CHARMED, STRANGE MESONS ($C = \pm 1$, $S = \pm 1$) (including possibly non-$q\overline{q}$ states)

$D_s^+ = c\overline{s}$, $D_s^- = \overline{c}s$, similarly for D_s^*'s

$D_s^\pm$

$I(J^P) = 0(0^-)$

Mass $m = 1968.35 \pm 0.07$ MeV
$m_{D_s^\pm} - m_{D^\pm} = 98.69 \pm 0.05$ MeV
Mean life $\tau = (501.2 \pm 2.2) \times 10^{-15}$ s (S = 1.3)
$c\tau = 150.3$ μm

CP-violating decay-rate asymmetries

$A_{CP}(\mu^\pm\nu) = (-0.2 \pm 2.5)\%$
$A_{CP}(\tau^\pm\nu)$ in $D_s^+ \to \tau^+\nu_\tau$, $D_s^- \to \tau^-\overline{\nu}_\tau = (3 \pm 5)\%$
$A_{CP}(K^\pm K_S^0) = (0.09 \pm 0.26)\%$
$A_{CP}(K^\pm K_L^0)$ in $D_s^\pm \to K^\pm K_L^0 = (-1.1 \pm 2.7) \times 10^{-2}$
$A_{CP}(K^+K^-\pi^\pm) = (-0.5 \pm 0.9)\%$
$A_{CP}(\phi\pi^\pm) = (-0.38 \pm 0.27)\%$
$A_{CP}(K^\pm K_S^0\pi^0) = (-2 \pm 6)\%$
$A_{CP}(2K_S^0\pi^\pm) = (3 \pm 5)\%$
$A_{CP}(K^+K^-\pi^\pm\pi^0) = (0.0 \pm 3.0)\%$
$A_{CP}(K^\pm K_S^0\pi^+\pi^-) = (-6 \pm 5)\%$
$A_{CP}(K_S^0K^\mp 2\pi^\pm) = (4.1 \pm 2.8)\%$
$A_{CP}(\pi^+\pi^-\pi^\pm) = (-0.7 \pm 3.1)\%$
$A_{CP}(\pi^\pm\eta) = (0.32 \pm 0.31)\%$
$A_{CP}(\pi^\pm\eta') = (-0.06 \pm 0.22)\%$ (S = 1.6)
$A_{CP}(\eta\pi^\pm\pi^0) = (-1 \pm 4)\%$
$A_{CP}(\eta'\pi^\pm\pi^0) = (0 \pm 8)\%$
$A_{CP}(K^\pm\pi^0) = (2 \pm 4)\%$ (S = 1.2)
$A_{CP}(\overline{K}^0/K^0\pi^\pm) = (0.4 \pm 0.5)\%$
$A_{CP}(K_S^0\pi^\pm) = (0.20 \pm 0.18)\%$
$A_{CP}(K^\pm\pi^+\pi^-) = (3.7 \pm 2.7)\%$
$A_{CP}(K_S^0\pi^+\pi^0)$ in $D_s^\pm \to K_S^0\pi^\pm\pi^0 = (3 \pm 6)\%$
$A_{CP}(K^\pm\pi^+\pi^-\pi^0)$ in $D_s^\pm \to K^\pm\pi^+\pi^-\pi^0 = (7 \pm 5) \times 10^{-2}$
$A_{CP}(K^\pm\eta) = (1.8 \pm 1.9)\%$
$A_{CP}(K^\pm\eta'(958)) = (6 \pm 19)\%$

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

Local *CPV* in $D_s^\pm \to K^+K^-K^\pm = 0.133$
$A_T(K_S^0 K^\pm \pi^+\pi^-) = (-8 \pm 6) \times 10^{-3}$ [a]

$D_s^+ \to \phi \ell^+ \nu_\ell$ form factors

$r_2 = 0.83 \pm 0.08$ (S = 1.8)
$r_v = 1.76 \pm 0.07$ (S = 1.1)
$\Gamma_L/\Gamma_T = 0.72 \pm 0.18$
$f_+(0)\,|V_{cs}|$ in $D_s^+ \to \eta e^+ \nu_e = 0.452 \pm 0.010$
$f_+(0)\,|V_{cs}|$ in $D_s^+ \to \eta' e^+ \nu_e = 0.525 \pm 0.026$
$f_+(0)|V_{cd}|$ in $D_s^+ \to K^0 e^+ \nu_e = 0.162 \pm 0.019$
$r_v \equiv V(0)/A_1(0)$ in $D_s^+ \to K^*(892)^0 e^+ \nu_e = 1.7 \pm 0.4$
$r_2 \equiv A_2(0)/A_1(0)$ in $D_s^+ \to K^*(892)^0 e^+ \nu_e = 0.77 \pm 0.29$
$f_{D_s^+}\,|V_{cs}|$ in $D_s^+ \to \mu^+ \nu_\mu = 241.8 \pm 3.3$ MeV
$f_{D_s^+}\,|V_{cs}|$ in $D_s^+ \to \tau^+ \nu_\tau = 246.6 \pm 2.5$ MeV

