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

$A_{CP}(\mu^\pm \nu) = (8 \pm 8)\%$
$A_{CP}(K^0_L e^\pm \nu) = (-0.6 \pm 1.6)\%$
$A_{CP}(K^0_S \pi^\pm) = (-0.41 \pm 0.09)\%$
$A_{CP}(K^\mp 2\pi^\pm) = (-0.18 \pm 0.16)\%$
$A_{CP}(K^\mp \pi^\pm \pi^\pm \pi^0) = (-0.3 \pm 0.7)\%$
$A_{CP}(K^0_S \pi^\pm \pi^0) = (-0.1 \pm 0.7)\%$
$A_{CP}(K^0_S \pi^\pm \pi^+ \pi^-) = (0.0 \pm 1.2)\%$
$A_{CP}(\pi^\pm \pi^0) = (2.4 \pm 1.2)\%$
$A_{CP}(\pi^\pm \eta) = (1.0 \pm 1.5)\%$ (S = 1.4)
$A_{CP}(\pi^\pm \eta'(958)) = (-0.6 \pm 0.7)\%$
$A_{CP}(\overline{K}^0 / K^0 K^\pm) = (0.11 \pm 0.17)\%$
$A_{CP}(K^0_S K^\pm) = (-0.11 \pm 0.25)\%$
$A_{CP}(K^+ K^- \pi^\pm) = (0.37 \pm 0.29)\%$
$A_{CP}(K^\pm K^{*0}) = (-0.3 \pm 0.4)\%$
$A_{CP}(\phi \pi^\pm) = (0.09 \pm 0.19)\%$ (S = 1.2)
$A_{CP}(K^\pm K^*_0(1430)^0) = (8^{+7}_{-6})\%$
$A_{CP}(K^\pm K^*_2(1430)^0) = (43^{+20}_{-26})\%$
$A_{CP}(K^\pm K^*_0(700)) = (-12^{+18}_{-13})\%$
$A_{CP}(a_0(1450)^0 \pi^\pm) = (-19^{+14}_{-16})\%$
$A_{CP}(\phi(1680) \pi^\pm) = (-9 \pm 26)\%$
$A_{CP}(\pi^+ \pi^- \pi^\pm) = (-2 \pm 4)\%$
$A_{CP}(K^0_S K^\pm \pi^+ \pi^-) = (-4 \pm 7)\%$
$A_{CP}(K^\pm \pi^0) = (-4 \pm 11)\%$

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 $D^+, D^0 \to \rho e^+ \nu_e = 1.48 \pm 0.16$
$r_2 \equiv A_2(0)/A_1(0)$ in $D^+, D^0 \to \rho e^+ \nu_e = 0.83 \pm 0.12$
$r_v \equiv V(0)/A_1(0)$ 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	(1.03 ± 0.12) %			–

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
$\tau^+ \nu_\tau$	< 1.2	$\times 10^{-3}$	CL=90%	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
$\overline{K}^*(892)^0 e^+ \nu_e$, $\overline{K}^*(892)^0 \rightarrow K^- \pi^+$	(3.77 ± 0.17) %			722
$(K^- \pi^+)_{[0.8–1.0]\mathrm{GeV}} e^+ \nu_e$	(3.39 ± 0.09) %			864
$(K^- \pi^+)_{S-wave} e^+ \nu_e$	(2.28 ± 0.11)	$\times 10^{-3}$		–
$\overline{K}^*(1410)^0 e^+ \nu_e$, $\overline{K}^*(1410)^0 \rightarrow K^- \pi^+$	< 6	$\times 10^{-3}$	CL=90%	–
$\overline{K}^*_2(1430)^0 e^+ \nu_e$, $\overline{K}^*_2(1430)^0 \rightarrow K^- \pi^+$	< 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
$\overline{K}^*(892)^0 \mu^+ \nu_\mu$, $\overline{K}^*(892)^0 \rightarrow K^- \pi^+$	(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
$\overline{K}^*_0(1430)^0 \mu^+ \nu_\mu$	< 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
$\rho^0 e^+ \nu_e$	($2.18 {}^{+0.17}_{-0.25}$)	$\times 10^{-3}$		774
$\rho^0 \mu^+ \nu_\mu$	(2.4 ± 0.4)	$\times 10^{-3}$		770
$\omega e^+ \nu_e$	(1.69 ± 0.11)	$\times 10^{-3}$		771
$\eta'(958) e^+ \nu_e$	(2.0 ± 0.4)	$\times 10^{-4}$		690
$a(980)^0 e^+ \nu_e$, $a(980)^0 \rightarrow \eta \pi^0$	($1.7 {}^{+0.8}_{-0.7}$)	$\times 10^{-4}$		–
$\phi e^+ \nu_e$	< 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
$\overline{K}^*_0(1430)^0\pi^+$, $\overline{K}^*_0(1430)^0 \rightarrow K^-\pi^+$	[d]	(1.25 ± 0.06) %		382
$\overline{K}^*(892)^0\pi^+$, $\overline{K}^*(892)^0 \rightarrow K^-\pi^+$		(1.04 ± 0.12) %		714
$\overline{K}^*(1410)^0\pi^+$, $\overline{K}^{*0} \rightarrow K^-\pi^+$		not seen		381
$\overline{K}^*_2(1430)^0\pi^+$, $\overline{K}^*_2(1430)^0 \rightarrow K^-\pi^+$	[d]	$(2.3 \pm 0.7) \times 10^{-4}$		371
$\overline{K}^*(1680)^0\pi^+$, $\overline{K}^*(1680)^0 \rightarrow K^-\pi^+$	[d]	$(2.2 \pm 1.1) \times 10^{-4}$		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
$K^0_S \rho(1450)^+$, $\rho^+ \rightarrow \pi^+\pi^0$		$(1.5 {}^{+1.2}_{-1.4}) \times 10^{-3}$		–
$\overline{K}^*(892)^0\pi^+$, $\overline{K}^*(892)^0 \rightarrow K^0_S\pi^0$		$(2.64 \pm 0.32) \times 10^{-3}$		714
$\overline{K}^*_0(1430)^0\pi^+$, $\overline{K}^{*0}_0 \rightarrow K^0_S\pi^0$		$(2.7 \pm 0.9) \times 10^{-3}$		–
$\overline{K}^*_0(1680)^0\pi^+$, $\overline{K}^{*0}_0 \rightarrow K^0_S\pi^0$		$(10 {}^{+7}_{-10}) \times 10^{-4}$		–
$\overline{\kappa}^0\pi^+$, $\overline{\kappa}^0 \rightarrow K^0_S\pi^0$		$(6 {}^{+5}_{-4}) \times 10^{-3}$		–
$K^0_S \pi^+\pi^0$ nonresonant		$(3 \pm 4) \times 10^{-3}$		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
$K^0_S \pi^+\eta'(958)$		$(1.90 \pm 0.21) \times 10^{-3}$		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]	$(5.7 \pm 0.5) \times 10^{-3}$	S=1.1	772
$\overline{K}^*(892)^0 2\pi^+\pi^-$, $\overline{K}^*(892)^0 \rightarrow K^-\pi^+$		$(1.2 \pm 0.4) \times 10^{-3}$		645
$\overline{K}^*(892)^0\rho^0\pi^+$, $\overline{K}^*(892)^0 \rightarrow K^-\pi^+$		$(2.3 \pm 0.4) \times 10^{-3}$		239
$\overline{K}^*(892)^0 a_1(1260)^+$	[f]	$(9.3 \pm 1.9) \times 10^{-3}$		†

