CHARMED, STRANGE MESONS ($C = S = \pm1$)

$D_s^+ = c\overline{s}$, $D_s^- = \overline{c}s$, 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 $\tau = (0.467 \pm 0.017) \times 10^{-12}$ s
$c\tau = 140$ μm

D_s^+ form factors

$r_2 = 1.6 \pm 0.4$
$r_v = 1.5 \pm 0.5$
$\Gamma_L/\Gamma_T = 0.72 \pm 0.18$

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 ± 28) %		–
K^+ anything		$(20\ ^{+18}_{-14})$ %		–
non-$K\overline{K}$ anything		(64 ± 17) %		–
e^+ anything		$(8\ ^{+6}_{-5})$ %		–
ϕ anything		$(18\ ^{+15}_{-10})$ %		–
Leptonic and semileptonic modes				
$\mu^+\nu_\mu$		$(4.0\ ^{+2.2}_{-2.0}) \times 10^{-3}$	S=1.4	981
$\tau^+\nu_\tau$		(7 ± 4) %		182
$\phi\ell^+\nu_\ell$	[xx]	(2.0 ± 0.5) %		–
$\eta\ell^+\nu_\ell + \eta'(958)\ell^+\nu_\ell$	[xx]	(3.4 ± 1.0) %		–
$\eta\ell^+\nu_\ell$		(2.5 ± 0.7) %		–
$\eta'(958)\ell^+\nu_\ell$		$(8.8 \pm 3.4) \times 10^{-3}$		–

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

$K^+\overline{K}^0$		(3.6 ± 1.1) %		850
$K^+K^-\pi^+$	[qq]	(4.4 ± 1.2) %	S=1.1	805
$\phi\pi^+$	[yy]	(3.6 ± 0.9) %		712
$K^+\overline{K}^*(892)^0$	[yy]	(3.3 ± 0.9) %		682
$f_0(980)\pi^+$	[yy]	(1.8 ± 0.8) %	S=1.3	732
$K^+\overline{K}^*_0(1430)^0$	[yy]	(7 ± 4) $\times 10^{-3}$		186
$f_J(1710)\pi^+ \to K^+K^-\pi^+$	[zz]	(1.5 ± 1.9) $\times 10^{-3}$		204
$K^+K^-\pi^+$ nonresonant		(9 ± 4) $\times 10^{-3}$		805
$K^0\overline{K}^0\pi^+$		—		802
$K^*(892)^+\overline{K}^0$	[yy]	(4.3 ± 1.4) %		683
$K^+K^-\pi^+\pi^0$		—		748
$\phi\pi^+\pi^0$	[yy]	(9 ± 5) %		687
$\phi\rho^+$	[yy]	(6.7 ± 2.3) %		407
$\phi\pi^+\pi^0$ 3-body	[yy]	< 2.6 %	CL=90%	687
$K^+K^-\pi^+\pi^0$ non-ϕ		< 9 %	CL=90%	748
$K^+\overline{K}^0\pi^+\pi^-$		< 2.8 %	CL=90%	744
$K^0K^-\pi^+\pi^+$		(4.3 ± 1.5) %		744
$K^*(892)^+\overline{K}^*(892)^0$	[yy]	(5.8 ± 2.5) %		412
$K^0K^-\pi^+\pi^+$ non-$K^{*+}\overline{K}^{*0}$		< 2.9 %	CL=90%	744
$K^+K^-\pi^+\pi^+\pi^-$		(8.3 ± 3.3) $\times 10^{-3}$		673
$\phi\pi^+\pi^+\pi^-$	[yy]	(1.18 ± 0.35) %		640
$K^+K^-\pi^+\pi^+\pi^-$ non-ϕ		($3.0^{+3.0}_{-2.0}$) $\times 10^{-3}$		673

Hadronic modes without K's

$\pi^+\pi^+\pi^-$		(1.0 ± 0.4) %	S=1.2	959
$\rho^0\pi^+$		< 8 $\times 10^{-4}$	CL=90%	827
$f_0(980)\pi^+$	[yy]	(1.8 ± 0.8) %	S=1.7	732
$f_2(1270)\pi^+$	[yy]	(2.3 ± 1.3) $\times 10^{-3}$		559
$f_0(1500)\pi^+ \to \pi^+\pi^-\pi^+$	[aaa]	(2.8 ± 1.6) $\times 10^{-3}$		391
$\pi^+\pi^+\pi^-$ nonresonant		< 2.8 $\times 10^{-3}$	CL=90%	959
$\pi^+\pi^+\pi^-\pi^0$		< 12 %	CL=90%	935
$\eta\pi^+$	[yy]	(2.0 ± 0.6) %		902
$\omega\pi^+$	[yy]	(3.1 ± 1.4) $\times 10^{-3}$		822
$\pi^+\pi^+\pi^+\pi^-\pi^-$		(6.9 ± 3.0) $\times 10^{-3}$		899
$\pi^+\pi^+\pi^-\pi^0\pi^0$		—		902
$\eta\rho^+$	[yy]	(10.3 ± 3.2) %		727
$\eta\pi^+\pi^0$ 3-body	[yy]	< 3.0 %	CL=90%	886
$\pi^+\pi^+\pi^+\pi^-\pi^-\pi^0$		(4.9 ± 3.2) %		856
$\eta'(958)\pi^+$	[yy]	(4.9 ± 1.8) %		743
$\pi^+\pi^+\pi^+\pi^-\pi^-\pi^0\pi^0$		—		803
$\eta'(958)\rho^+$	[yy]	(12 ± 4) %		470
$\eta'(958)\pi^+\pi^0$ 3-body	[yy]	< 3.1 %	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
$K^*(892)^0 \pi^+$		[yy]	(6.5 ± 2.8)	$\times 10^{-3}$		773
$K^+ K^+ K^-$			< 6	$\times 10^{-4}$	CL=90%	628
ϕK^+		[yy]	< 5	$\times 10^{-4}$	CL=90%	607

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

$\pi^+ \mu^+ \mu^-$		[ss]	< 4.3	$\times 10^{-4}$	CL=90%	968
$K^+ \mu^+ \mu^-$	*C1*		< 5.9	$\times 10^{-4}$	CL=90%	909
$K^*(892)^+ \mu^+ \mu^-$	*C1*		< 1.4	$\times 10^{-3}$	CL=90%	765
$\pi^- \mu^+ \mu^+$	*L*		< 4.3	$\times 10^{-4}$	CL=90%	968
$K^- \mu^+ \mu^+$	*L*		< 5.9	$\times 10^{-4}$	CL=90%	909
$K^*(892)^- \mu^+ \mu^+$	*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 $m = 2573.5 \pm 1.7$ 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