Unless otherwise noted, the branching fractions for modes with a resonance in the final state include all the decay modes of the resonance. D_s^- modes are charge conjugates of the modes below.

D_s^+ DECAY MODES		Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
Inclusive modes				
e^+ semileptonic	[b]	(6.33 ±0.15) %		–
π^+ anything		(119.3 ±1.4) %		–
π^- anything		(43.2 ±0.9) %		–
π^0 anything		(123 ±7) %		–
K^- anything		(18.7 ±0.5) %		–
K^+ anything		(28.9 ±0.7) %		–
K_S^0 anything		(19.0 ±1.1) %		–
η anything	[c]	(29.9 ±2.8) %		–
ω anything		(6.1 ±1.4) %		–
η' anything	[d]	(10.3 ±1.4) %	S=1.1	–
$f_0(980)$ anything, $f_0 \to \pi^+\pi^-$		< 1.3 %	CL=90%	–
ϕ anything		(15.7 ±1.0) %		–
K^+K^- anything		(15.8 ±0.7) %		–
$K_S^0 K^+$ anything		(5.8 ±0.5) %		–
$K_S^0 K^-$ anything		(1.9 ±0.4) %		–
$2K_S^0$ anything		(1.70 ±0.32) %		–
$2K^+$ anything		< 2.6	$\times 10^{-3}$ CL=90%	–
$2K^-$ anything		< 6	$\times 10^{-4}$ CL=90%	–
$2\pi^+\pi^-$ + anything		(32.8 ±0.7) %		–

Leptonic and semileptonic modes

$e^+\nu_e$		<	8.3		$\times 10^{-5}$	CL=90%	984
$\mu^+\nu_\mu$		(	5.35	±0.12)	$\times 10^{-3}$		981
$\tau^+\nu_\tau$		(	5.36	±0.10)	%		182
$\gamma e^+\nu_e$		<	1.3		$\times 10^{-4}$	CL=90%	984
$K^+K^-e^+\nu_e$				—			851
$K^0_S K^0_S e^+\nu_e$		<	3.8		$\times 10^{-4}$	CL=90%	849
$\phi e^+\nu_e$	[e]	(	2.39	±0.16)	%	S=1.3	720
$K_1(1270)^0 e^+\nu_e$		<	4.1		$\times 10^{-4}$	CL=90%	585
$b_1(1235)^0 e^+\nu_e$, $b_1^0 \to \omega\pi^0$		<	6.4		$\times 10^{-4}$	CL=90%	–
$\phi\mu^+\nu_\mu$		(	2.24	±0.11)	%		715
$\eta e^+\nu_e + \eta'(958) e^+\nu_e$	[e]	(	3.03	±0.24)	%		–
$\eta e^+\nu_e$	[e]	(	2.26	±0.06)	%		908
$\eta'(958) e^+\nu_e$	[e]	(	8.0	±0.4)	$\times 10^{-3}$		751
$\eta\mu^+\nu_\mu$		(	2.4	±0.5)	%		905
$\eta'(958)\mu^+\nu_\mu$		(	1.1	±0.5)	%		747
$\omega e^+\nu_e$	[f]	<	2.0		$\times 10^{-3}$	CL=90%	829
$K^0 e^+\nu_e$		(	3.4	±0.4)	$\times 10^{-3}$		921
$K^*(892)^0 e^+\nu_e$	[e]	(	2.15	±0.28)	$\times 10^{-3}$	S=1.1	782
$f_0(500) e^+\nu_e$, $f_0 \to \pi^0\pi^0$		<	7.3		$\times 10^{-4}$	CL=90%	–
$f_0(980) e^+\nu_e$, $f_0 \to \pi^0\pi^0$		(	7.9	±1.5)	$\times 10^{-4}$		–
$f_0(980)\mu^+\nu_\mu$, $f_0 \to K^+K^-$		<	5.45		$\times 10^{-4}$	CL=90%	–
$a_0(980)^0 e^+\nu_e$, $a_0^0 \to \pi^0\eta$		<	1.2		$\times 10^{-4}$	CL=90%	–
$\pi^0 e^+\nu_e$		<	6.4		$\times 10^{-5}$	CL=90%	980

