.1 \pm 0.5)\%$
$A_{CP}(K^+\pi^-\pi^0) = (0 \pm 5)\%$
$A_{CP}(K^0_S\pi^+\pi^-) = (-0.1 \pm 0.8)\%$
$A_{CP}(K^*(892)^-\pi^+ \to K^0_S\pi^+\pi^-) = (0.4 \pm 0.5)\%$
$A_{CP}(K^*(892)^+\pi^- \to K^0_S\pi^+\pi^-) = (1 \pm 6)\%$
$A_{CP}(\overline{K}^0\rho^0 \to K^0_S\pi^+\pi^-) = (-0.1 \pm 0.5)\%$
$A_{CP}(\overline{K}^0\omega \to K^0_S\pi^+\pi^-) = (-13 \pm 7)\%$
$A_{CP}(\overline{K}^0 f_0(980) \to K^0_S\pi^+\pi^-) = (-0.4 \pm 2.7)\%$
$A_{CP}(\overline{K}^0 f_2(1270) \to K^0_S\pi^+\pi^-) = (-4 \pm 5)\%$

$A_{CP}(\overline{K}^0 f_0(1370) \to K^0_S \pi^+\pi^-) = (-1 \pm 9)\%$
$A_{CP}(\overline{K}^0 \rho^0(1450) \to K^0_S \pi^+\pi^-) = (-4 \pm 10)\%$
$A_{CP}(\overline{K}^0 f_0(600) \to K^0_S \pi^+\pi^-) = (-3 \pm 5)\%$
$A_{CP}(K^*(1410)^-\pi^+ \to K^0_S \pi^+\pi^-) = (-2 \pm 9)\%$
$A_{CP}(K^*_0(1430)^-\pi^+ \to K^0_S \pi^+\pi^-) = (4 \pm 4)\%$
$A_{CP}(K^*_0(1430)^+\pi^- \to K^0_S \pi^+\pi^-) = (12 \pm 15)\%$
$A_{CP}(K^*_2(1430)^-\pi^+ \to K^0_S \pi^+\pi^-) = (3 \pm 6)\%$
$A_{CP}(K^*_2(1430)^+\pi^- \to K^0_S \pi^+\pi^-) = (-10 \pm 32)\%$
$A_{CP}(K^-\pi^+\pi^+\pi^-) = (0.2 \pm 0.5)\%$
$A_{CP}(K^+\pi^-\pi^+\pi^-) = (-2 \pm 4)\%$
$A_{CP}(K^+K^-\pi^+\pi^-) = (1.3 \pm 1.7)\%$
$A_{CP}(K^*_1(1270)^+K^- \to K^+K^-\pi^+\pi^-) = (-2.3 \pm 1.7)\%$
$A_{CP}(K^*_1(1270)^+K^- \to K^{*0}\pi^+K^-) = (-1 \pm 10)\%$
$A_{CP}(K^*_1(1270)^-K^+ \to \overline{K}^{*0}\pi^-K^+) = (-10 \pm 32)\%$
$A_{CP}(K^*_1(1270)^-K^+ \to K^+K^-\pi^+\pi^-) = (1.7 \pm 3.5)\%$
$A_{CP}(K^*_1(1270)^+K^- \to \rho^0 K^+K^-) = (-7 \pm 17)\%$
$A_{CP}(K^*_1(1270)^-K^+ \to \rho^0 K^-K^+) = (10 \pm 13)\%$
$A_{CP}(K_1(1400)^+K^- \to K^+K^-\pi^+\pi^-) = (-4.4 \pm 2.1)\%$
$A_{CP}(K^*(1410)^+K^- \to K^{*0}\pi^+K^-) = (-20 \pm 17)\%$
$A_{CP}(K^*(1410)^-K^+ \to \overline{K}^{*0}\pi^-K^+) = (-1 \pm 14)\%$
$A_{CP}(K^*(1680)^+K^- \to K^+K^-\pi^+\pi^-) = (-17 \pm 29)\%$
$A_{CP}(K^{*0}\overline{K}^{*0})$ in D^0, $\overline{D}^0 \to K^{*0}\overline{K}^{*0} = (-5 \pm 14)\%$
$A_{CP}(K^{*0}\overline{K}^{*0}$ S-wave$) = (-3.9 \pm 2.2)\%$
$A_{CP}(\phi\rho^0)$ in D^0, $\overline{D}^0 \to \phi\rho^0 = (1 \pm 9)\%$
$A_{CP}(\phi\rho^0$ S-wave$) = (-3 \pm 5)\%$
$A_{CP}(\phi\rho^0$ D-wave$) = (-37 \pm 19)\%$
$A_{CP}(\phi(\pi^+\pi^-)_{S-wave}) = (6 \pm 6)\%$
$A_{CP}(K^*(892)^0(K^-\pi^+)_{S-wave}) = (-10 \pm 40)\%$
$A_{CP}(K^+K^-\pi^+\pi^-$ non-resonant$) = (8 \pm 20)\%$
$A_{CP}((K^-\pi^+)_{P-wave}\,(K^+\pi^-)_{S-wave}) = (3 \pm 11)\%$
$A_{CP}(K^+K^-\mu^+\mu^-)$ in D^0, $\overline{D}^0 \to K^+K^-\mu^+\mu^- = (0 \pm 11)\%$
$A_{CP}(\pi^+\pi^-\mu^+\mu^-)$ in D^0, $\overline{D}^0 \to \pi^+\pi^-\mu^+\mu^- = (5 \pm 4)\%$

CP-even fractions (labeled by the D^0 decay)

CP-even fraction in $D^0 \to \pi^+\pi^-\pi^0$ decays $= (97.3 \pm 1.7)\%$
CP-even fraction in $D^0 \to K^+K^-\pi^0$ decays $= (73 \pm 6)\%$
CP-even fraction in $D^0 \to \pi^+\pi^-\pi^+\pi^-$ decays $= (76.9 \pm 2.3)\%$
CP-even fraction in $D^0 \to K^0_S\pi^+\pi^-\pi^0$ decays $= (23.8 \pm 1.7)\%$
CP-even fraction in $D^0 \to K^+K^-\pi^+\pi^-$ decays $= (75 \pm 4)\%$

