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 $\tau = (490 \pm 9) \times 10^{-15}$ s (S = 1.1)
$c\tau = 147.0\ \mu$m

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)

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

Hadronic modes without K's

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

$\eta \pi^+ \pi^0$ 3-body		[aaa]	$<$ 4	%	CL=90%	886
$\pi^+ \pi^+ \pi^+ \pi^- \pi^- \pi^0$			(4.9 $\pm$ 3.2)	%		856
$\eta'(958) \pi^+$		[aaa]	(3.9 $\pm$ 1.0)	%		743
$\pi^+ \pi^+ \pi^+ \pi^- \pi^- \pi^0 \pi^0$			—			803
$\eta'(958) \rho^+$		[aaa]	(10.1 $\pm$ 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 $\pm$ 0.4)	%		900
$K^+ \rho^0$			$<$ 2.9	$\times 10^{-3}$	CL=90%	747
$K^*(892)^0 \pi^+$		[aaa]	(6.5 $\pm$ 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
$D_s^+\pi^0$	$(\ 5.8\pm2.5)$ %	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
$D^*(2007)^0K^+$	seen	169
D^+K^0	not seen	382
D^0K^+	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^0K^+	seen	436
$D^*(2007)^0K^+$	not seen	245