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

$K^+K^0_S$		(	1.450	±0.035)	%		850
$K^+K^0_L$		(	1.49	±0.06)	%		850
$K^+\overline{K}^0$		(	2.95	±0.14)	%		850
$K^+K^-\pi^+$	[g]	(	5.37	±0.10)	%	S=1.1	805
$\phi\pi^+$	[e,h]	(	4.5	±0.4)	%		712
$\phi\pi^+$, $\phi \to K^+K^-$	[h]	(	2.21	±0.06)	%		712
$K^+\overline{K}^*(892)^0$		(	12.7	$^{+4.0}_{-3.1}$)	%		685
$K^+\overline{K}^*(892)^0$, $\overline{K}^{*0} \to K^-\pi^+$		(	2.58	±0.06)	%		416
$K^+\overline{K}^*(892)^0$, $\overline{K}^{*0} \to K^0_S\pi^0$		(	4.8	±0.5)	$\times 10^{-3}$		–
$f_0(980)\pi^+$, $f_0 \to K^+K^-$		(	1.11	±0.19)	%		732
$f_0(1370)\pi^+$, $f_0 \to K^+K^-$		(	7.1	±2.9)	$\times 10^{-4}$		–
$f_0(1710)\pi^+$, $f_0 \to K^+K^-$		(	6.7	±2.8)	$\times 10^{-4}$		198
$a_0(980)^+\pi^0$, $a_0^+ \to K^+K^0_S$		(	1.1	±0.4)	$\times 10^{-3}$		–
$a_0(1710)^+\pi^0$, $a_0^+ \to K^+K^0_S$		(	3.5	±0.6)	$\times 10^{-3}$		–

$K^+\overline{K}_0^*(1430)^0,\ \overline{K}_0^* \to K^-\pi^+$		(1.76 ±0.25) × 10^{-3}			218
$K^+\overline{K}^*(1410)^0,\ \overline{K}_0^* \to K_S^0\pi^0$		(8.8 ±2.8) × 10^{-4}			–
$K^+K_S^0\pi^0$		(1.47 ±0.07) %			805
$K^*(892)^+K_S^0,\ K^{*+} \to K^+\pi^0$		(2.04 ±0.33) × 10^{-3}			–
$2K_S^0\pi^+$		(7.1 ±0.4) × 10^{-3}		S=1.3	802
$f_0(980)\pi^+,\ f_0 \to K_S^0K_S^0$		< 1.8	× 10^{-4}	CL=90%	–
$f_0(1710)\pi^+,\ f_0 \to K_S^0K_S^0$		(3.3 ±0.4) × 10^{-3}			–
$K^*(892)^+K_S^0,\ K^{*+} \to K_S^0\pi^+$		(3.09 ±0.33) × 10^{-3}			683
$K^0\overline{K}^0\pi^+$		—			802
$K^*(892)^+\overline{K}^0$	[e]	(5.4 ±1.2) %			683
$K^+K^-\pi^+\pi^0$		(5.50 ±0.24) %		S=1.3	748
$\phi\rho^+$	[e]	(5.59 ±0.34) %			401
$\overline{K}_1(1270)^0K^+,\ \overline{K}_1(1270)^0 \to K^-\rho^+$		(5.7 ±0.6) × 10^{-3}			–
$\overline{K}_1(1270)^0K^+,\ \overline{K}_1(1270)^0 \to K^*(892)\pi$		(1.31 ±0.25) %			–
$\overline{K}_1(1400)^0K^+,\ \overline{K}_1(1400)^0 \to K^*(892)\pi$		(2.0 ±0.4) %			–
$a_0(980)^0\rho^+,\ a_0^0 \to K^+K^-$		(1.9 ±0.4) × 10^{-3}			–
$f_1(1420)^0\pi^+,\ f_1(1420)^0 \to K^*(892)^\mp K^\pm$		(3.9 ±0.7) × 10^{-3}			–
$f_1(1420)^0\pi^+,\ f_1(1420)^0 \to a_0(980)^0\pi^0,\ a_0(980)^0 \to K^+K^-$		(4.0 ±1.4) × 10^{-4}			–
$\eta(1475)\pi^+,\ \eta(1475) \to a_0(980)^0\pi^0,\ a_0(980)^0 \to K^+K^-$		(7.0 ±2.8) × 10^{-4}			–
$K_S^0K^-2\pi^+$		(1.53 ±0.08) %		S=1.5	744
$K^+K^-K_S^0\pi^+$		(1.29 ±0.18) × 10^{-4}			527
$K^*(892)^+\overline{K}^*(892)^0$	[e]	(5.64 ±0.35) %			417
$\eta(1475)K_S^0,\ \eta \to K^*(892)^0\pi^+,\ K^{*0} \to K^-\pi^+$		(3.4 ±1.0) × 10^{-4}			–
$\eta(1475)\pi^+,\ \eta \to \overline{K}^*(892)^+K^-,\ \overline{K}^{*+} \to K_S^0\pi^+$		(3.4 ±1.0) × 10^{-4}			–
$\eta(1475)\pi^+,\ \eta \to a_0(980)^-\pi^+,\ a_0^- \to K_S^0K^-$		(1.7 ±0.9) × 10^{-3}			–