CP-violation asymmetry difference

$\Delta A_{CP} = A_{CP}(K^+K^-) - A_{CP}(\pi^+\pi^-) = (-0.154 \pm 0.029)\%$

χ^2 tests of *CP*-violation (*CPV*) p-values

Local *CPV* in D^0, $\overline{D}{}^0 \to \pi^+\pi^-\pi^0 = 4.9\%$
Local *CPV* in D^0, $\overline{D}{}^0 \to \pi^+\pi^-\pi^+\pi^- = (0.6 \pm 0.2)\%$
Local *CPV* in D^0, $\overline{D}{}^0 \to K^0_S\pi^+\pi^- = 96\%$
Local *CPV* in D^0, $\overline{D}{}^0 \to K^+K^-\pi^0 = 16.6\%$
Local *CPV* in D^0, $\overline{D}{}^0 \to K^+K^-\pi^+\pi^- = 9.1\%$

T-violation decay-rate asymmetry

$A_T(K^+K^-\pi^+\pi^-) = (2.9 \pm 2.2) \times 10^{-3}$ [b]
$A_{\mathrm{Tviol}}(K_S\pi^+\pi^-\pi^0)$ in D^0, $\overline{D}{}^0 \to K_S\pi^+\pi^-\pi^0 = (-0.3^{+1.4}_{-1.6})\times 10^{-3}$

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 $D^0 \to K^*(892)^-\ell^+\nu_\ell = 1.46 \pm 0.07$
$r_2 \equiv A_2(0)/A_1(0)$ in $D^0 \to K^*(892)^-\ell^+\nu_\ell = 0.68 \pm 0.06$
$f_+(0)$ in $D^0 \to K^-\ell^+\nu_\ell = 0.736 \pm 0.004$
$f_+(0)|V_{cs}|$ in $D^0 \to K^-\ell^+\nu_\ell = 0.7166 \pm 0.0030$
$r_1 \equiv a_1/a_0$ in $D^0 \to K^-\ell^+\nu_\ell = -2.40 \pm 0.16$
$r_2 \equiv a_2/a_0$ in $D^0 \to K^-\ell^+\nu_\ell = 5 \pm 4$
$f_+(0)$ in $D^0 \to \pi^-\ell^+\nu_\ell = 0.637 \pm 0.009$
$f_+(0)|V_{cd}|$ in $D^0 \to \pi^-\ell^+\nu_\ell = 0.1436 \pm 0.0026$ (S = 1.5)
$r_1 \equiv a_1/a_0$ in $D^0 \to \pi^-\ell^+\nu_\ell = -1.97 \pm 0.28$ (S = 1.4)
$r_2 \equiv a_1/a_0$ in $D^0 \to \pi^-\ell^+\nu_\ell = -0.2 \pm 2.2$ (S = 1.7)

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	(71 ± 6) %		–
4-prongs	[k] (14.6 ± 0.5) %		–
6-prongs	[l] (6.5 ± 1.3) $\times 10^{-4}$		–

Inclusive modes

e^+ anything	[n]	(6.49 ± 0.11) %		–
μ^+ anything		(6.8 ± 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		(1.08 ± 0.04) %		–
invisibles		< 9.4 $\times 10^{-5}$	CL=90%	–

Semileptonic modes

$K^- e^+ \nu_e$		(3.542± 0.035) %	S=1.3	867
$K^- \mu^+ \nu_\mu$		(3.41 ± 0.04) %		864
$K^*(892)^- e^+ \nu_e$		(2.15 ± 0.16) %		719
$K^*(892)^- \mu^+ \nu_\mu$		(1.89 ± 0.24) %		714
$K^- \pi^0 e^+ \nu_e$		(1.6 $^{+\ 1.3}_{-\ 0.5}$) %		861
$\overline{K}^0 \pi^- e^+ \nu_e$		(1.44 ± 0.04) %		860
$(\overline{K}^0 \pi^-)_{\ S-wave}\, e^+ \nu_e$		(7.9 ± 1.7) $\times 10^{-4}$		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 $^{+\ 4.0}_{-\ 3.1}$) $\times 10^{-4}$		511
$K^- \pi^+ \pi^- \mu^+ \nu_\mu$		< 1.3 $\times 10^{-3}$	CL=90%	821
$(\overline{K}^*(892)\pi)^- \mu^+ \nu_\mu$		< 1.5 $\times 10^{-3}$	CL=90%	692
$\pi^- e^+ \nu_e$		(2.91 ± 0.04) $\times 10^{-3}$		927
$\pi^- \mu^+ \nu_\mu$		(2.67 ± 0.12) $\times 10^{-3}$	S=1.3	924
$\pi^- \pi^0 e^+ \nu_e$		(1.45 ± 0.07) $\times 10^{-3}$		922
$\rho^- e^+ \nu_e$		(1.50 ± 0.12) $\times 10^{-3}$	S=1.9	771
$a(980)^- e^+ \nu_e,\ a^- \to \eta \pi^-$		(1.33 $^{+\ 0.34}_{-\ 0.30}$) $\times 10^{-4}$		–

Hadronic modes with one $\overline{K}$

$K^- \pi^+$		(3.950± 0.031) %	S=1.2	861
$K^0_S \pi^0$		(1.240± 0.022) %		860
$K^0_L \pi^0$		(10.0 ± 0.7) $\times 10^{-3}$		860
$K^0_S \pi^+ \pi^-$	[c]	(2.80 ± 0.18) %	S=1.1	842
$K^0_S \rho^0$		(6.3 $^{+\ 0.6}_{-\ 0.8}$) $\times 10^{-3}$		674
$K^0_S \omega,\ \omega \to \pi^+ \pi^-$		(2.0 ± 0.6) $\times 10^{-4}$		670
$K^0_S (\pi^+ \pi^-)_{S-wave}$		(3.3 ± 0.8) $\times 10^{-3}$		842

