CHARMED, STRANGE MESONS
$(C = S = \pm 1)$

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

$D_s^{\pm}$ was $F^{\pm}$

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

Mass $m = 1968.5 \pm 0.6$ MeV $(S = 1.1)$

$m_{D_s^{\pm}} - m_{D^{\pm}} = 99.2 \pm 0.5$ MeV $(S = 1.1)$

Mean life $\tau = (490 \pm 9) \times 10^{-15}$ s $(S = 1.1)$

$c\tau = 147.0$ μm

D_s^+ form factors

$r_2 = 1.60 \pm 0.24$

$r_v = 1.92 \pm 0.32$

$\Gamma_L/\Gamma_T = 0.72 \pm 0.18$

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				
K^- anything		$(13 \, {}^{+14}_{-12})\%$		–
$\overline{K}^0$ anything $+ K^0$ anything		$(39 \pm 28)\%$		–
K^+ anything		$(20 \, {}^{+18}_{-14})\%$		–
non-$K\overline{K}$ anything		$(64 \pm 17)\%$		–
e^+ anything		$(8 \, {}^{+6}_{-5})\%$		–
ϕ anything		$(18 \, {}^{+15}_{-10})\%$		–
Leptonic and semileptonic modes				
$\mu^+ \nu_\mu$		$(5.1 \pm 1.9) \times 10^{-3}$	S=1.2	981
$\tau^+ \nu_\tau$		$(6.4 \pm 1.5)\%$		182
$\phi \ell^+ \nu_\ell$	[zz]	$(2.0 \pm 0.5)\%$		–
$\eta \ell^+ \nu_\ell + \eta'(958)\ell^+ \nu_\ell$	[zz]	$(3.5 \pm 1.0)\%$		–
$\eta \ell^+ \nu_\ell$	[zz]	$(2.6 \pm 0.7)\%$		–
$\eta'(958)\ell^+ \nu_\ell$	[zz]	$(9.1 \pm 3.4) \times 10^{-3}$		–

Hadronic modes with a $K\overline{K}$ pair (including from a ϕ)

$K^+\overline{K}^0$		(3.6 ± 1.1) %		850
$K^+K^-\pi^+$	[rr]	(4.4 ± 1.2) %		805
$\phi\pi^+$	[aaa]	(3.6 ± 0.9) %		712
$K^+\overline{K}^*(892)^0$	[aaa]	(3.3 ± 0.9) %		682
$f_0(980)\pi^+$	[bbb]	(4.9 ± 2.3) $\times 10^{-3}$		732
$\quad \times B(f_0 \to K^+K^-)$				
$K^+\overline{K}_0^*(1430)^0$	[aaa]	(7 ± 4) $\times 10^{-3}$		186
$K^+K^-\pi^+$ nonresonant		(9 ± 4) $\times 10^{-3}$		805
$K^0\overline{K}^0\pi^+$		—		802
$K^*(892)^+\overline{K}^0$	[aaa]	(4.3 ± 1.4) %		683
$K^+K^-\pi^+\pi^0$		—		748
$\phi\pi^+\pi^0$	[aaa]	(9 ± 5) %		687
$\phi\rho^+$	[aaa]	(6.7 ± 2.3) %		407
$\phi\pi^+\pi^0$ 3-body	[aaa]	< 2.6 %	CL=90%	687
$K^+K^-\pi^+\pi^0$ non-ϕ		< 9 %	CL=90%	748
$K^+\overline{K}^0\pi^+\pi^-$		(2.5 ± 0.9) %		744
$K^0K^-\pi^+\pi^+$		(4.3 ± 1.5) %		744
$K^*(892)^+\overline{K}^*(892)^0$	[aaa]	(5.8 ± 2.5) %		412
$K^0K^-\pi^+\pi^+$ non-$K^{*+}\overline{K}^{*0}$		< 2.9 %	CL=90%	744
$K^+K^-\pi^+\pi^+\pi^-$		(8.4 ± 3.3) $\times 10^{-3}$		673
$\phi\pi^+\pi^+\pi^-$	[aaa]	(1.18± 0.35) %		640