$f_1(1285)\pi^+,\ f_1 \to$ $a_0(980)^-\pi^+,\ a_0^- \to$ $K^0_S K^-$		(	3.4	± 0.8) $\times 10^{-4}$			–
$K^+ K^0_S \pi^+\pi^-$		(	9.5	± 0.8) $\times 10^{-3}$	S=1.1		744
$K^+ K^- 2\pi^+\pi^-$		(	6.6	± 0.6) $\times 10^{-3}$			673
$\phi 2\pi^+\pi^-$	[e]	(	1.21	± 0.16) %			640
$\phi\rho^0\pi^+,\ \phi \to\ K^+K^-$		(	4.9	± 0.7) $\times 10^{-3}$			181
$\phi a_1(1260)^+,\ \phi \to$ $K^+K^-,\ a_1^+ \to$ $\rho^0\pi^+$		(	7.4	± 1.2) $\times 10^{-3}$			†
$\phi 2\pi^+\pi^-$ non-$\rho,\ \phi \to$ K^+K^-		(	1.4	± 0.5) $\times 10^{-3}$			–
$K^+ K^- \rho^0\pi^+$ non-ϕ		<	2.0	$\times 10^{-4}$	CL=90%		249
$K^+ K^- 2\pi^+\pi^-$ nonresonant		(	1.0	± 0.4) $\times 10^{-3}$			673
$2K^0_S 2\pi^+\pi^-$		(	7.8	± 3.3) $\times 10^{-4}$			669

Hadronic modes without K's

$\pi^+\pi^0$		<	1.2	$\times 10^{-4}$	CL=90%		975
$2\pi^+\pi^-$		(	1.08	± 0.04) %			959
$\rho^0\pi^+$		(	1.12	± 0.17) $\times 10^{-4}$			825
$\pi^+(\pi^+\pi^-)_{S-\text{wave}}$	[i]	(	9.12	± 0.35) $\times 10^{-3}$			959
$f_2(1270)\pi^+,\ f_2 \to\ \pi^+\pi^-$		(	1.40	± 0.11) $\times 10^{-3}$			559
$f_2'(1525)^0\pi^+,\ f_2' \to\ \pi^+\pi^-$		(	5.7	± 2.0) $\times 10^{-6}$			–
$\rho(1450)^0\pi^+,\ \rho^0 \to\ \pi^+\pi^-$		(	1.8	± 0.6) $\times 10^{-4}$			421
$\rho(1700)^0\pi^+,\ \rho^0 \to\ \pi^+\pi^-$		(	4	± 4) $\times 10^{-5}$			–
$\pi^+ 2\pi^0$		(	5.2	± 0.5) $\times 10^{-3}$	S=1.1		961
$f_0(980)\pi^+,\ f_0 \to\ \pi^0\pi^0$		(	2.9	± 0.6) $\times 10^{-3}$			–
$f_0(1370)\pi^+,\ f_0 \to\ \pi^0\pi^0$		(	1.3	± 0.6) $\times 10^{-3}$			–
$f_2(1270)\pi^+,\ f_2 \to\ \pi^0\pi^0$		(	5.0	± 3.5) $\times 10^{-4}$			–
$2\pi^+\pi^-\pi^0$				—			935
$\eta\pi^+$	[e]	(	1.67	± 0.09) %		S=1.1	902
$\omega\pi^+$	[e]	(	1.92	± 0.30) $\times 10^{-3}$			822
$\omega\pi^+,\ \omega \to\ \pi^+\pi^-$		(	3.9	± 0.5) $\times 10^{-5}$			–
$3\pi^+ 2\pi^-$		(	7.8	± 0.8) $\times 10^{-3}$			899
$2\pi^+\pi^- 2\pi^0$				—			902
$\eta\rho^+$	[e]	(	8.9	± 0.8) %			724
$\eta\pi^+\pi^0$		(	9.5	± 0.5) %			885
$\eta(\pi^+\pi^0)_{\ P-wave}$		(	5.1	± 3.1) $\times 10^{-3}$			885
$a_0(980)^{+0}\pi^{0+},$ $a_0(980)^{+0} \to\ \eta\pi^{+0}$		(	2.2	± 0.4) %			–
$\omega\pi^+\pi^0$	[e]	(	2.8	± 0.7) %			802
$2\pi^+\pi^-\eta$		(	3.12	± 0.16) %			855