$K^- \rho^0 2\pi^+$		$(1.72 \pm 0.28) \times 10^{-3}$		524
$K^- 3\pi^+ \pi^-$ nonresonant		$(4.0 \pm 2.9) \times 10^{-4}$		772
$K^+ 2K^0_S$		$(2.54 \pm 0.13) \times 10^{-3}$		545
$K^+ K^- K^0_S \pi^+$		$(2.4 \pm 0.5) \times 10^{-4}$		436
Pionic modes				
$\pi^+ \pi^0$		$(1.247 \pm 0.033) \times 10^{-3}$		925
$2\pi^+ \pi^-$		$(3.27 \pm 0.18) \times 10^{-3}$		909
$\rho^0 \pi^+$		$(8.3 \pm 1.5) \times 10^{-4}$		767
$\pi^+ (\pi^+ \pi^-)_{S-\text{wave}}$		$(1.83 \pm 0.16) \times 10^{-3}$		909
$\sigma \pi^+$, $\sigma \to \pi^+ \pi^-$		$(1.38 \pm 0.12) \times 10^{-3}$		–
$f_0(980) \pi^+$, $f_0(980) \to \pi^+ \pi^-$		$(1.56 \pm 0.33) \times 10^{-4}$		669
$f_0(1370) \pi^+$, $f_0(1370) \to \pi^+ \pi^-$		$(8 \pm 4) \times 10^{-5}$		–
$f_2(1270) \pi^+$, $f_2(1270) \to \pi^+ \pi^-$		$(5.0 \pm 0.9) \times 10^{-4}$		485
$\rho(1450)^0 \pi^+$, $\rho(1450)^0 \to \pi^+ \pi^-$		$< 8 \times 10^{-5}$	CL=95%	338
$f_0(1500) \pi^+$, $f_0(1500) \to \pi^+ \pi^-$		$(1.1 \pm 0.4) \times 10^{-4}$		–
$f_0(1710) \pi^+$, $f_0(1710) \to \pi^+ \pi^-$		$< 5 \times 10^{-5}$	CL=95%	–
$f_0(1790) \pi^+$, $f_0(1790) \to \pi^+ \pi^-$		$< 7 \times 10^{-5}$	CL=95%	–
$(\pi^+ \pi^+)_{S-\text{wave}} \pi^-$		$< 1.2 \times 10^{-4}$	CL=95%	909
$2\pi^+ \pi^-$ nonresonant		$< 1.1 \times 10^{-4}$	CL=95%	909
$\pi^+ 2\pi^0$		$(4.7 \pm 0.4) \times 10^{-3}$		910
$2\pi^+ \pi^- \pi^0$		(1.16 ± 0.08) %		883
$3\pi^+ 2\pi^-$		$(1.66 \pm 0.16) \times 10^{-3}$	S=1.1	845
$\eta \pi^+$		$(3.77 \pm 0.09) \times 10^{-3}$		848
$\eta \pi^+ \pi^0$		$(1.38 \pm 0.35) \times 10^{-3}$		831
$\omega \pi^+$		$(2.8 \pm 0.6) \times 10^{-4}$		764
$\eta'(958) \pi^+$		$(4.97 \pm 0.19) \times 10^{-3}$		681
$\eta'(958) \pi^+ \pi^0$		$(1.6 \pm 0.5) \times 10^{-3}$		654
Hadronic modes with a $K\overline{K}$ pair				
$K^+ K^0_S$		$(3.04 \pm 0.09) \times 10^{-3}$	S=2.2	793
$K^+ K^- \pi^+$	[c]	$(9.93 \pm 0.24) \times 10^{-3}$		744
$\phi \pi^+$, $\phi \to K^+ K^-$		$(2.76 {}^{+0.08}_{-0.09}) \times 10^{-3}$		647
$K^+ \overline{K}^*(892)^0$, $\overline{K}^*(892)^0 \to K^- \pi^+$		$(2.55 {}^{+0.09}_{-0.14}) \times 10^{-3}$		613
$K^+ \overline{K}^*_0(1430)^0$, $\overline{K}^*_0(1430)^0 \to K^- \pi^+$		$(1.9 \pm 0.4) \times 10^{-3}$		–

$K^+ \overline{K}_2^*(1430)^0$, $\overline{K}_2^* \to K^- \pi^+$	$(1.7 \; {}^{+1.3}_{-0.8}) \times 10^{-4}$		–
$K^+ \overline{K}_0^*(700)$, $\overline{K}_0^* \to K^- \pi^+$	$(6.9 \; {}^{+4.0}_{-2.1}) \times 10^{-4}$		–
$a_0(1450)^0 \pi^+$, $a_0^0 \to K^+ K^-$	$(4.6 \; {}^{+7.0}_{-1.9}) \times 10^{-4}$		–
$\phi(1680) \pi^+$, $\phi \to K^+ K^-$	$(5.1 \; {}^{+4.0}_{-1.9}) \times 10^{-5}$		–
$K_S^0 K_S^0 \pi^+$	$(2.70 \pm 0.13) \times 10^{-3}$		741
$K^+ K_S^0 \pi^+ \pi^-$	$(1.74 \pm 0.18) \times 10^{-3}$		678
$K_S^0 K^- 2\pi^+$	$(2.38 \pm 0.17) \times 10^{-3}$		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
$K^*(892)^+ K_S^0$	(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
$K^+ \pi^+ \pi^-$	$(5.42 \pm 0.22) \times 10^{-4}$		846
$K^+ \rho^0$	$(2.1 \pm 0.5) \times 10^{-4}$		679
$K^*(892)^0 \pi^+$, $K^*(892)^0 \to K^+ \pi^-$	$(2.5 \pm 0.4) \times 10^{-4}$		714
$K^+ f_0(980)$, $f_0(980) \to \pi^+ \pi^-$	$(4.8 \pm 2.9) \times 10^{-5}$		–
$K_2^*(1430)^0 \pi^+$, $K_2^*(1430)^0 \to K^+ \pi^-$	$(4.3 \pm 2.9) \times 10^{-5}$		–
$K^+ \pi^+ \pi^-$ nonresonant	not seen		846
$2K^+ K^-$	$(8.9 \pm 2.1) \times 10^{-5}$		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
$\pi^+ \pi^0 e^+ e^-$			$< 1.4 \times 10^{-5}$	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
$K^+ \pi^0 e^+ e^-$			$< 1.5 \times 10^{-5}$	CL=90%	864