Hadronic modes without K's

$\pi^+\pi^+\pi^-$		(1.01± 0.28) %	S=1.1	959
$\rho^0\pi^+$		< 7 $\times 10^{-4}$	CL=90%	827
$f_0(980)\pi^+$	[tt]	(5.7 ± 1.7) $\times 10^{-3}$		732
$\quad \times B(f_0 \to \pi^+\pi^-)$				
$f_2(1270)\pi^+$	[aaa]	(3.5 ± 1.2) $\times 10^{-3}$		559
$f_0(1370)\pi^+$	[tt]	(3.3 ± 1.2) $\times 10^{-3}$		—
$\quad \times B(f_0 \to \pi^+\pi^-)$				
$\rho(1450)^0\pi^+$	[tt]	(4.4 ± 2.5) $\times 10^{-4}$		—
$\quad \times B(\rho^0 \to \pi^+\pi^-)$				
$\pi^+\pi^+\pi^-$ nonresonant		(5 ±22) $\times 10^{-5}$		959
$\pi^+\pi^+\pi^-\pi^0$		< 12 %	CL=90%	935
$\eta\pi^+$	[aaa]	(1.7 ± 0.5) %		902
$\omega\pi^+$	[aaa]	(2.8 ± 1.1) $\times 10^{-3}$		822
$\pi^+\pi^+\pi^+\pi^-\pi^-$		(7.0 ± 3.0) $\times 10^{-3}$		899
$\pi^+\pi^+\pi^-\pi^0\pi^0$		—		902
$\eta\rho^+$	[aaa]	(10.8 ± 3.1) %		727

$\eta\pi^+\pi^0$ 3-body	[aaa]	< 4	%	CL=90%	886
$\pi^+\pi^+\pi^+\pi^-\pi^-\pi^0$		(4.9 ± 3.2) %			856
$\eta'(958)\pi^+$	[aaa]	(3.9 ± 1.0) %			743
$\pi^+\pi^+\pi^+\pi^-\pi^-\pi^0\pi^0$		—			803
$\eta'(958)\rho^+$	[aaa]	(10.1 ± 2.8) %			470
$\eta'(958)\pi^+\pi^0$ 3-body	[aaa]	< 1.4	%	CL=90%	720

Modes with one or three K's

$K^0\pi^+$		< 8	$\times 10^{-3}$	CL=90%	916
$K^+\pi^+\pi^-$		(1.0 ± 0.4) %			900
$K^+\rho^0$		< 2.9	$\times 10^{-3}$	CL=90%	747
$K^*(892)^0\pi^+$	[aaa]	(6.5 ± 2.8) $\times 10^{-3}$			773
$K^+K^+K^-$		< 6	$\times 10^{-4}$	CL=90%	628
ϕK^+	[aaa]	< 5	$\times 10^{-4}$	CL=90%	607

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

$\pi^+e^+e^-$		[uu]	< 2.7	$\times 10^{-4}$	CL=90%	979
$\pi^+\mu^+\mu^-$		[uu]	< 1.4	$\times 10^{-4}$	CL=90%	968
$K^+e^+e^-$	C1		< 1.6	$\times 10^{-3}$	CL=90%	922
$K^+\mu^+\mu^-$	C1		< 1.4	$\times 10^{-4}$	CL=90%	909
$K^*(892)^+\mu^+\mu^-$	C1		< 1.4	$\times 10^{-3}$	CL=90%	765
$\pi^+e^\pm\mu^\mp$	LF	[ff]	< 6.1	$\times 10^{-4}$	CL=90%	976
$K^+e^\pm\mu^\mp$	LF	[ff]	< 6.3	$\times 10^{-4}$	CL=90%	919
$\pi^-e^+e^+$	L		< 6.9	$\times 10^{-4}$	CL=90%	979
$\pi^-\mu^+\mu^+$	L		< 8.2	$\times 10^{-5}$	CL=90%	968
$\pi^-e^+\mu^+$	L		< 7.3	$\times 10^{-4}$	CL=90%	976
$K^-e^+e^+$	L		< 6.3	$\times 10^{-4}$	CL=90%	922
$K^-\mu^+\mu^+$	L		< 1.8	$\times 10^{-4}$	CL=90%	909
$K^-e^+\mu^+$	L		< 6.8	$\times 10^{-4}$	CL=90%	919
$K^*(892)^-\mu^+\mu^+$	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 $m = 2112.4 \pm 0.7$ MeV (S = 1.1)

$m_{D_s^{*\pm}} - m_{D_s^{\pm}} = 143.8 \pm 0.4$ 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)
$D_s^+ \gamma$	(94.2 ± 2.5) %	139
$D_s^+ \pi^0$	(5.8 ± 2.5) %	48

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

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

Mass $m = 2535.35 \pm 0.34 \pm 0.5$ MeV

Full width $\Gamma < 2.3$ MeV, CL = 90%

$D_{s1}(2536)^-$ modes are charge conjugates of the modes below.

$D_{s1}(2536)^+$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^*(2010)^+ K^0$	seen	150
$D^*(2007)^0 K^+$	seen	169
$D^+ K^0$	not seen	382
$D^0 K^+$	not seen	392
$D_s^{*+} \gamma$	possibly seen	389

$D_{sJ}(2573)^\pm$

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

J^P is natural, width and decay modes consistent with 2^+.

Mass $m = 2572.4 \pm 1.5$ MeV

Full width $\Gamma = 15^{+5}_{-4}$ MeV

$D_{sJ}(2573)^-$ modes are charge conjugates of the modes below.

$D_{sJ}(2573)^+$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^0 K^+$	seen	436
$D^*(2007)^0 K^+$	not seen	245