$a_1(1260)^+\eta$, $a_1^+ \to$		(	1.73	± 0.16) %		–
$\rho(770)^0\pi^+$, $\rho^0 \to$						
$\pi^+\pi^-$						
$a_1(1260)^+\eta$, $a_1^+ \to$		(	2.5	± 0.9) $\times 10^{-3}$		–
$f_0(500)\pi^+$, $f_0 \to \pi^+\pi^-$						
$a_0(980)^+\rho(770)^0$, $a_0^+ \to$		(	2.1	± 0.9) $\times 10^{-3}$		–
$\eta\pi^+$						
$\eta(1405)\pi^+$, $\eta(1405) \to$		(	2.2	± 0.7) $\times 10^{-4}$		–
$a_0(980)^-\pi^+$, $a_0^- \to$						
$\eta\pi^-$						
$\eta(1405)\pi^+$, $\eta(1405) \to$		(	2.2	± 0.7) $\times 10^{-4}$		–
$a_0(980)^+\pi^-$, $a_0^+ \to$						
$\eta\pi^+$						
$f_1(1420)\pi^+$, $f_1 \to$		(	5.9	± 1.8) $\times 10^{-4}$		–
$a_0(980)^-\pi^+$, $a_0^- \to$						
$\eta\pi^-$						
$f_1(1420)\pi^+$, $f_1 \to$		(	5.3	± 1.8) $\times 10^{-4}$		–
$a_0(980)^+\pi^-$, $a_0^+ \to$						
$\eta\pi^+$						
$3\pi^+2\pi^-\pi^0$		(	4.9	± 3.2) %		856
$\omega 2\pi^+\pi^-$	[e]	(	1.6	± 0.5) %		766
$\eta'(958)\pi^+$	[d,e]	(	3.94	± 0.25) %		743
$3\pi^+2\pi^-2\pi^0$				—		803
$\omega\eta\pi^+$	[e]	(	5.4	± 1.3) $\times 10^{-3}$		654
$\eta'(958)\rho^+$	[d,e]	(	5.8	± 1.5) %		465
$\eta'(958)\pi^+\pi^0$		(	6.08	± 0.29) %		720
$\eta'(958)\pi^+\pi^0$ nonresonant		$<$	5.1	%	CL=90%	720

Modes with one or three K's

$K^+\pi^0$		(	7.4	± 0.5) $\times 10^{-4}$		917
$K^0_S\pi^+$		(	1.09	± 0.05) $\times 10^{-3}$		916
$K^+\eta$	[e]	(	1.73	± 0.08) $\times 10^{-3}$		835
$K^+\omega$	[e]	(	9.9	± 1.5) $\times 10^{-4}$		741
$K^+\eta'(958)$	[e]	(	2.64	± 0.24) $\times 10^{-3}$		646
$K^+\pi^+\pi^-$		(	6.20	± 0.19) $\times 10^{-3}$		900
$K^+\rho^0$		(	2.17	± 0.25) $\times 10^{-3}$		745
$K^+\rho(1450)^0$, $\rho^0 \to \pi^+\pi^-$		(	7.2	± 1.7) $\times 10^{-4}$		–
$K^+ f_0(500)$, $f_0 \to \pi^+\pi^-$		(	4.5	± 3.0) $\times 10^{-4}$		–
$K^+ f_0(980)$, $f_0 \to \pi^+\pi^-$		(	2.8	± 1.1) $\times 10^{-4}$		–
$K^+ f_0(1370)$, $f_0 \to \pi^+\pi^-$		(	1.2	± 0.6) $\times 10^{-3}$		–
$K^*(892)^0\pi^+$, $K^{*0} \to$		(	1.67	± 0.26) $\times 10^{-3}$		775
$K^+\pi^-$						
$K^*(1410)^0\pi^+$, $K^{*0} \to$		(	6	± 4) $\times 10^{-4}$		–
$K^+\pi^-$						