$K^0_S f_0(980),\ f_0 \to \pi^+\pi^-$		$(1.20 \ ^{+\ 0.40}_{-\ 0.23}) \times 10^{-3}$			549
$K^0_S f_0(1370),\ f_0 \to \pi^+\pi^-$		$(2.8 \ ^{+\ 0.9}_{-\ 1.3}) \times 10^{-3}$			†
$K^0_S f_2(1270),\ f_2 \to \pi^+\pi^-$		$(9 \ ^{+10}_{-\ 6}) \times 10^{-5}$			262
$K^*(892)^-\pi^+,\ K^{*-} \to K^0_S\pi^-$		$(1.64 \ ^{+\ 0.14}_{-\ 0.17})$ %			711
$K^*_0(1430)^-\pi^+,\ K^{*-}_0 \to K^0_S\pi^-$		$(2.67 \ ^{+\ 0.40}_{-\ 0.33}) \times 10^{-3}$			378
$K^*_2(1430)^-\pi^+,\ K^{*-}_2 \to K^0_S\pi^-$		$(3.4 \ ^{+\ 1.9}_{-\ 1.0}) \times 10^{-4}$			367
$K^*(1680)^-\pi^+,\ K^{*-} \to K^0_S\pi^-$		$(4.4 \pm 3.5) \times 10^{-4}$			46
$K^*(892)^+\pi^-,\ K^{*+} \to K^0_S\pi^+$	[o]	$(1.13 \ ^{+\ 0.60}_{-\ 0.34}) \times 10^{-4}$			711
$K^*_0(1430)^+\pi^-,\ K^{*+}_0 \to K^0_S\pi^+$	[o]	$< 1.4 \times 10^{-5}$		CL=95%	–
$K^*_2(1430)^+\pi^-,\ K^{*+}_2 \to K^0_S\pi^+$	[o]	$< 3.4 \times 10^{-5}$		CL=95%	–
$K^0_S\pi^+\pi^-$ nonresonant		$(2.5 \ ^{+\ 6.0}_{-\ 1.6}) \times 10^{-4}$			842
$K^-\pi^+\pi^0$	[c]	(14.4 ± 0.5) %		S=2.0	844
$K^-\rho^+$		(11.3 ± 0.7) %			675
$K^-\rho(1700)^+,\ \rho^+ \to \pi^+\pi^0$		$(8.2 \pm 1.8) \times 10^{-3}$			†
$K^*(892)^-\pi^+,\ K^*(892)^- \to K^-\pi^0$		$(2.31 \ ^{+\ 0.40}_{-\ 0.20})$ %			711
$\overline{K}^*(892)^0\pi^0,\ \overline{K}^*(892)^0 \to K^-\pi^+$		(1.95 ± 0.24) %			711
$K^*_0(1430)^-\pi^+,\ K^{*-}_0 \to K^-\pi^0$		$(4.8 \pm 2.2) \times 10^{-3}$			378
$\overline{K}^*_0(1430)^0\pi^0,\ \overline{K}^{*0}_0 \to K^-\pi^+$		$(5.9 \ ^{+\ 5.0}_{-\ 1.6}) \times 10^{-3}$			379
$K^*(1680)^-\pi^+,\ K^{*-} \to K^-\pi^0$		$(1.9 \pm 0.7) \times 10^{-3}$			46
$K^-\pi^+\pi^0$ nonresonant		$(1.15 \ ^{+\ 0.60}_{-\ 0.20})$ %			844
$K^0_S 2\pi^0$		$(9.1 \pm 1.1) \times 10^{-3}$		S=2.2	843
$K^0_S(2\pi^0)_{S-wave}$		$(2.6 \pm 0.7) \times 10^{-3}$			–
$\overline{K}^*(892)^0\pi^0,\ \overline{K}^{*0} \to K^0_S\pi^0$		$(8.1 \pm 0.7) \times 10^{-3}$			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]	(8.23 ± 0.14) %	S=1.1	813
$K^-\pi^+\rho^0$ total		(6.87 ± 0.31) %		609
$K^-\pi^+\rho^0$ 3-body		$(6.1 \pm 1.6) \times 10^{-3}$		609
$\overline{K}^*(892)^0\rho^0$, $\overline{K}^{*0} \to K^-\pi^+$		(1.01 ± 0.05) %		416
$\overline{K}^*(892)^0\rho^0$ transverse, $\overline{K}^{*0} \to K^-\pi^+$		(1.2 ± 0.4) %		417
$K^- a_1(1260)^+$, $a_1^+ \to \rho^0\pi^+$		(4.33 ± 0.32) %		327
$K_1(1270)^-\pi^+$, $K_1^- \to K^-\pi^+\pi^-$ total		$(3.9 \pm 0.4) \times 10^{-3}$		–
$K_1(1270)^-\pi^+$, $K_1^- \to \overline{K}^*(892)^0\pi^-$, $\overline{K}^{*0} \to K^-\pi^+$		$(6.6 \pm 2.3) \times 10^{-4}$		484
$K^- 2\pi^+\pi^-$ nonresonant		(1.81 ± 0.07) %		813
$K^0_S\pi^+\pi^-\pi^0$	[p]	(5.2 ± 0.6) %		813
$K^0_S\eta$, $\eta \to \pi^+\pi^-\pi^0$		$(1.17 \pm 0.03) \times 10^{-3}$		772
$K^0_S\omega$, $\omega \to \pi^+\pi^-\pi^0$		$(9.9 \pm 0.6) \times 10^{-3}$		670
$K^-\pi^+ 2\pi^0$		(8.86 ± 0.23) %		815
$K^- 2\pi^+\pi^-\pi^0$		(4.3 ± 0.4) %		771
$\overline{K}^*(892)^0\pi^+\pi^-\pi^0$, $\overline{K}^{*0} \to K^-\pi^+$		(1.3 ± 0.6) %		643
$K^-\pi^+\omega$, $\omega \to \pi^+\pi^-\pi^0$		(2.8 ± 0.5) %		605
$\overline{K}^*(892)^0\omega$, $\overline{K}^{*0} \to K^-\pi^+$, $\omega \to \pi^+\pi^-\pi^0$		$(6.5 \pm 3.0) \times 10^{-3}$		410
$K^0_S\eta\pi^0$		$(5.7 \pm 1.1) \times 10^{-3}$		721
$K^0_S a_0(980)$, $a_0 \to \eta\pi^0$		$(6.8 \pm 2.1) \times 10^{-3}$		–
$\overline{K}^*(892)^0\eta$, $\overline{K}^{*0} \to K^0_S\pi^0$		$(1.7 \pm 0.5) \times 10^{-3}$		–
$K^0_S 2\pi^+ 2\pi^-$		$(2.66 \pm 0.30) \times 10^{-3}$		768
$K^0_S\rho^0\pi^+\pi^-$, no $K^*(892)^-$		$(1.1 \pm 0.7) \times 10^{-3}$		–
$K^*(892)^- 2\pi^+\pi^-$, $K^*(892)^- \to K^0_S\pi^-$, no ρ^0		$(5 \pm 7) \times 10^{-4}$		642
$K^*(892)^-\rho^0\pi^+$, $K^*(892)^- \to K^0_S\pi^-$		$(1.6 \pm 0.6) \times 10^{-3}$		230
$K^0_S 2\pi^+ 2\pi^-$ nonresonant		$< 1.2 \times 10^{-3}$	CL=90%	768
$K^- 3\pi^+ 2\pi^-$		$(2.2 \pm 0.6) \times 10^{-4}$		713