$K^0_S \pi^+ e^+ e^-$			< 2.6	$\times 10^{-5}$ CL=90%	–
$K^0_S K^+ e^+ e^-$			< 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
$\pi^- 2e^+$	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
$K^- 2\mu^+$	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
$c\tau = 122.9$ μm

Mixing and related parameters

$\left|m_{D^0_1} - m_{D^0_2}\right| = (0.95^{+0.41}_{-0.44}) \times 10^{10}$ $\hbar$ s^{-1}
$(\Gamma_{D^0_1} - \Gamma_{D^0_2})/\Gamma = 2y = (1.29^{+0.14}_{-0.18}) \times 10^{-2}$
$|q/p| = 0.92^{+0.12}_{-0.09}$
$A_\Gamma = (-0.125 \pm 0.526) \times 10^{-3}$
$K^+\pi^-$ 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]

$A_{CP}(f_0(980)\pi^0 \rightarrow K^+K^-\pi^0) = (-3 \pm 19)\%$ [i]
$A_{CP}(a_0(980)^0\pi^0 \rightarrow K^+K^-\pi^0) = (-5 \pm 16)\%$ [i]
$A_{CP}(f_2'(1525)\pi^0 \rightarrow K^+K^-\pi^0) = (0 \pm 160)\%$ [i]
$A_{CP}(K^*(892)^-K^+ \rightarrow K^+K^-\pi^0) = (-5 \pm 4)\%$ [i]
$A_{CP}(K^*(1410)^-K^+ \rightarrow K^+K^-\pi^0) = (-17 \pm 29)\%$ [i]
$A_{CP}((K^-\pi^0)_{S-wave}K^+ \rightarrow K^+K^-\pi^0) = (-10 \pm 40)\%$ [i]
$A_{CP}(K^0_S\pi^0) = (-0.20 \pm 0.17)\%$
$A_{CP}(K^0_S\eta) = (0.5 \pm 0.5)\%$
$A_{CP}(K^0_S\eta') = (1.0 \pm 0.7)\%$
$A_{CP}(K^0_S\phi) = (-3 \pm 9)\%$
$A_{CP}(K^-\pi^+) = (0.2 \pm 0.5)\%$
$A_{CP}(K^+\pi^-) = (-0.9 \pm 1.4)\%$
$A_{CP}(D_{CP(\pm1)} \rightarrow K^\mp\pi^\pm) = (12.7 \pm 1.5)\%$
$A_{CP}(K^-\pi^+\pi^0) = (0.1 \pm 0.5)\%$
$A_{CP}(K^+\pi^-\pi^0) = (0 \pm 5)\%$
$A_{CP}(K^0_S\pi^+\pi^-) = (-0.1 \pm 0.8)\%$
$A_{CP}(K^*(892)^-\pi^+ \rightarrow K^0_S\pi^+\pi^-) = (0.4 \pm 0.5)\%$
$A_{CP}(K^*(892)^+\pi^- \rightarrow K^0_S\pi^+\pi^-) = (1 \pm 6)\%$
$A_{CP}(\overline{K}^0\rho^0 \rightarrow K^0_S\pi^+\pi^-) = (-0.1 \pm 0.5)\%$
$A_{CP}(\overline{K}^0\omega \rightarrow K^0_S\pi^+\pi^-) = (-13 \pm 7)\%$
$A_{CP}(\overline{K}^0 f_0(980) \rightarrow K^0_S\pi^+\pi^-) = (-0.4 \pm 2.7)\%$
$A_{CP}(\overline{K}^0 f_2(1270) \rightarrow K^0_S\pi^+\pi^-) = (-4 \pm 5)\%$
$A_{CP}(\overline{K}^0 f_0(1370) \rightarrow K^0_S\pi^+\pi^-) = (-1 \pm 9)\%$
$A_{CP}(\overline{K}^0\rho^0(1450) \rightarrow K^0_S\pi^+\pi^-) = (-4 \pm 10)\%$
$A_{CP}(\overline{K}^0 f_0(600) \rightarrow K^0_S\pi^+\pi^-) = (-3 \pm 5)\%$
$A_{CP}(K^*(1410)^-\pi^+ \rightarrow K^0_S\pi^+\pi^-) = (-2 \pm 9)\%$
$A_{CP}(K^*_0(1430)^-\pi^+ \rightarrow K^0_S\pi^+\pi^-) = (4 \pm 4)\%$
$A_{CP}(K^*_0(1430)^+\pi^- \rightarrow K^0_S\pi^+\pi^-) = (12 \pm 15)\%$
$A_{CP}(K^*_2(1430)^-\pi^+ \rightarrow K^0_S\pi^+\pi^-) = (3 \pm 6)\%$
$A_{CP}(K^*_2(1430)^+\pi^- \rightarrow K^0_S\pi^+\pi^-) = (-10 \pm 32)\%$
$A_{CP}(K^-\pi^+\pi^+\pi^-) = (0.2 \pm 0.5)\%$
$A_{CP}(K^+\pi^-\pi^+\pi^-) = (-2 \pm 4)\%$
$A_{CP}(K^+K^-\pi^+\pi^-) = (1.3 \pm 1.7)\%$
$A_{CP}(K^*_1(1270)^+K^- \rightarrow K^+K^-\pi^+\pi^-) = (25 \pm 16)\%$
$A_{CP}(K^*_1(1270)^+K^- \rightarrow K^{*0}\pi^+K^-) = (-1 \pm 10)\%$
$A_{CP}(K^*_1(1270)^-K^+ \rightarrow \overline{K}^{*0}\pi^-K^+) = (-10 \pm 32)\%$
$A_{CP}(K^*_1(1270)^-K^+ \rightarrow K^+K^-\pi^+\pi^-) = (-50 \pm 20)\%$
$A_{CP}(K^*_1(1270)^+K^- \rightarrow \rho^0K^+K^-) = (-7 \pm 17)\%$
$A_{CP}(K^*_1(1270)^-K^+ \rightarrow \rho^0K^-K^+) = (10 \pm 13)\%$
$A_{CP}(K^*_1(1400)^+K^- \rightarrow K^+K^-\pi^+\pi^-) = (9 \pm 25)\%$
$A_{CP}(K^*(1410)^+K^- \rightarrow K^{*0}\pi^+K^-) = (-20 \pm 17)\%$
$A_{CP}(K^*(1410)^-K^+ \rightarrow \overline{K}^{*0}\pi^-K^+) = (-1 \pm 14)\%$