$K^*(1430)^0\pi^+,\ K^{*0}\to K^+\pi^-$	(9.3 ±3.1) × 10^{-4}		–
$K^+\pi^+\pi^-$ nonresonant	(9.9 ±3.2) × 10^{-4}		900
$K^0_S\pi^+\pi^0$	(5.38 ±0.32) × 10^{-3}		899
$K^0_S\rho(770)^+,\ \rho^+\to\pi^+\pi^0$	(2.7 ±0.5) × 10^{-3}		–
$K^0_S\rho(1450)^+,\ \rho^+\to\pi^+\pi^0$	(1.10 ±0.34) × 10^{-3}		–
$K^*(892)^0\pi^+,\ K^{*0}\to K^0_S\pi^0$	(4.5 ±1.3) × 10^{-4}		–
$K^*(892)^+\pi^0,\ K^{*+}\to K^0_S\pi^+$	(2.5 ±0.8) × 10^{-4}		–
$K^*(1410)^0\pi^+,\ K^{*0}\to K^0_S\pi^0$	(1.8 ±0.9) × 10^{-4}		–
$K^0_S 2\pi^+\pi^-$	(2.8 ±1.0) × 10^{-3}		870
$K^+\pi^+\pi^-\pi^0$	(9.7 ±0.6) × 10^{-3}		873
$K^*(892)^0\rho^+,\ K^{*0}\to K^+\pi^-$	(3.9 ±0.4) × 10^{-3}		–
$K^*(892)^+\rho^0,\ K^{*+}\to K^+\pi^0$	(4.2 ±1.2) × 10^{-4}		–
$K_1(1270)^0\pi^+,\ K^0_1\to K^+\rho^-$	(3.9 ±1.3) × 10^{-4}		†
$K_1(1400)^0\pi^+,\ K^0_1\to K^*(890)^+\pi^-,\ K^{*+}\to K^+\pi^0$	(5.4 ±0.9) × 10^{-4}		–
$K_1(1400)^0\pi^+,\ K^0_1\to K^*(890)^0\pi^0,\ K^{*0}\to K^+\pi^-$	(5.9 ±1.0) × 10^{-4}		–
$K^+a_1(1260)^0,\ a_1\to\rho^+\pi^-$	(1.8 ±1.1) × 10^{-4}		–
$K^+a_1(1260)^0,\ a_1\to\rho^-\pi^+$	(1.8 ±1.1) × 10^{-4}		–
$K^+\pi^+\pi^-\pi^0$ nonresonant	(9.2 ±2.4) × 10^{-4}		873
$(K^+\pi^0)_{\ P-wave}\rho^0$	(1.01 ±0.21) × 10^{-3}		688
$K^+\omega\pi^0$	[e] < 8.2 × 10^{-3}	CL=90%	684
$K^+\omega\pi^+\pi^-$	[e] < 5.4 × 10^{-3}	CL=90%	603
$K^+\omega\eta$	[e] < 7.9 × 10^{-3}	CL=90%	366
$2K^+K^-$	(2.15 ±0.20) × 10^{-4}		628
$\phi K^+,\ \phi\to K^+K^-$	(8.8 ±2.0) × 10^{-5}		–

Doubly Cabibbo-suppressed modes

$2K^+\pi^-$	(1.274±0.031) × 10^{-4}		805
$K^+K^*(892)^0,\ K^{*0}\to K^+\pi^-$	(6.0 ±3.4) × 10^{-5}		–

Baryon-antibaryon mode

$p\overline{n}$	(1.22 ±0.11) × 10^{-3}		295
$p\overline{p}e^+\nu_e$	< 2.0 × 10^{-4}	CL=90%	296

