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 $\tau = (504 \pm 4) \times 10^{-15}$ s (S = 1.2)
$c\tau = 151.2\ \mu$m

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 $D_s^\pm \to K^\pm K_L^0 = (-1.1 \pm 2.7) \times 10^{-2}$
$A_{CP}(K^+K^-\pi^\pm) = (-0.5 \pm 0.9)\%$
$A_{CP}(\phi\pi^\pm) = (-0.38 \pm 0.27)\%$
$A_{CP}(K^\pm K_S^0\pi^0) = (-2 \pm 6)\%$
$A_{CP}(2K_S^0\pi^\pm) = (3 \pm 5)\%$
$A_{CP}(K^+K^-\pi^\pm\pi^0) = (0.0 \pm 3.0)\%$
$A_{CP}(K^\pm K_S^0\pi^+\pi^-) = (-6 \pm 5)\%$
$A_{CP}(K_S^0 K^\mp 2\pi^\pm) = (4.1 \pm 2.8)\%$
$A_{CP}(\pi^+\pi^-\pi^\pm) = (-0.7 \pm 3.1)\%$
$A_{CP}(\pi^\pm\eta) = (0.3 \pm 0.4)\%$
$A_{CP}(\pi^\pm\eta') = (-0.9 \pm 0.5)\%$
$A_{CP}(\eta\pi^\pm\pi^0) = (-1 \pm 4)\%$
$A_{CP}(\eta'\pi^\pm\pi^0) = (0 \pm 8)\%$
$A_{CP}(K^\pm\pi^0) = (2 \pm 4)\%$ (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 $D_s^\pm \to K_S^0\pi^+\pi^0 = (3 \pm 6)\%$
$A_{CP}(K^\pm\pi^+\pi^-\pi^0)$ 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

$A_T(K^0_S K^\pm \pi^+ \pi^-) = (-14 \pm 8) \times 10^{-3}$ [a]

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

$r_2 = 0.84 \pm 0.11$ (S = 2.4)
$r_v = 1.80 \pm 0.08$
$\Gamma_L/\Gamma_T = 0.72 \pm 0.18$
$f_+(0)\,|V_{cs}|$ in $D_s^+ \to \eta e^+ \nu_e = 0.446 \pm 0.007$
$f_+(0)\,|V_{cs}|$ in $D_s^+ \to \eta' e^+ \nu_e = 0.48 \pm 0.05$
$f_+(0)|V_{cd}|$ 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 $D_s^+ \to \mu^+ \nu_\mu = 243 \pm 5$ MeV
$f_{D_s^+}\,|V_{cs}|$ in $D_s^+ \to \tau^+ \nu_\tau = 245.3 \pm 3.0$ 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^0_S 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) %		–
$K^0_S K^+$ anything		(5.8 ±0.5) %		–
$K^0_S K^-$ anything		(1.9 ±0.4) %		–
$2K^0_S$ anything		(1.70 ±0.32) %		–
$2K^+$ anything		< 2.6	$\times 10^{-3}$ CL=90%	–
$2K^-$ anything		< 6	$\times 10^{-4}$ CL=90%	–

Leptonic and semileptonic modes

$e^+\nu_e$		<	8.3		$\times 10^{-5}$	CL=90%	984
$\mu^+\nu_\mu$		(	5.43	±0.15)	$\times 10^{-3}$		981
$\tau^+\nu_\tau$		(	5.32	±0.11)	%		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
$\phi\mu^+\nu_\mu$		(	1.9	±0.5)	%		715
$\eta e^+\nu_e$ + $\eta'(958)e^+\nu_e$	[e]	(	3.03	±0.24)	%		–
$\eta e^+\nu_e$	[e]	(	2.32	±0.08)	%		908
$\eta'(958)e^+\nu_e$	[e]	(	8.0	±0.7)	$\times 10^{-3}$		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)	$\times 10^{-4}$		–
$a_0(980)^0 e^+\nu_e$, $a_0(980)^0 \to \pi^0\eta$		<	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)	$\times 10^{-3}$		218