$A_{CP}(K^*(1680)^+ K^- \rightarrow K^+ K^- \pi^+ \pi^-) = (-17 \pm 29)\%$
$A_{CP}(K^{*0}\overline{K}^{*0})$ in D^0, $\overline{D}^0 \rightarrow K^{*0}\overline{K}^{*0} = (-5 \pm 14)\%$
$A_{CP}(K^{*0}\overline{K}^{*0}$ S-wave$) = (10 \pm 14)\%$
$A_{CP}(\phi\rho^0)$ in D^0, $\overline{D}^0 \rightarrow \phi\rho^0 = (1 \pm 9)\%$
$A_{CP}(\phi\rho^0$ S-wave$) = (-3 \pm 5)\%$
$A_{CP}(\phi\rho^0$ D-wave$) = (-37 \pm 19)\%$
$A_{CP}(\phi(\pi^+\pi^-)_{S-wave}) = (0 \pm 50)\%$
$A_{CP}(K^*(892)^0(K^-\pi^+)_{S-wave}) = (-10 \pm 40)\%$
$A_{CP}(K^+K^-\pi^+\pi^-$ 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, $\overline{D}^0 \rightarrow K^+K^-\mu^+\mu^- = (0 \pm 11)\%$
$A_{CP}(\pi^+\pi^-\mu^+\mu^-)$ in D^0, $\overline{D}^0 \rightarrow \pi^+\pi^-\mu^+\mu^- = (5 \pm 4)\%$

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

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

CP-violation asymmetry difference

$\Delta A_{CP} = A_{CP}(K^+K^-) - A_{CP}(\pi^+\pi^-) = (-0.161 \pm 0.029)\%$

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

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

T-violation decay-rate asymmetry

$A_T(K^+K^-\pi^+\pi^-) = (1.7 \pm 2.7) \times 10^{-3}$ [b]
$A_{\mathrm{Tviol}}(K_S\pi^+\pi^-\pi^0)$ in D^0, $\overline{D}^0 \rightarrow K_S\pi^+\pi^-\pi^0 = (-0.3^{+1.4}_{-1.6}) \times 10^{-3}$

CPT-violation decay-rate asymmetry

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

Form factors

$\mathrm{r}_V \equiv \mathrm{V}(0)/\mathrm{A}_1(0)$ in $D^0 \rightarrow K^*(892)^-\ell^+\nu_\ell = 1.7 \pm 0.8$
$\mathrm{r}_2 \equiv \mathrm{A}_2(0)/\mathrm{A}_1(0)$ in $D^0 \rightarrow K^*(892)^-\ell^+\nu_\ell = 0.9 \pm 0.4$
$f_+(0)$ in $D^0 \rightarrow K^-\ell^+\nu_\ell = 0.736 \pm 0.004$
$f_+(0)|V_{cs}|$ in $D^0 \rightarrow K^-\ell^+\nu_\ell = 0.7166 \pm 0.0030$
$r_1 \equiv a_1/a_0$ in $D^0 \rightarrow K^-\ell^+\nu_\ell = -2.40 \pm 0.16$

$r_2 \equiv a_2/a_0$ 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		(1.05 ± 0.11) %		–
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
$\overline{K}^0 \pi^- e^+ \nu_e$		(2.7 $^{+0.9}_{-0.7}$) %		860
$K^- \pi^+ \pi^- e^+ \nu_e$		(2.8 $^{+1.4}_{-1.1}$) $\times 10^{-4}$		843