Fractions of some of the following modes with resonances have already appeared above as submodes of particular charged-particle modes. These nine modes below are all corrected for unseen decays of the resonances.

$K^0_S\eta$	(5.09 ± 0.13) × 10^{-3}			772
$K^0_S\omega$	(1.11 ± 0.06) %			670
$K^0_S\eta'(958)$	(9.49 ± 0.32) × 10^{-3}			565
$\overline{K}^*(892)^0\pi^+\pi^-\pi^0$	(1.9 ± 0.9) %			643
$K^-\pi^+\omega$	(3.1 ± 0.6) %			605
$\overline{K}^*(892)^0\omega$	(1.1 ± 0.5) %			410
$K^-\pi^+\eta'(958)$	(6.43 ± 0.34) × 10^{-3}			479
$K^0_S\eta'(958)\pi^0$	(2.52 ± 0.27) × 10^{-3}			479
$\overline{K}^*(892)^0\eta'(958)$	< 1.0	× 10^{-3}	CL=90%	119

Hadronic modes with three K's

$K^0_S K^+K^-$	(4.42 ± 0.32) × 10^{-3}			544
$K^0_S a_0(980)^0$, $a^0_0 \to K^+K^-$	(2.9 ± 0.4) × 10^{-3}			–
$K^- a_0(980)^+$, $a^+_0 \to K^+K^0_S$	(5.9 ± 1.8) × 10^{-4}			–
$K^+ a_0(980)^-$, $a^-_0 \to K^-K^0_S$	< 1.1	× 10^{-4}	CL=95%	–
$K^0_S f_0(980)$, $f_0 \to K^+K^-$	< 9	× 10^{-5}	CL=95%	–
$K^0_S\phi$, $\phi \to K^+K^-$	(2.03 ± 0.15) × 10^{-3}			520
$K^0_S f_0(1370)$, $f_0 \to K^+K^-$	(1.7 ± 1.1) × 10^{-4}			–
$3K^0_S$	(7.5 ± 0.7) × 10^{-4}		S=1.4	539
$K^+2K^-\pi^+$	(2.25 ± 0.32) × 10^{-4}			434
$K^+K^-\overline{K}^*(892)^0$, $\overline{K}^{*0} \to K^-\pi^+$	(4.5 ± 1.8) × 10^{-5}			†
$K^-\pi^+\phi$, $\phi \to K^+K^-$	(4.1 ± 1.7) × 10^{-5}			422
$\phi\overline{K}^*(892)^0$, $\phi \to K^+K^-$, $\overline{K}^{*0} \to K^-\pi^+$	(1.08 ± 0.21) × 10^{-4}			†
$K^+2K^-\pi^+$ nonresonant	(3.4 ± 1.5) × 10^{-5}			434
$2K^0_S K^\pm\pi^\mp$	(5.9 ± 1.3) × 10^{-4}			427

Pionic modes

$\pi^+\pi^-$	(1.455± 0.024) × 10^{-3}		S=1.3	922
$2\pi^0$	(8.26 ± 0.25) × 10^{-4}			923
$\pi^+\pi^-\pi^0$	(1.49 ± 0.06) %		S=2.1	907
$\rho^+\pi^-$	(1.01 ± 0.04) %			764
$\rho^0\pi^0$	(3.86 ± 0.23) × 10^{-3}			764
$\rho^-\pi^+$	(5.15 ± 0.25) × 10^{-3}			764
$\rho(1450)^+\pi^-$, $\rho^+ \to \pi^+\pi^0$	(1.6 ± 2.1) × 10^{-5}			–
$\rho(1450)^0\pi^0$, $\rho^0 \to \pi^+\pi^-$	(4.5 ± 2.0) × 10^{-5}			–
$\rho(1450)^-\pi^+$, $\rho^- \to \pi^-\pi^0$	(2.7 ± 0.4) × 10^{-4}			–
$\rho(1700)^+\pi^-$, $\rho^+ \to \pi^+\pi^0$	(6.1 ± 1.5) × 10^{-4}			–