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

$\pi^+ e^+ e^-$		[j]	<	5.5	$\times 10^{-6}$ CL=90%	979
$\pi^+ \phi,\ \phi \to\ e^+ e^-$		[k]	(	$6\ ^{+8}_{-4}$) $\times 10^{-6}$		–
$\pi^+ \mu^+ \mu^-$		[j]	<	1.8	$\times 10^{-7}$ CL=90%	968
$K^+ e^+ e^-$	*C1*		<	3.7	$\times 10^{-6}$ CL=90%	922
$K^+ \mu^+ \mu^-$	*C1*		<	1.4	$\times 10^{-7}$ CL=90%	909
$K^*(892)^+ \mu^+ \mu^-$	*C1*		<	1.4	$\times 10^{-3}$ CL=90%	765
$\pi^+ e^+ \mu^-$	*LF*		<	1.1	$\times 10^{-6}$ CL=90%	976
$\pi^+ e^- \mu^+$	*LF*		<	9.4	$\times 10^{-7}$ CL=90%	976
$K^+ e^+ \mu^-$	*LF*		<	7.9	$\times 10^{-7}$ CL=90%	919
$K^+ e^- \mu^+$	*LF*		<	5.6	$\times 10^{-7}$ CL=90%	919
$\pi^- 2e^+$	*L*		<	1.4	$\times 10^{-6}$ CL=90%	979
$\pi^- 2\mu^+$	*L*		<	8.6	$\times 10^{-8}$ CL=90%	968
$\pi^- e^+ \mu^+$	*L*		<	6.3	$\times 10^{-7}$ CL=90%	976
$K^- 2e^+$	*L*		<	7.7	$\times 10^{-7}$ CL=90%	922
$K^- 2\mu^+$	*L*		<	2.6	$\times 10^{-8}$ CL=90%	909
$K^- e^+ \mu^+$	*L*		<	2.6	$\times 10^{-7}$ CL=90%	919
$K^*(892)^- 2\mu^+$	*L*		<	1.4	$\times 10^{-3}$ CL=90%	765

$D_s^{*\pm}$

$I(J^P) = 0(1^-)$

Mass $m = 2112.2 \pm 0.4$ MeV
$m_{D_s^{*\pm}} - m_{D_s^{\pm}} = 143.8 \pm 0.4$ MeV
Full width $\Gamma < 1.9$ MeV, CL = 90%

D_s^{*-} modes are charge conjugates of the modes below.

D_s^{*+} DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D_s^+ \gamma$	(93.6 ±0.4) %	139
$D_s^+ \pi^0$	(5.77±0.35) %	48
$D_s^+ e^+ e^-$	(6.7 ±1.6) $\times 10^{-3}$	139
$e^+ \nu_e$	(2.1 $^{+1.2}_{-0.9}$) $\times 10^{-5}$	1056

$D_{s0}^*(2317)^{\pm}$

$I(J^P) = 0(0^+)$
J, *P* need confirmation.
J^P is natural, low mass consistent with 0^+.

See the review on "Heavy Non-$q\overline{q}$ Mesons."

Mass $m = 2317.8 \pm 0.5$ MeV
$m_{D^*_{s0}(2317)^\pm} - m_{D^\pm_s} = 349.4 \pm 0.5$ MeV
Full width $\Gamma < 3.8$ MeV, CL = 95%

$D^*_{s0}(2317)^-$ modes are charge conjugates of modes below.

$D^*_{s0}(2317)^\pm$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$D^+_s\pi^0$	$(100^{+\ 0}_{-20})$ %		298
$D^+_s\gamma$	< 5 %	90%	323
$D^*_s(2112)^+\gamma$	< 6 %	90%	–
$D^+_s\gamma\gamma$	< 18 %	95%	323
$D^*_s(2112)^+\pi^0$	< 11 %	90%	–
$D^+_s\pi^+\pi^-$	$< 4 \times 10^{-3}$	90%	194
$D^+_s\pi^0\pi^0$	not seen		205

$D_{s1}(2460)^\pm$

$I(J^P) = 0(1^+)$

See the review on "Heavy Non-$q\overline{q}$ Mesons."
Mass $m = 2459.5 \pm 0.6$ MeV (S = 1.1)
$m_{D_{s1}(2460)^\pm} - m_{D^{*\pm}_s} = 347.3 \pm 0.7$ MeV (S = 1.2)
$m_{D_{s1}(2460)^\pm} - m_{D^\pm_s} = 491.1 \pm 0.6$ MeV (S = 1.1)
Full width $\Gamma < 3.5$ MeV, CL = 95%

$D_{s1}(2460)^-$ modes are charge conjugates of the modes below.

$D_{s1}(2460)^+$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
$D^{*+}_s\pi^0$	(48 ± 11) %		297
$D^+_s\gamma$	(18 ± 4) %		442
$D^+_s\pi^+\pi^-$	(4.3 ± 1.3) %	S=1.1	363
$D^{*+}_s\gamma$	< 8 %	CL=90%	323
$D^*_{s0}(2317)^+\gamma$	$(3.7^{+\ 5.0}_{-\ 2.4})$ %		138

$D_{s1}(2536)^\pm$

$I(J^P) = 0(1^+)$
J, P need confirmation.