$K_1(1270)^- e^+ \nu_e$		$(7.6 \pm^{4.0}_{3.1}) \times 10^{-4}$		498
$K^- \pi^+ \pi^- \mu^+ \nu_\mu$		$< 1.3 \times 10^{-3}$	CL=90%	821
$(\overline{K}^*(892)\pi)^- \mu^+ \nu_\mu$		$< 1.5 \times 10^{-3}$	CL=90%	692
$\pi^- e^+ \nu_e$		$(2.91 \pm 0.04) \times 10^{-3}$		927
$\pi^- \mu^+ \nu_\mu$		$(2.67 \pm 0.12) \times 10^{-3}$	S=1.3	924
$\rho^- e^+ \nu_e$		$(1.77 \pm 0.16) \times 10^{-3}$		771
$a(980)^- e^+ \nu_e,\ a^- \rightarrow \eta \pi^-$		$(1.33 \pm^{0.34}_{0.30}) \times 10^{-4}$		–
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
$K^0_L \pi^0$		$(10.0 \pm 0.7) \times 10^{-3}$		860
$K^0_S \pi^+ \pi^-$	[c]	(2.80 ± 0.18) %	S=1.1	842
$K^0_S \rho^0$		$(6.3 \pm^{0.6}_{0.8}) \times 10^{-3}$		674
$K^0_S \omega,\ \omega \rightarrow \pi^+ \pi^-$		$(2.0 \pm 0.6) \times 10^{-4}$		670
$K^0_S (\pi^+ \pi^-)_{S-wave}$		$(3.3 \pm 0.8) \times 10^{-3}$		842
$K^0_S f_0(980),\ f_0 \rightarrow \pi^+ \pi^-$		$(1.20 \pm^{0.40}_{0.23}) \times 10^{-3}$		549
$K^0_S f_0(1370),\ f_0 \rightarrow \pi^+ \pi^-$		$(2.8 \pm^{0.9}_{1.3}) \times 10^{-3}$		†
$K^0_S f_2(1270),\ f_2 \rightarrow \pi^+ \pi^-$		$(9 \pm^{10}_{6}) \times 10^{-5}$		262
$K^*(892)^- \pi^+,\ K^{*-} \rightarrow K^0_S \pi^-$		$(1.64 \pm^{0.14}_{0.17})$ %		711
$K^*_0(1430)^- \pi^+,\ K^{*-}_0 \rightarrow K^0_S \pi^-$		$(2.67 \pm^{0.40}_{0.33}) \times 10^{-3}$		378
$K^*_2(1430)^- \pi^+,\ K^{*-}_2 \rightarrow K^0_S \pi^-$		$(3.4 \pm^{1.9}_{1.0}) \times 10^{-4}$		367
$K^*(1680)^- \pi^+,\ K^{*-} \rightarrow K^0_S \pi^-$		$(4.4 \pm 3.5) \times 10^{-4}$		46
$K^*(892)^+ \pi^-,\ K^{*+} \rightarrow K^0_S \pi^+$	[o]	$(1.13 \pm^{0.60}_{0.34}) \times 10^{-4}$		711
$K^*_0(1430)^+ \pi^-,\ K^{*+}_0 \rightarrow K^0_S \pi^+$	[o]	$< 1.4 \times 10^{-5}$	CL=95%	–
$K^*_2(1430)^+ \pi^-,\ K^{*+}_2 \rightarrow K^0_S \pi^+$	[o]	$< 3.4 \times 10^{-5}$	CL=95%	–
$K^0_S \pi^+ \pi^-$ nonresonant		$(2.5 \pm^{6.0}_{1.6}) \times 10^{-4}$		842
$K^- \pi^+ \pi^0$	[c]	(14.4 ± 0.5) %	S=2.0	844
$K^- \rho^+$		(11.3 ± 0.7) %		675
$K^- \rho(1700)^+,\ \rho^+ \rightarrow \pi^+ \pi^0$		$(8.2 \pm 1.8) \times 10^{-3}$		†

$K^*(892)^- \pi^+$, $K^*(892)^- \to K^- \pi^0$		$(2.31 {}^{+0.40}_{-0.20})$ %		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
$K_S^0 2\pi^0$		$(9.1 \pm 1.1) \times 10^{-3}$	S=2.2	843
$K_S^0 (2\pi^0)_{S-wave}$		$(2.6 \pm 0.7) \times 10^{-3}$		–
$\overline{K}^*(892)^0 \pi^0$, $\overline{K}^{*0} \to K_S^0 \pi^0$		$(8.1 \pm 0.7) \times 10^{-3}$		711
$\overline{K}^*(1430)^0 \pi^0$, $\overline{K}^{*0} \to K_S^0 \pi^0$		$(4 \pm 23) \times 10^{-5}$		–
$\overline{K}^*(1680)^0 \pi^0$, $\overline{K}^{*0} \to K_S^0 \pi^0$		$(1.0 \pm 0.4) \times 10^{-3}$		–
$K_S^0 f_2(1270)$, $f_2 \to 2\pi^0$		$(2.3 \pm 1.1) \times 10^{-4}$		–
$2K_S^0$, one $K_S^0 \to 2\pi^0$		$(3.2 \pm 1.1) \times 10^{-4}$		–
$K^- 2\pi^+ \pi^-$	[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
$(K^- \pi^+)_{S-wave} \rho^0$		$(7.7 \pm 1.1) \times 10^{-4}$		609
$\overline{K}^*(892)^0 \rho^0$, $\overline{K}^{*0} \to K^- \pi^+$		(1.01 ± 0.05) %		416
$\overline{K}^*(892)^0 (\pi^+ \pi^-)_{S-wave}$, $\overline{K}^*(892)^0 \to K^- \pi^+$		$(1.9 \pm 0.4) \times 10^{-3}$		–
$(\overline{K}^*(892)^0 \rho^0)_{S-wave}$, $\overline{K}^*(892)^0 \to K^- \pi^+$		$(6.0 \pm 0.4) \times 10^{-3}$		–
$(\overline{K}^*(892)^0 \rho^0)_{P-wave}$, $\overline{K}^*(892)^0 \to K^- \pi^+$		$(4.96 \pm 0.25) \times 10^{-3}$		–
$(\overline{K}^*(892)^0 \rho^0)_{D-wave}$, $\overline{K}^*(892)^0 \to K^- \pi^+$		$(6.8 \pm 0.4) \times 10^{-3}$		–
$\overline{K}^*(892)^0 \rho^0$ transverse, $\overline{K}^{*0} \to K^- \pi^+$		(1.2 ± 0.4) %		417
$(\overline{K}^*(892)^0 \rho(1450)^0)_{S-wave}$, $\overline{K}^*(892)^0 \to K^- \pi^+$, $\rho(1450)^0 \to \pi^+ \pi^-$		$(5.0 \pm 1.8) \times 10^{-4}$		–