$\rho(1700)^0\pi^0$, $\rho^0 \to \pi^+\pi^-$	(7.4 ± 1.8) × 10^{-4}	–
$\rho(1700)^-\pi^+$, $\rho^- \to \pi^-\pi^0$	(4.8 ± 1.1) × 10^{-4}	–
$f_0(980)\pi^0$, $f_0 \to \pi^+\pi^-$	(3.7 ± 0.9) × 10^{-5}	–
$f_0(500)\pi^0$, $f_0 \to \pi^+\pi^-$	(1.22 ± 0.22) × 10^{-4}	–
$f_0(1370)\pi^0$, $f_0 \to \pi^+\pi^-$	(5.5 ± 2.1) × 10^{-5}	–
$f_0(1500)\pi^0$, $f_0 \to \pi^+\pi^-$	(5.8 ± 1.6) × 10^{-5}	–
$f_0(1710)\pi^0$, $f_0 \to \pi^+\pi^-$	(4.6 ± 1.6) × 10^{-5}	–
$f_2(1270)\pi^0$, $f_2 \to \pi^+\pi^-$	(1.97 ± 0.21) × 10^{-4}	–
$\pi^+\pi^-\pi^0$ nonresonant	(1.3 ± 0.4) × 10^{-4}	907
$3\pi^0$	(2.0 ± 0.5) × 10^{-4}	908
$2\pi^+2\pi^-$	(7.56 ± 0.20) × 10^{-3}	880
$a_1(1260)^+\pi^-$, $a_1^+ \to$ $2\pi^+\pi^-$ total	(4.54 ± 0.31) × 10^{-3}	–
$a_1(1260)^+\pi^-$, $a_1^+ \to$ $\rho^0\pi^+$ *S*-wave	(3.14 ± 0.21) × 10^{-3}	–
$a_1(1260)^+\pi^-$, $a_1^+ \to$ $\rho^0\pi^+$ *D*-wave	(1.9 ± 0.5) × 10^{-4}	–
$a_1(1260)^+\pi^-$, $a_1^+ \to$ $\sigma\pi^+$	(6.4 ± 0.7) × 10^{-4}	–
$a_1(1260)^-\pi^+$, $a_1^- \to$ $\rho^0\pi^-$ *S*-wave	(2.3 ± 0.9) × 10^{-4}	–
$a_1(1260)^-\pi^+$, $a_1^- \to \sigma\pi^-$	(6.1 ± 3.4) × 10^{-5}	–
$\pi(1300)^+\pi^-$, $\pi(1300)^+ \to$ $\sigma\pi^+$	(5.1 ± 2.7) × 10^{-4}	–
$\pi(1300)^-\pi^+$, $\pi(1300)^- \to$ $\sigma\pi^-$	(2.3 ± 2.2) × 10^{-4}	–
$a_1(1640)^+\pi^-$, $a_1^+ \to$ $\rho^0\pi^+$ *D*-wave	(3.2 ± 1.6) × 10^{-4}	–
$a_1(1640)^+\pi^-$, $a_1^+ \to \sigma\pi^+$	(1.8 ± 1.4) × 10^{-4}	–
$\pi_2(1670)^+\pi^-$, $\pi_2^+ \to$ $f_2(1270)^0\pi^+$, $f_2^0 \to$ $\pi^+\pi^-$	(2.0 ± 0.9) × 10^{-4}	–
$\pi_2(1670)^+\pi^-$, $\pi_2^+ \to \sigma\pi^+$	(2.6 ± 1.0) × 10^{-4}	–
$2\rho^0$ total	(1.85 ± 0.13) × 10^{-3}	518
$2\rho^0$, parallel helicities	(8.3 ± 3.2) × 10^{-5}	–
$2\rho^0$, perpendicular helicities	(4.8 ± 0.6) × 10^{-4}	–
$2\rho^0$, longitudinal helicities	(1.27 ± 0.10) × 10^{-3}	–
$2\rho(770)^0$, *S*-wave	(1.8 ± 1.3) × 10^{-4}	–
$2\rho(770)^0$, *P*-wave	(5.3 ± 1.3) × 10^{-4}	–
$2\rho(770)^0$, *D*-wave	(6.2 ± 3.0) × 10^{-4}	–
Resonant $(\pi^+\pi^-)\pi^+\pi^-$ 3-body total	(1.51 ± 0.12) × 10^{-3}	–
$\sigma\pi^+\pi^-$	(6.2 ± 0.9) × 10^{-4}	–

$\sigma\rho(770)^0$		$(5.0 \pm 2.5) \times 10^{-4}$		–
$f_0(980)\pi^+\pi^-$, $f_0 \to \pi^+\pi^-$		$(1.8 \pm 0.5) \times 10^{-4}$		–
$f_2(1270)\pi^+\pi^-$, $f_2 \to \pi^+\pi^-$		$(3.7 \pm 0.6) \times 10^{-4}$		–
$2f_2(1270)$, $f_2 \to \pi^+\pi^-$		$(1.6 \pm 1.8) \times 10^{-4}$		–
$f_0(1370)\sigma$, $f_0 \to \pi^+\pi^-$		$(1.6 \pm 0.5) \times 10^{-3}$		–
$\pi^+\pi^-2\pi^0$		(1.02 ± 0.09) %		882
$\eta\pi^0$	[q]	$(6.3 \pm 0.6) \times 10^{-4}$	S=1.1	846
$\omega\pi^0$	[q]	$(1.17 \pm 0.35) \times 10^{-4}$		761
$\omega\eta$		$(1.98 \pm 0.18) \times 10^{-3}$	S=1.1	648
$2\pi^+2\pi^-\pi^0$		$(4.2 \pm 0.5) \times 10^{-3}$		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
$\eta 2\pi^0$		$(3.8 \pm 1.3) \times 10^{-4}$		829
$3\pi^+3\pi^-$		$(4.3 \pm 1.2) \times 10^{-4}$		795
$\eta'(958)\pi^0$		$(9.2 \pm 1.0) \times 10^{-4}$		678
$\eta'(958)\pi^+\pi^-$		$(4.5 \pm 1.7) \times 10^{-4}$		650
2η		$(2.11 \pm 0.19) \times 10^{-3}$	S=2.2	754
$2\eta\pi^0$		$(7.3 \pm 2.2) \times 10^{-4}$		699
3η		$< 1.3 \times 10^{-4}$	CL=90%	421
$\eta\eta'(958)$		$(1.01 \pm 0.19) \times 10^{-3}$		537