Mass $m = 2535.11 \pm 0.06$ MeV
$m_{D_{s1}(2536)^\pm} - m_{D^*_s(2111)} = 422.9 \pm 0.4$ MeV
$m_{D_{s1}(2536)^\pm} - m_{D^*(2010)^\pm} = 524.85 \pm 0.04$ MeV
$m_{D_{s1}(2536)^\pm} - m_{D^*(2007)^0} = 528.26 \pm 0.05$ MeV (S = 1.1)
Full width $\Gamma = 0.92 \pm 0.05$ MeV

Branching fractions are given relative to the one **DEFINED AS 1**.
$D_{s1}(2536)^-$ modes are charge conjugates of the modes below.

$D_{s1}(2536)^+$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$D^*(2010)^+ K^0$	0.85 ±0.12		149
$(D^*(2010)^+ K^0)_{S-wave}$	0.61 ±0.09		149
$K^0_S D^*(2010)^+$	0.48 ±0.07		149
$D^+ \pi^- K^+$	0.028±0.005		176
$D^*(2007)^0 K^+$	**DEFINED AS 1**		167
$D^+ K^0$	<0.34	90%	381
$D^0 K^+$	<0.12	90%	391
$D_s^{*+} \gamma$	possibly seen		388
$D_s^+ \pi^+ \pi^-$	seen		437

$D^*_{s2}(2573)$

$I(J^P) = 0(2^+)$

Mass $m = 2569.1 \pm 0.8$ MeV (S = 2.4)
$m_{D^*_{s2}(2573)} - m_{D^0} = 704 \pm 3.2$ MeV
Full width $\Gamma = 16.9 \pm 0.7$ MeV

$D^*_{s2}(2573)^-$ modes are charge conjugates of the modes below.

$D^*_{s2}(2573)^+$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^0 K^+$	seen	431
$D^*(2007)^0 K^+$	not seen	238
$D^+ K^0_S$	seen	422
$D^{*+} K^0_S$	seen	225

$D^*_{s1}(2700)^\pm$

$I(J^P) = 0(1^-)$

Mass $m = 2714 \pm 5$ MeV (S = 1.5)
Full width $\Gamma = 122 \pm 10$ MeV

$D^*_{s1}(2700)^\pm$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^0 K^+$	seen	579
$D^+ K^0_S$	seen	573
$D^{*0} K^+$	seen	438
$D^{*+} K^0_S$	seen	431

$D_{s3}^{*}(2860)^{\pm}$

$I(J^P) = 0(3^-)$

Mass $m = 2860 \pm 7$ MeV
Full width $\Gamma = 53 \pm 10$ MeV

$D_{s3}^{*}(2860)^{\pm}$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^0 K^+$	seen	710
$D^+ K_S^0$	seen	704
$D^{*0} K^+$	seen	589
$D^{*+} K_S^0$	seen	584

NOTES

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

[*b*] This is the purely e^+ semileptonic branching fraction: the e^+ fraction from τ^+ decays has been subtracted off. The sum of our (non-τ) e^+ exclusive fractions — an $e^+\nu_e$ with an η, η', ϕ, K^0, or K^{*0} — is 5.99 $\pm$ 0.31 %.

[*c*] This fraction includes η from η' decays.

[*d*] The sum of our exclusive η' fractions — $\eta' e^+\nu_e$, $\eta'\mu^+\nu_\mu$, $\eta'\pi^+$, $\eta'\rho^+$, and $\eta' K^+$ — is 11.8 $\pm$ 1.6%.

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

[*f*] A test for $u\overline{u}$ or $d\overline{d}$ content in the D_s^+. Neither Cabibbo-favored nor Cabibbo-suppressed decays can contribute, and $\omega-\phi$ mixing is an unlikely explanation for any fraction above about 2×10^{-4}.

[*g*] 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.

[*h*] We decouple the $D_s^+ \to \phi\pi^+$ branching fraction obtained from mass projections (and used to get some of the other branching fractions) from the $D_s^+ \to \phi\pi^+$, $\phi \to K^+K^-$ branching fraction obtained from the Dalitz-plot analysis of $D_s^+ \to K^+K^-\pi^+$. That is, the ratio of these two branching fractions is not exactly the $\phi \to K^+K^-$ branching fraction 0.491.

[*i*] This is the average of a model-independent and a K-matrix parametrization of the $\pi^+\pi^-$ S-wave and is a sum over several f_0 mesons.

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

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