$K^+\overline{K}^*(1410)^0,\ \overline{K}^*_0 \to$ $K^0_S\pi^0$		(8.8	$\pm$2.8) $\times 10^{-4}$			–
$K^+K^0_S\pi^0$		(1.47	$\pm$0.07) %			805
$2K^0_S\pi^+$		(7.1	$\pm$0.4) $\times 10^{-3}$		S=1.3	802
$f_0(980)\pi^+,\ f_0 \to\ K^0_SK^0_S$		< 1.8		$\times 10^{-4}$	CL=90%	–
$f_0(1710)\pi^+,\ f_0 \to\ K^0_SK^0_S$		(3.3	$\pm$0.4) $\times 10^{-3}$			–
$K^0\overline{K}^0\pi^+$			—			802
$K^*(892)^+\overline{K}^0$	[e]	(5.4	$\pm$1.2) %			683
$K^*(892)^+K^0_S$		(3.09	$\pm$0.33) $\times 10^{-3}$			683
$K^*(892)^+K^0_S,\ K^{*+} \to$ $K^+\pi^0$		(2.04	$\pm$0.33) $\times 10^{-3}$			–
$K^+K^-\pi^+\pi^0$		(5.50	$\pm$0.24) %		S=1.3	748
$\phi\rho^+$	[e]	(5.59	$\pm$0.34) %			401
$\overline{K}_1(1270)^0K^+,$ $\overline{K}_1(1270)^0 \to\ K^-\rho^+$		(5.7	$\pm$0.6) $\times 10^{-3}$			–
$\overline{K}_1(1270)^0K^+,$ $\overline{K}_1(1270)^0 \to\ K^*(892)\pi$		(1.31	$\pm$0.25) %			–
$\overline{K}_1(1400)^0K^+,$ $\overline{K}_1(1400)^0 \to\ K^*(892)\pi$		(2.0	$\pm$0.4) %			–
$a_0(980)^0\rho^+,\ a_0(980)^0 \to$ K^+K^-		(1.9	$\pm$0.4) $\times 10^{-3}$			–
$f_1(1420)^0\pi^+,\ f_1(1420)^0 \to$ $K^*(892)^\mp K^\pm$		(3.9	$\pm$0.7) $\times 10^{-3}$			–
$f_1(1420)^0\pi^+,\ f_1(1420)^0 \to$ $a_0(980)^0\pi^0,\ a_0(980)^0 \to$ K^+K^-		(4.0	$\pm$1.4) $\times 10^{-4}$			–
$\eta(1475)\pi^+,\ \eta(1475) \to$ $a_0(980)^0\pi^0,\ a_0(980)^0 \to$ K^+K^-		(7.0	$\pm$2.8) $\times 10^{-4}$			–
$K^0_SK^-2\pi^+$		(1.53	$\pm$0.08) %		S=1.5	744
$K^*(892)^+\overline{K}^*(892)^0$	[e]	(5.64	$\pm$0.35) %			417
$\eta(1475)K^0_S,\ \eta \to$ $K^*(892)^0\pi^+,\ K^{*0} \to$ $K^-\pi^+$		(3.4	$\pm$1.0) $\times 10^{-4}$			–
$\eta(1475)\pi^+,\ \eta \to$ $\overline{K}^*(892)^+K^-,\ \overline{K}^{*+} \to$ $K^0_S\pi^+$		(3.4	$\pm$1.0) $\times 10^{-4}$			–
$\eta(1475)\pi^+,\ \eta \to$ $a_0(980)^-\pi^+,\ a_0^- \to$ $K^0_SK^-$		(1.7	$\pm$0.9) $\times 10^{-3}$			–
$f_1(1285)\pi^+,\ f_1 \to$ $a_0(980)^-\pi^+,\ a_0^- \to$ $K^0_SK^-$		(3.4	$\pm$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-ρ, $\phi \to K^+ K^-$		(	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
$\rho^0 \pi^+$		(	1.2	± 0.6) $\times 10^{-4}$			825
$\pi^+ (\pi^+ \pi^-)_{S-\text{wave}}$	[i]	(	9.0	± 0.4) $\times 10^{-3}$			959
$f_2(1270)\pi^+$, $f_2 \to \pi^+ \pi^-$		(	1.11	± 0.12) $\times 10^{-3}$			559
$\rho(1450)^0 \pi^+$, $\rho^0 \to \pi^+ \pi^-$		(	1.6	± 0.7) $\times 10^{-4}$			421
$\pi^+ 2\pi^0$		(	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
$3\pi^+ 2\pi^-$		(	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
$a_1(1260)^+ \eta$, $a_1^+ \to \rho(770)^0 \pi^+$, $\rho^0 \to \pi^+ \pi^-$		(	1.73	± 0.16) %			–
$a_1(1260)^+ \eta$, $a_1^+ \to f_0(500)\pi^+$, $f_0 \to \pi^+ \pi^-$		(	2.5	± 0.9) $\times 10^{-3}$			–
$a_0(980)^+ \rho(770)^0$, $a_0^+ \to \eta \pi^+$		(	2.1	± 0.9) $\times 10^{-3}$			–