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

K^+K^-		$(4.08 \pm 0.06) \times 10^{-3}$	S=1.6	791
$2K^0_S$		$(1.41 \pm 0.05) \times 10^{-4}$	S=1.1	789
$K^0_S K^-\pi^+$		$(3.3 \pm 0.5) \times 10^{-3}$	S=1.1	739
$\overline{K}^*(892)^0 K^0_S$, $\overline{K}^{*0} \to K^-\pi^+$		$(8.2 \pm 1.6) \times 10^{-5}$		608
$K^*(892)^+ K^-$, $K^{*+} \to K^0_S\pi^+$		$(1.89 \pm 0.30) \times 10^{-3}$		–
$\overline{K}^*(1410)^0 K^0_S$, $\overline{K}^{*0} \to K^-\pi^+$		$(1.3 \pm 1.9) \times 10^{-4}$		–
$K^*(1410)^+ K^-$, $K^{*+} \to K^0_S\pi^+$		$(3.2 \pm 1.9) \times 10^{-4}$		–
$(K^-\pi^+)_{S-wave} K^0_S$		$(6.0 \pm 2.9) \times 10^{-4}$		739
$(K^0_S\pi^+)_{S-wave} K^-$		$(3.9 \pm 1.0) \times 10^{-4}$		739
$a_0(980)^-\pi^+$, $a_0^- \to K^0_S K^-$		$(1.3 \pm 1.4) \times 10^{-4}$		–
$a_0(1450)^-\pi^+$, $a_0^- \to K^0_S K^-$		$(2.5 \pm 2.0) \times 10^{-5}$		–
$a_2(1320)^-\pi^+$, $a_2^- \to K^0_S K^-$		$(5 \pm 5) \times 10^{-6}$		–
$\rho(1450)^-\pi^+$, $\rho^- \to K^0_S K^-$		$(4.6 \pm 2.5) \times 10^{-5}$		–

$K^0_S K^+ \pi^-$	$(2.17 \pm 0.34) \times 10^{-3}$	S=1.1	739
$K^*(892)^0 K^0_S$, $K^{*0} \to K^+ \pi^-$	$(1.12 \pm 0.21) \times 10^{-4}$		608
$K^*(892)^- K^+$, $K^{*-} \to K^0_S \pi^-$	$(6.2 \pm 1.0) \times 10^{-4}$		–
$K^*(1410)^0 K^0_S$, $K^{*0} \to K^+ \pi^+$	$(5 \pm 8) \times 10^{-5}$		–
$K^*(1410)^- K^+$, $K^{*-} \to K^0_S \pi^-$	$(2.6 \pm 2.0) \times 10^{-4}$		–
$(K^+ \pi^-)_{S-wave} K^0_S$	$(3.7 \pm 1.9) \times 10^{-4}$		739
$(K^0_S \pi^-)_{S-wave} K^+$	$(1.4 \pm 0.6) \times 10^{-4}$		739
$a_0(980)^+ \pi^-$, $a_0^+ \to K^0_S K^+$	$(6 \pm 4) \times 10^{-4}$		–
$a_0(1450)^+ \pi^-$, $a_0^+ \to K^0_S K^+$	$(3.2 \pm 2.5) \times 10^{-5}$		–
$\rho(1700)^+ \pi^-$, $\rho^+ \to K^0_S K^+$	$(1.1 \pm 0.6) \times 10^{-5}$		–
$K^+ K^- \pi^0$	$(3.42 \pm 0.14) \times 10^{-3}$		743
$K^*(892)^+ K^-$, $K^*(892)^+ \to K^+ \pi^0$	$(1.52 \pm 0.07) \times 10^{-3}$		–
$K^*(892)^- K^+$, $K^*(892)^- \to K^- \pi^0$	$(5.4 \pm 0.4) \times 10^{-4}$		–
$(K^+ \pi^0)_{S-wave} K^-$	$(2.43 \pm 0.18) \times 10^{-3}$		743
$(K^- \pi^0)_{S-wave} K^+$	$(1.3 \pm 0.5) \times 10^{-4}$		743
$f_0(980) \pi^0$, $f_0 \to K^+ K^-$	$(3.6 \pm 0.6) \times 10^{-4}$		–
$\phi \pi^0$, $\phi \to K^+ K^-$	$(6.6 \pm 0.4) \times 10^{-4}$		–
$2K^0_S \pi^0$	$< 5.9 \times 10^{-4}$		740
$K^+ K^- \pi^+ \pi^-$	$(2.47 \pm 0.11) \times 10^{-3}$		677
$\phi(\pi^+ \pi^-)_{S-wave}$, $\phi \to K^+ K^-$	$(10 \pm 5) \times 10^{-5}$		614
$(\phi \rho^0)_{S-wave}$, $\phi \to K^+ K^-$	$(6.9 \pm 0.6) \times 10^{-4}$		250
$(\phi \rho^0)_{P-wave}$, $\phi \to K^+ K^-$	$(4.0 \pm 1.9) \times 10^{-5}$		–
$(\phi \rho^0)_{D-wave}$, $\phi \to K^+ K^-$	$(4.2 \pm 1.4) \times 10^{-5}$		–
$(K^*(892)^0 \overline{K}^*(892)^0)_{S-wave}$, $K^{*0} \to K^\pm \pi^\mp$	$(2.24 \pm 0.13) \times 10^{-4}$		–
$(K^*(892)^0 \overline{K}^*(892)^0)_{P-wave}$, $K^* \to K^\pm \pi^\mp$	$(1.20 \pm 0.08) \times 10^{-4}$		–
$(K^*(892)^0 \overline{K}^*(892)^0)_{D-wave}$, $K^* \to K^\pm \pi^\mp$	$(4.7 \pm 0.4) \times 10^{-5}$		–
$K^*(892)^0 (K^- \pi^+)_{S-wave}$ 3-body, $K^{*0} \to K^+ \pi^-$	$(1.4 \pm 0.6) \times 10^{-4}$		–
$K_1(1270)^+ K^-$, $K_1^+ \to K^{*0} \pi^+$	$(1.4 \pm 0.9) \times 10^{-4}$		–
$K_1(1270)^+ K^-$, $K_1^+ \to K^*(1430)^0 \pi^+$, $K^{*0} \to K^+ \pi^-$	$(1.5 \pm 0.5) \times 10^{-4}$		–