$(\overline{K}^*(892)^0 \rho(1450)^0)$ $P-wave$, $\overline{K}^*(892)^0 \to K^- \pi^+$, $\rho(1450)^0 \to \pi^+ \pi^-$	$(1.63 \pm 0.28) \times 10^{-3}$	–
$(\overline{K}^*(892)^0 \rho(1450)^0)$ $D-wave$, $\overline{K}^*(892)^0 \to K^- \pi^+$, $\rho(1450)^0 \to \pi^+ \pi^-$	$(3.8 \pm 1.3) \times 10^{-4}$	–
$K^- a_1(1260)^+$, $a_1^+ \to 2\pi^+ \pi^-$ total	(3.13 ± 0.21) %	–
$K^- a_1(1260)^+$, $a_1^+ \to \rho^0 \pi^+$	(4.33 ± 0.32) %	327
$K^- a_1(1260)^+$, $a_1(1260)^+ \to (\rho^0 \pi^+)_{S-wave}$	(4.4 ± 0.4) %	–
$K^- a_1(1260)^+$, $a_1(1260)^+ \to (\rho^0 \pi^+)_{D-wave}$	$(2.5 \pm 1.2) \times 10^{-4}$	–
$K_1(1270)^- \pi^+$, $K_1^- \to K^- \pi^+ \pi^-$ total	$(3.9 \pm 0.4) \times 10^{-3}$	–
$\overline{K}^*(892)^0 \pi^+ \pi^-$ 3-body, $\overline{K}^{*0} \to K^- \pi^+$	$(6.0 \pm 0.5) \times 10^{-3}$	685
$K_1(1270)^- \pi^+$, $K_1^- \to \overline{K}^*(892)^0 \pi^-$, $\overline{K}^{*0} \to K^- \pi^+$	$(6.6 \pm 2.3) \times 10^{-4}$	484
$K_1(1270)^- \pi^+$, $K_1(1270)^- \to (\overline{K}^{*0} \pi^-)_{S-wave}$, $\overline{K}^*(892)^0 \to K^- \pi^+$	$(8 \pm 12) \times 10^{-5}$	–
$K_1(1270)^- \pi^+$, $K_1(1270)^- \to (\overline{K}^{*0} \pi^-)_{D-wave}$, $\overline{K}^*(892)^0 \to K^- \pi^+$	$(5.8 \pm 2.3) \times 10^{-4}$	–
$K_1(1270)^- \pi^+$, $K_1(1270)^- \to (K^- \rho^0)_{S-wave}$	$(2.8 \pm 0.5) \times 10^{-3}$	–
$K_1(1400)^- \pi^+$, $K_1(1400)^- \to (\overline{K}^*(892)^0 \pi^-)_{S-wave}$, $\overline{K}^*(892)^0 \to K^- \pi^+$	$(9.5 \pm 1.9) \times 10^{-4}$	–
$K_2^*(1430)^- \pi^+$, $K_2^*(1430)^- \to \overline{K}^*(892)^0 \pi^-$, $\overline{K}^*(892)^0 \to K^- \pi^+$	$(3.8 \pm 0.4) \times 10^{-4}$	–

$K(1460)^- \pi^+$, $K(1460)^- \to K^- \pi^+ \pi^-$ total		$(3.1 \pm 0.4) \times 10^{-3}$		–
$K^- 2\pi^+ \pi^-$ 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
$K^- 2\pi^+ \pi^- \pi^0$		(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.

$K^0_S \eta$		$(5.09 \pm 0.13) \times 10^{-3}$		772
$K^0_S \omega$		(1.11 ± 0.06) %		670
$K^0_S \eta'(958)$		$(9.49 \pm 0.32) \times 10^{-3}$		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
$K^- \pi^+ \eta'(958)$		$(6.43 \pm 0.34) \times 10^{-3}$		479
$K^0_S \eta'(958) \pi^0$		$(2.52 \pm 0.27) \times 10^{-3}$		479
$\overline{K}^*(892)^0 \eta'(958)$		$< 1.0 \times 10^{-3}$	CL=90%	119

Hadronic modes with three K's

$K^0_S K^+ K^-$		$(4.42 \pm 0.32) \times 10^{-3}$		544
$K^0_S a_0(980)^0$, $a_0^0 \to K^+ K^-$		$(2.9 \pm 0.4) \times 10^{-3}$		–
$K^- a_0(980)^+$, $a_0^+ \to K^+ K^0_S$		$(5.9 \pm 1.8) \times 10^{-4}$		–

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

Pionic modes

$\pi^+ \pi^-$	$(1.455 \pm 0.024) \times 10^{-3}$	S=1.3	922
$2\pi^0$	$(8.26 \pm 0.25) \times 10^{-4}$		923
$\pi^+ \pi^- \pi^0$	(1.49 ± 0.06) %	S=2.1	907
$\rho^+ \pi^-$	(1.01 ± 0.04) %		764
$\rho^0 \pi^0$	$(3.86 \pm 0.23) \times 10^{-3}$		764
$\rho^- \pi^+$	$(5.15 \pm 0.25) \times 10^{-3}$		764
$\rho(1450)^+ \pi^-$, $\rho^+ \to \pi^+ \pi^0$	$(1.6 \pm 2.1) \times 10^{-5}$		–
$\rho(1450)^0 \pi^0$, $\rho^0 \to \pi^+ \pi^-$	$(4.5 \pm 2.0) \times 10^{-5}$		–
$\rho(1450)^- \pi^+$, $\rho^- \to \pi^- \pi^0$	$(2.7 \pm 0.4) \times 10^{-4}$		–
$\rho(1700)^+ \pi^-$, $\rho^+ \to \pi^+ \pi^0$	$(6.1 \pm 1.5) \times 10^{-4}$		–
$\rho(1700)^0 \pi^0$, $\rho^0 \to \pi^+ \pi^-$	$(7.4 \pm 1.8) \times 10^{-4}$		–
$\rho(1700)^- \pi^+$, $\rho^- \to \pi^- \pi^0$	$(4.8 \pm 1.1) \times 10^{-4}$		–
$f_0(980) \pi^0$, $f_0 \to \pi^+ \pi^-$	$(3.7 \pm 0.9) \times 10^{-5}$		–
$f_0(500) \pi^0$, $f_0 \to \pi^+ \pi^-$	$(1.22 \pm 0.22) \times 10^{-4}$		–
$f_0(1370) \pi^0$, $f_0 \to \pi^+ \pi^-$	$(5.5 \pm 2.1) \times 10^{-5}$		–
$f_0(1500) \pi^0$, $f_0 \to \pi^+ \pi^-$	$(5.8 \pm 1.6) \times 10^{-5}$		–
$f_0(1710) \pi^0$, $f_0 \to \pi^+ \pi^-$	$(4.6 \pm 1.6) \times 10^{-5}$		–
$f_2(1270) \pi^0$, $f_2 \to \pi^+ \pi^-$	$(1.97 \pm 0.21) \times 10^{-4}$		–
$\pi^+ \pi^- \pi^0$ nonresonant	$(1.3 \pm 0.4) \times 10^{-4}$		907
$3\pi^0$	$(2.0 \pm 0.5) \times 10^{-4}$		908
$2\pi^+ 2\pi^-$	$(7.56 \pm 0.20) \times 10^{-3}$		880
$a_1(1260)^+ \pi^-$, $a_1^+ \to 2\pi^+ \pi^-$ total	$(4.54 \pm 0.31) \times 10^{-3}$		–
$a_1(1260)^+ \pi^-$, $a_1^+ \to \rho^0 \pi^+$ S-wave	$(3.14 \pm 0.21) \times 10^{-3}$		–
$a_1(1260)^+ \pi^-$, $a_1^+ \to \rho^0 \pi^+$ D-wave	$(1.9 \pm 0.5) \times 10^{-4}$		–