$\eta(1405)\pi^+$, $\eta(1405) \to$ $a_0(980)^-\pi^+$, $a_0^- \to$ $\eta\pi^-$		(	2.2	± 0.7) $\times 10^{-4}$			–
$\eta(1405)\pi^+$, $\eta(1405) \to$ $a_0(980)^+\pi^-$, $a_0^+ \to$ $\eta\pi^+$		(	2.2	± 0.7) $\times 10^{-4}$			–
$f_1(1420)\pi^+$, $f_1 \to$ $a_0(980)^-\pi^+$, $a_0^- \to$ $\eta\pi^-$		(	5.9	± 1.8) $\times 10^{-4}$			–
$f_1(1420)\pi^+$, $f_1 \to$ $a_0(980)^+\pi^-$, $a_0^+ \to$ $\eta\pi^+$		(	5.3	± 1.8) $\times 10^{-4}$			–
$3\pi^+2\pi^-\pi^0$		(	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]	<	2.13		%	CL=90%	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) $\times 10^{-3}$			–
$K^*(892)^0\pi^+$, $K^{*0} \to$ $K^+\pi^-$		(	1.67	± 0.26) $\times 10^{-3}$			775
$K^*(1410)^0\pi^+$, $K^{*0} \to$ $K^+\pi^-$		(	6	± 4) $\times 10^{-4}$			–
$K^*(1430)^0\pi^+$, $K^{*0} \to$ $K^+\pi^-$		(	9.3	± 3.1) $\times 10^{-4}$			–
$K^+\pi^+\pi^-$ nonresonant		(	9.9	± 3.2) $\times 10^{-4}$			900
$K^0\pi^+\pi^0$		(	1.08	± 0.06) %			899
$K^0_S 2\pi^+\pi^-$		(	2.8	± 1.0) $\times 10^{-3}$			870
$K^+\pi^+\pi^-\pi^0$		(	9.7	± 0.6) $\times 10^{-3}$			873
$K^*(892)^0\rho^+$, $K^{*0} \to$ $K^+\pi^-$		(	3.9	± 0.4) $\times 10^{-3}$			–