$K_1(1270)^+ K^-$, $K_1^+ \to \rho^0 K^+$		$(\ 2.2 \pm 0.6\ ) \times 10^{-4}$		–
$K_1(1270)^+ K^-$, $K_1^+ \to \omega(782) K^+$, $\omega \to \pi^+\pi^-$		$(\ 1.5 \pm 1.2\ ) \times 10^{-5}$		–
$K_1(1270)^- K^+$, $K_1^- \to \rho^0 K^-$		$(\ 1.3 \pm 0.4\ ) \times 10^{-4}$		–
$K_1(1400)^+ K^-$, $K_1^+ \to K^*(892)^0 \pi^+$, $K^{*0} \to K^+\pi^-$		$(\ 4.6 \pm 0.4\ ) \times 10^{-4}$		–
$K^*(1410)^- K^+$, $K^{*-} \to \overline{K}^{*0}\pi^-$		$(\ 7.0 \pm 1.1\ ) \times 10^{-5}$		–
$K_1(1680)^+ K^-$, $K_1^+ \to K^{*0}\pi^+$, $K^{*0} \to K^+\pi^-$		$(\ 8.9 \pm 3.2\ ) \times 10^{-5}$		–
$K^+ K^- \pi^+ \pi^-$ non-resonant		$(\ 2.7 \pm 0.6\ ) \times 10^{-4}$		–
$2K_S^0 \pi^+ \pi^-$		$(\ 1.22 \pm 0.23\ ) \times 10^{-3}$		673
$K_S^0 K^- 2\pi^+ \pi^-$		$< 1.4 \times 10^{-4}$	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.

$\phi\pi^0$		$(\ 1.17 \pm 0.04\ ) \times 10^{-3}$		645
$\phi\eta$		$(\ 1.8 \pm 0.5\ ) \times 10^{-4}$		489
$\phi\omega$		$< 2.1 \times 10^{-3}$	CL=90%	238

Radiative modes

$\rho^0\gamma$		$(\ 1.82 \pm 0.32\ ) \times 10^{-5}$		771
$\omega\gamma$		$< 2.4 \times 10^{-4}$	CL=90%	768
$\phi\gamma$		$(\ 2.81 \pm 0.19\ ) \times 10^{-5}$		654
$\overline{K}^*(892)^0\gamma$		$(\ 4.2 \pm 0.7\ ) \times 10^{-4}$		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*	$(\ 1.50 \pm 0.07\ ) \times 10^{-4}$	S=3.0	861
$K^+\pi^-$ via DCS		$(\ 1.364 \pm 0.026) \times 10^{-4}$		–
$K^+\pi^-$ via $\overline{D}^0$		$< 1.6 \times 10^{-5}$	CL=95%	861
$K_S^0\pi^+\pi^-$ in $D^0 \to \overline{D}^0$		$< 1.8 \times 10^{-4}$	CL=95%	–
$K^*(892)^+\pi^-$, $K^{*+} \to K_S^0\pi^+$	*DC*	$(\ 1.13\ ^{+\ 0.60}_{-\ 0.34}\ ) \times 10^{-4}$		711
$K_0^*(1430)^+\pi^-$, $K_0^{*+} \to K_S^0\pi^+$	*DC*	$< 1.4 \times 10^{-5}$		–
$K_2^*(1430)^+\pi^-$, $K_2^{*+} \to K_S^0\pi^+$	*DC*	$< 3.4 \times 10^{-5}$		–

$K^+\pi^-\pi^0$	*DC*	(3.06 ± 0.15) × 10^{-4}				844
$K^+\pi^-\pi^0$ via $\overline{D}^0$		(7.6 $^{+\ 0.5}_{-\ 0.6}$) × 10^{-4}				–
$K^+\pi^+2\pi^-$ via DCS		(2.49 ± 0.07) × 10^{-4}				–
$K^+\pi^+2\pi^-$	*DC*	(2.65 ± 0.06) × 10^{-4}				813
$K^+\pi^+2\pi^-$ via $\overline{D}^0$		(7.9 ± 3.0) × 10^{-6}				812
μ^- anything via $\overline{D}^0$		< 4		× 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*	< 8.5		× 10^{-7}	CL=90%	932
e^+e^-	*C1*	< 7.9		× 10^{-8}	CL=90%	932
$\mu^+\mu^-$	*C1*	< 6.2		× 10^{-9}	CL=90%	926
$\pi^0 e^+e^-$	*C1*	< 4		× 10^{-6}	CL=90%	928
$\pi^0\mu^+\mu^-$	*C1*	< 1.8		× 10^{-4}	CL=90%	915
ηe^+e^-	*C1*	< 3		× 10^{-6}	CL=90%	852
$\eta\mu^+\mu^-$	*C1*	< 5.3		× 10^{-4}	CL=90%	838
$\pi^+\pi^-e^+e^-$	*C1*	< 7		× 10^{-6}	CL=90%	922
$\rho^0 e^+e^-$	*C1*	< 1.0		× 10^{-4}	CL=90%	771
$\pi^+\pi^-\mu^+\mu^-$	*C1*	(9.6 ± 1.2) × 10^{-7}				894
$\pi^+\pi^-\mu^+\mu^-$ (non-res)		< 5.5		× 10^{-7}	CL=90%	–
$\rho^0\mu^+\mu^-$	*C1*	< 2.2		× 10^{-5}	CL=90%	754
ωe^+e^-	*C1*	< 6		× 10^{-6}	CL=90%	768
$\omega\mu^+\mu^-$	*C1*	< 8.3		× 10^{-4}	CL=90%	751
$K^-K^+e^+e^-$	*C1*	< 1.1		× 10^{-5}	CL=90%	791
ϕe^+e^-	*C1*	< 5.2		× 10^{-5}	CL=90%	654
$K^-K^+\mu^+\mu^-$	*C1*	(1.54 ± 0.32) × 10^{-7}				710
$K^-K^+\mu^+\mu^-$ (non-res)		< 3.3		× 10^{-5}	CL=90%	–
$\phi\mu^+\mu^-$	*C1*	< 3.1		× 10^{-5}	CL=90%	631
$\overline{K}^0 e^+e^-$		[*h*] < 2.4		× 10^{-5}	CL=90%	866
$\overline{K}^0\mu^+\mu^-$		[*h*] < 2.6		× 10^{-4}	CL=90%	852
$K^-\pi^+e^+e^-$, 675 < m_{ee} < 875 MeV		(4.0 ± 0.5) × 10^{-6}				–
$K^-\pi^+e^+e^-$, 1.005 < m_{ee} < 1.035 GeV		< 5		× 10^{-7}	CL=90%	–
$\overline{K}^*(892)^0 e^+e^-$		[*h*] < 4.7		× 10^{-5}	CL=90%	719
$K^-\pi^+\mu^+\mu^-$	*C1*	< 3.59		× 10^{-4}	CL=90%	829
$K^-\pi^+\mu^+\mu^-$, 675 < $m_{\mu\mu}$ < 875 MeV		(4.2 ± 0.4) × 10^{-6}				–
$\overline{K}^*(892)^0\mu^+\mu^-$		[*h*] < 2.4		× 10^{-5}	CL=90%	700
$\pi^+\pi^-\pi^0\mu^+\mu^-$	*C1*	< 8.1		× 10^{-4}	CL=90%	863
$\mu^\pm e^\mp$	*LF*	[*r*] < 1.3		× 10^{-8}	CL=90%	929
$\pi^0 e^\pm\mu^\mp$	*LF*	[*r*] < 8.6		× 10^{-5}	CL=90%	924
$\eta e^\pm\mu^\mp$	*LF*	[*r*] < 1.0		× 10^{-4}	CL=90%	848