$a_1(1260)^+\pi^-$, $a_1^+ \to \sigma\pi^+$		$(6.4 \pm 0.7) \times 10^{-4}$		–
$a_1(1260)^-\pi^+$, $a_1^- \to \rho^0\pi^-$ S-wave		$(2.3 \pm 0.9) \times 10^{-4}$		–
$a_1(1260)^-\pi^+$, $a_1^- \to \sigma\pi^-$		$(6.1 \pm 3.4) \times 10^{-5}$		–
$\pi(1300)^+\pi^-$, $\pi(1300)^+ \to \sigma\pi^+$		$(5.1 \pm 2.7) \times 10^{-4}$		–
$\pi(1300)^-\pi^+$, $\pi(1300)^- \to \sigma\pi^-$		$(2.3 \pm 2.2) \times 10^{-4}$		–
$a_1(1640)^+\pi^-$, $a_1^+ \to \rho^0\pi^+$ D-wave		$(3.2 \pm 1.6) \times 10^{-4}$		–
$a_1(1640)^+\pi^-$, $a_1^+ \to \sigma\pi^+$		$(1.8 \pm 1.4) \times 10^{-4}$		–
$\pi_2(1670)^+\pi^-$, $\pi_2^+ \to f_2(1270)^0\pi^+$, $f_2^0 \to \pi^+\pi^-$		$(2.0 \pm 0.9) \times 10^{-4}$		–
$\pi_2(1670)^+\pi^-$, $\pi_2^+ \to \sigma\pi^+$		$(2.6 \pm 1.0) \times 10^{-4}$		–
$2\rho^0$ total		$(1.85 \pm 0.13) \times 10^{-3}$		518
$2\rho^0$, parallel helicities		$(8.3 \pm 3.2) \times 10^{-5}$		–
$2\rho^0$, perpendicular helicities		$(4.8 \pm 0.6) \times 10^{-4}$		–
$2\rho^0$, longitudinal helicities		$(1.27 \pm 0.10) \times 10^{-3}$		–
$2\rho(770)^0$, S-wave		$(1.8 \pm 1.3) \times 10^{-4}$		–
$2\rho(770)^0$, P-wave		$(5.3 \pm 1.3) \times 10^{-4}$		–
$2\rho(770)^0$, D-wave		$(6.2 \pm 3.0) \times 10^{-4}$		–
Resonant $(\pi^+\pi^-)\pi^+\pi^-$ 3-body total		$(1.51 \pm 0.12) \times 10^{-3}$		–
$\sigma\pi^+\pi^-$		$(6.2 \pm 0.9) \times 10^{-4}$		–
$\sigma\rho(770)^0$		$(5.0 \pm 2.5) \times 10^{-4}$		–
$f_0(980)\pi^+\pi^-$, $f_0 \to \pi^+\pi^-$		$(1.8 \pm 0.5) \times 10^{-4}$		–
$f_2(1270)\pi^+\pi^-$, $f_2 \to \pi^+\pi^-$		$(3.7 \pm 0.6) \times 10^{-4}$		–
$2f_2(1270)$, $f_2 \to \pi^+\pi^-$		$(1.6 \pm 1.8) \times 10^{-4}$		–
$f_0(1370)\sigma$, $f_0 \to \pi^+\pi^-$		$(1.6 \pm 0.5) \times 10^{-3}$		–
$\pi^+\pi^-2\pi^0$		(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
$(\phi \rho^0)_{P-wave}$, $\phi \to K^+ K^-$	$(4.0 \pm 1.9) \times 10^{-5}$		–
$(\phi \rho^0)_{D-wave}$, $\phi \to K^+ K^-$	$(4.2 \pm 1.4) \times 10^{-5}$		–
$(K^*(892)^0 \overline{K}^*(892)^0)_{S-wave}$, $K^{*0} \to K^\pm \pi^\mp$	$(1.1 \pm 0.5) \times 10^{-4}$		–
$(K^*(892)^0 \overline{K}^*(892)^0)_{P-wave}$, $K^* \to K^\pm \pi^\mp$	$(9 \pm 4) \times 10^{-5}$		–
$(K^*(892)^0 \overline{K}^*(892)^0)_{D-wave}$, $K^* \to K^\pm \pi^\mp$	$(9.9 \pm 2.3) \times 10^{-5}$		–
$K^*(892)^0 (K^- \pi^+)_{S-wave}$ 3-body, $K^{*0} \to K^+ \pi^-$	$(1.4 \pm 0.6) \times 10^{-4}$		–
$K_1(1270)^+ K^-$, $K_1^+ \to K^{*0} \pi^+$	$(1.4 \pm 0.9) \times 10^{-4}$		–
$K_1(1270)^+ K^-$, $K_1^+ \to K^*(1430)^0 \pi^+$, $K^{*0} \to K^+ \pi^-$	$(1.5 \pm 0.5) \times 10^{-4}$		–
$K_1(1270)^+ K^-$, $K_1^+ \to \rho^0 K^+$	$(2.2 \pm 0.6) \times 10^{-4}$		–
$K_1(1270)^+ K^-$, $K_1^+ \to \omega(782) K^+$, $\omega \to \pi^+ \pi^-$	$(1.5 \pm 1.2) \times 10^{-5}$		–
$K_1(1270)^- K^+$, $K_1^- \to \rho^0 K^-$	$(1.3 \pm 0.4) \times 10^{-4}$		–
$K_1(1400)^+ K^-$, $K_1^+ \to K^*(892)^0 \pi^+$, $K^{*0} \to K^+ \pi^-$	$(3.1 \pm 1.7) \times 10^{-4}$		–
$K_1(1680)^+ K^-$, $K_1^+ \to K^{*0} \pi^+$, $K^{*0} \to K^+ \pi^-$	$(8.9 \pm 3.2) \times 10^{-5}$		–
$K^+ K^- \pi^+ \pi^-$ non-resonant	$(2.7 \pm 0.6) \times 10^{-4}$		–
$2K^0_S \pi^+ \pi^-$	$(1.22 \pm 0.23) \times 10^{-3}$		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.