$K^*(892)^+\rho^0$, $K^{*+}\to K^+\pi^0$			(4.2	±1.2)	$\times10^{-4}$		–
$K_1(1270)^0\pi^+$, $K_1^0\to K^+\rho^-$			(3.9	±1.3)	$\times10^{-4}$		†
$K_1(1400)^0\pi^+$, $K_1^0\to K^*(890)^+\pi^-$, $K^{*+}\to K^+\pi^0$			(5.4	±0.9)	$\times10^{-4}$		–
$K_1(1400)^0\pi^+$, $K_1^0\to K^*(890)^0\pi^0$, $K^{*0}\to K^+\pi^-$			(5.9	±1.0)	$\times10^{-4}$		–
$K^+a_1(1260)^0$, $a_1\to\rho^+\pi^-$			(1.8	±1.1)	$\times10^{-4}$		–
$K^+a_1(1260)^0$, $a_1\to\rho^-\pi^+$			(1.8	±1.1)	$\times10^{-4}$		–
$K^+\pi^+\pi^-\pi^0$ nonresonant			(9.2	±2.4)	$\times10^{-4}$		873
$(K^+\pi^0)_{P-wave}\rho^0$			(1.01	±0.21)	$\times10^{-3}$		688
$K^+\omega\pi^0$		[e] <	8.2		$\times10^{-3}$	CL=90%	684
$K^+\omega\pi^+\pi^-$		[e] <	5.4		$\times10^{-3}$	CL=90%	603
$K^+\omega\eta$		[e] <	7.9		$\times10^{-3}$	CL=90%	366
$2K^+K^-$			(2.15	±0.20)	$\times10^{-4}$		628
ϕK^+, $\phi\to K^+K^-$			(8.8	±2.0)	$\times10^{-5}$		–
Doubly Cabibbo-suppressed modes							
$2K^+\pi^-$			(1.274	±0.031)	$\times10^{-4}$		805
$K^+K^*(892)^0$, $K^{*0}\to K^+\pi^-$			(6.0	±3.4)	$\times10^{-5}$		–
Baryon-antibaryon mode							
$p\overline{n}$			(1.22	±0.11)	$\times10^{-3}$		295
$p\overline{p}e^+\nu_e$		<	2.0		$\times10^{-4}$	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		$\times10^{-6}$	CL=90%	979
$\pi^+\phi$, $\phi\to e^+e^-$		[k]	(6	$^{+8}_{-4}$)	$\times10^{-6}$		–
$\pi^+\mu^+\mu^-$		[j] <	1.8		$\times10^{-7}$	CL=90%	968
$K^+e^+e^-$	$C1$	<	3.7		$\times10^{-6}$	CL=90%	922
$K^+\mu^+\mu^-$	$C1$	<	1.4		$\times10^{-7}$	CL=90%	909
$K^*(892)^+\mu^+\mu^-$	$C1$	<	1.4		$\times10^{-3}$	CL=90%	765
$\pi^+e^+\mu^-$	LF	<	1.1		$\times10^{-6}$	CL=90%	976
$\pi^+e^-\mu^+$	LF	<	9.4		$\times10^{-7}$	CL=90%	976
$K^+e^+\mu^-$	LF	<	7.9		$\times10^{-7}$	CL=90%	919
$K^+e^-\mu^+$	LF	<	5.6		$\times10^{-7}$	CL=90%	919
π^-2e^+	L	<	1.4		$\times10^{-6}$	CL=90%	979
$\pi^-2\mu^+$	L	<	8.6		$\times10^{-8}$	CL=90%	968
$\pi^-e^+\mu^+$	L	<	6.3		$\times10^{-7}$	CL=90%	976
K^-2e^+	L	<	7.7		$\times10^{-7}$	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

$D_s^{*\pm}$

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

J^P is natural, width and decay modes consistent with 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)
$D_s^+ \gamma$	(93.5±0.7) %	139
$D_s^+ \pi^0$	(5.8±0.7) %	48
$D_s^+ e^+ e^-$	(6.7±1.6) $\times 10^{-3}$	139

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

$I(J^P) = 0(0^+)$
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
$m_{D_{s0}^*(2317)^{\pm}} - m_{D_s^{\pm}} = 349.4 \pm 0.5$ 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)
$m_{D_{s1}(2460)^{\pm}} - m_{D_s^{*\pm}} = 347.3 \pm 0.7$ MeV (S = 1.2)
$m_{D_{s1}(2460)^{\pm}} - m_{D_s^{\pm}} = 491.1 \pm 0.6$ 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 = 1.2)
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
$D^+\pi^-K^+$	0.028±0.005		176
$D^*(2007)^0K^+$	**DEFINED AS 1**		167
D^+K^0	<0.34	90%	381
D^0K^+	<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
$D^+ K^0_S$	seen	704
$D^{*0} K^+$	seen	589
$D^{*+} K^0_S$	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 ± 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 ± 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.