$\pi^+\pi^- e^\pm\mu^\mp$	*LF*	[*r*] <	1.5	$\times 10^{-5}$	CL=90%	911
$\rho^0 e^\pm\mu^\mp$	*LF*	[*r*] <	4.9	$\times 10^{-5}$	CL=90%	767
$\omega e^\pm\mu^\mp$	*LF*	[*r*] <	1.2	$\times 10^{-4}$	CL=90%	764
$K^- K^+ e^\pm\mu^\mp$	*LF*	[*r*] <	1.8	$\times 10^{-4}$	CL=90%	754
$\phi e^\pm\mu^\mp$	*LF*	[*r*] <	3.4	$\times 10^{-5}$	CL=90%	648
$\overline{K}^0 e^\pm\mu^\mp$	*LF*	[*r*] <	1.0	$\times 10^{-4}$	CL=90%	863
$K^-\pi^+ e^\pm\mu^\mp$	*LF*	[*r*] <	5.53	$\times 10^{-4}$	CL=90%	848
$\overline{K}^*(892)^0 e^\pm\mu^\mp$	*LF*	[*r*] <	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
$K^-\pi^- 2e^+$		<	2.8	$\times 10^{-6}$	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*	[*s*] <	1.0	$\times 10^{-5}$	CL=90%	696
$\overline{p} e^+$	*L*,*B*	[*t*] <	1.1	$\times 10^{-5}$	CL=90%	696

$D^*(2007)^0$

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

Mass $m = 2006.85 \pm 0.05$ MeV (S = 1.1)
$m_{D^{*0}} - m_{D^0} = 142.014 \pm 0.030$ MeV (S = 1.5)
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*)
$D^0\pi^0$	(64.7±0.9) %	43
$D^0\gamma$	(35.3±0.9) %	137

$D^*(2010)^\pm$

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

Mass $m = 2010.26 \pm 0.05$ MeV
$m_{D^*(2010)^+} - m_{D^+} = 140.603 \pm 0.015$ MeV
$m_{D^*(2010)^+} - m_{D^0} = 145.4257 \pm 0.0017$ MeV
Full width $\Gamma = 83.4 \pm 1.8$ 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

$D_0^*(2300)^0$

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

was $D_0^*(2400)^0$

Mass $m = 2300 \pm 19$ MeV
Full width $\Gamma = 274 \pm 40$ MeV

$D_0^*(2300)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^+\pi^-$	seen	369

$D_1(2420)^0$

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

Mass $m = 2420.8 \pm 0.5$ MeV (S = 1.3)
$m_{D_1^0} - m_{D^{*+}} = 410.6 \pm 0.5$ MeV (S = 1.3)
Full width $\Gamma = 31.7 \pm 2.5$ MeV (S = 3.5)

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

$D_1(2420)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^*(2010)^+\pi^-$	seen	353
$D^0\pi^+\pi^-$	seen	425
$D^+\pi^-$	not seen	472
$D^{*0}\pi^+\pi^-$	not seen	279

$D_2^*(2460)^0$

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

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

Mass $m = 2460.7 \pm 0.4$ MeV (S = 3.1)
$m_{D_2^{*0}} - m_{D^+} = 591.0 \pm 0.4$ MeV (S = 2.9)
$m_{D_2^{*0}} - m_{D^{*+}} = 450.4 \pm 0.4$ MeV (S = 2.9)
Full width $\Gamma = 47.5 \pm 1.1$ MeV (S = 1.8)

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

$D_2^*(2460)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^+\pi^-$	seen	505
$D^*(2010)^+\pi^-$	seen	389
$D^0\pi^+\pi^-$	not seen	462
$D^{*0}\pi^+\pi^-$	not seen	324

$D_2^*(2460)^\pm$

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

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

Mass $m = 2465.4 \pm 1.3$ MeV (S = 3.1)
$m_{D_2^*(2460)^\pm} - m_{D_2^*(2460)^0} = 2.4 \pm 1.7$ MeV
Full width $\Gamma = 46.7 \pm 1.2$ MeV

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

$D_2^*(2460)^\pm$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^0\pi^+$	seen	513
$D^{*0}\pi^+$	seen	396
$D^+\pi^+\pi^-$	not seen	462
$D^{*+}\pi^+\pi^-$	not seen	326

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 $K^0_S2\pi^+\pi^-$ 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.

[*n*] 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 6.17 $\pm$ 0.17 %.

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

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

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

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