$\phi\eta$		$(1.5 \pm 0.5) \times 10^{-4}$		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
$K^0_S\pi^+\pi^-$ in $D^0 \to \overline{D}^0$		$< 1.8 \times 10^{-4}$	CL=95%	–
$K^*(892)^+\pi^-$, $K^{*+} \to K^0_S\pi^+$	*DC*	$(1.13 {}^{+0.60}_{-0.34}) \times 10^{-4}$		711
$K^*_0(1430)^+\pi^-$, $K^{*+}_0 \to K^0_S\pi^+$	*DC*	$< 1.4 \times 10^{-5}$		–
$K^*_2(1430)^+\pi^-$, $K^{*+}_2 \to K^0_S\pi^+$	*DC*	$< 3.4 \times 10^{-5}$		–
$K^+\pi^-\pi^0$	*DC*	$(3.06 \pm 0.15) \times 10^{-4}$		844
$K^+\pi^-\pi^0$ via $\overline{D}^0$		$(7.6 {}^{+0.5}_{-0.6}) \times 10^{-4}$		–
$K^+\pi^+2\pi^-$ via DCS		$(2.49 \pm 0.07) \times 10^{-4}$		–
$K^+\pi^+2\pi^-$	*DC*	$(2.65 \pm 0.06) \times 10^{-4}$		813
$K^+\pi^+2\pi^-$ via $\overline{D}^0$		$(7.9 \pm 3.0) \times 10^{-6}$		812
$(K^*(892)^0\rho(770)^0)_{S-wave}$ via DCS, $K^*(892)^0 \to K^+\pi^-$		$(2.4 \pm 0.5) \times 10^{-5}$		–
$(K^*(892)^0\rho(770)^0)_{P-wave}$ via DCS, $K^*(892)^0 \to K^+\pi^-$		$(2.10 \pm 0.26) \times 10^{-5}$		–
$(K^*(892)^0\rho(770)^0)_{D-wave}$ via DCS, $K^*(892)^0 \to K^+\pi^-$		$(2.54 \pm 0.33) \times 10^{-5}$		–

$(K^*(892)^0 \rho(1450)^0)$ $s-wave$ via DCS, $K^*(892)^0 \to K^+\pi^-$, $\rho(1450)^0 \to \pi^+\pi^-$	$(2.0 \pm 0.5) \times 10^{-5}$		–
$(K_1(1270)^+ \pi^-)$ $s-wave$ via DCS, $K_1(1270)^+ \to K^+\pi^-\pi^+$ total	$(4.5 \pm 0.6) \times 10^{-5}$		–
$(K_1(1400)^+ \pi^-)$ $s-wave$ via DCS, $K_1(1400)^+ \to (K^*(892)^0 \pi^+)$ $s-wave$, $K^*(892)^0 \to K^+\pi^-$	$(6.6 \pm 0.7) \times 10^{-5}$		–
$K^+\pi^+2\pi^-$ non-resonant via DCS	$(5.2 \pm 0.5) \times 10^{-5}$		–
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

$\gamma\gamma$	$C1$	$< 8.5 \times 10^{-7}$	CL=90%	932
e^+e^-	$C1$	$< 7.9 \times 10^{-8}$	CL=90%	932
$\mu^+\mu^-$	$C1$	$< 6.2 \times 10^{-9}$	CL=90%	926
$\pi^0 e^+e^-$	$C1$	$< 4 \times 10^{-6}$	CL=90%	928
$\pi^0\mu^+\mu^-$	$C1$	$< 1.8 \times 10^{-4}$	CL=90%	915
ηe^+e^-	$C1$	$< 3 \times 10^{-6}$	CL=90%	852
$\eta\mu^+\mu^-$	$C1$	$< 5.3 \times 10^{-4}$	CL=90%	838
$\pi^+\pi^-e^+e^-$	$C1$	$< 7 \times 10^{-6}$	CL=90%	922
$\rho^0 e^+e^-$	$C1$	$< 1.0 \times 10^{-4}$	CL=90%	771
$\pi^+\pi^-\mu^+\mu^-$	$C1$	$(9.6 \pm 1.2) \times 10^{-7}$		894
$\pi^+\pi^-\mu^+\mu^-$ (non-res)		$< 5.5 \times 10^{-7}$	CL=90%	–
$\rho^0\mu^+\mu^-$	$C1$	$< 2.2 \times 10^{-5}$	CL=90%	754
ωe^+e^-	$C1$	$< 6 \times 10^{-6}$	CL=90%	768
$\omega\mu^+\mu^-$	$C1$	$< 8.3 \times 10^{-4}$	CL=90%	751
$K^-K^+e^+e^-$	$C1$	$< 1.1 \times 10^{-5}$	CL=90%	791
ϕe^+e^-	$C1$	$< 5.2 \times 10^{-5}$	CL=90%	654
$K^-K^+\mu^+\mu^-$	$C1$	$(1.54 \pm 0.32) \times 10^{-7}$		710
$K^-K^+\mu^+\mu^-$ (non-res)		$< 3.3 \times 10^{-5}$	CL=90%	–
$\phi\mu^+\mu^-$	$C1$	$< 3.1 \times 10^{-5}$	CL=90%	631
$\overline{K}^0 e^+e^-$		[h] $< 2.4 \times 10^{-5}$	CL=90%	866
$\overline{K}^0\mu^+\mu^-$		[h] $< 2.6 \times 10^{-4}$	CL=90%	852

$K^- \pi^+ e^+ e^-$	*C1*		$<$ 4.1	$\times 10^{-5}$	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
$K^- \pi^+ \mu^+ \mu^-$, 675 $<$ $m_{\mu\mu}$ $<$ 875 MeV			(4.2 $\pm$ 0.4)	$\times 10^{-6}$		–
$\overline{K}^*(892)^0 \mu^+ \mu^-$		[*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*	[*r*]	$<$ 1.3	$\times 10^{-8}$	CL=90%	929
$\pi^0 e^\pm \mu^\mp$	*LF*	[*r*]	$<$ 8.6	$\times 10^{-5}$	CL=90%	924
$\eta e^\pm \mu^\mp$	*LF*	[*r*]	$<$ 1.0	$\times 10^{-4}$	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
$K^- \pi^- 2e^+ +$ 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*	[*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$\pm$0.9) %	43
$D^0 \gamma$	(35.3$\pm$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

$D_0^*(2300)^0$

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

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)
$m_{D_1^0} - m_{D^{*+}} = 410.6 \pm 0.5$ (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 $Z^0 \rightarrow c\overline{c}$ 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 $D^+ \rightarrow K^- 2\pi^+ \pi^0$ 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.

[*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 $D^0 \rightarrow K^0_S \pi^+ \pi^- \pi^0$ 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 $p e^-$.

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