

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

$$D_s^+ = c\bar{s}, D_s^- = \bar{c}s, \text{ similarly for } D_s^{*+}s$$

NODE=MXXX040

 $D_s^\pm$ 

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

$$\text{Mass } m = 1968.49 \pm 0.32 \text{ MeV} \quad (S = 1.3)$$

$$m_{D_s^\pm} - m_{D^\pm} = 98.87 \pm 0.29 \text{ MeV} \quad (S = 1.4)$$

$$\text{Mean life } \tau = (500 \pm 7) \times 10^{-15} \text{ s} \quad (S = 1.3)$$

$$c\tau = 149.9 \mu\text{m}$$

### CP-violating decay-rate asymmetries

$$A_{CP}(\mu^\pm \nu) = (5 \pm 6)\%$$

$$A_{CP}(K^\pm K_S^0) = (0.3 \pm 0.4)\%$$

$$A_{CP}(K^+ K^- \pi^\pm) = (0.3 \pm 1.4)\%$$

$$A_{CP}(K^+ K^- \pi^\pm \pi^0) = (-6 \pm 4)\%$$

$$A_{CP}(K_S^0 K^\mp 2\pi^\pm) = (-1 \pm 4)\%$$

$$A_{CP}(\pi^+ \pi^- \pi^\pm) = (2 \pm 5)\%$$

$$A_{CP}(\pi^\pm \eta) = (-4.6 \pm 2.9)\%$$

$$A_{CP}(\pi^\pm \eta') = (-6.1 \pm 3.0)\%$$

$$A_{CP}(K^\pm \pi^0) = (-27 \pm 24)\%$$

$$A_{CP}(K_S^0 \pi^\pm) = (6.6 \pm 3.3)\% \quad (S = 1.4)$$

$$A_{CP}(K^\pm \pi^+ \pi^-) = (11 \pm 7)\%$$

$$A_{CP}(K^\pm \eta) = (9 \pm 15)\%$$

$$A_{CP}(K^\pm \eta'(958)) = (6 \pm 19)\%$$

### T-violating decay-rate asymmetry

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

### $D_s^+ \rightarrow \phi \ell^+ \nu_\ell$ form factors

$$r_2 = 0.84 \pm 0.11 \quad (S = 2.4)$$

$$r_V = 1.80 \pm 0.08$$

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

NODE=S034

NODE=S034M;DTYPE=M

NODE=S034DM;DTYPE=D

NODE=S034T;DTYPE=T

NODE=S034CTA;DTYPE=C;OUR EVAL

CLUMP=P

NODE=S034A13;DTYPE=v;CLUMP=P

NODE=S034A05;DTYPE=v;CLUMP=P

NODE=S034A06;DTYPE=v;CLUMP=P

NODE=S034A07;DTYPE=v;CLUMP=P

NODE=S034A08;DTYPE=v;CLUMP=P

NODE=S034A09;DTYPE=v;CLUMP=P

NODE=S034A10;DTYPE=v;CLUMP=P

NODE=S034A11;DTYPE=v;CLUMP=P

NODE=S034A01;DTYPE=v;CLUMP=P

NODE=S034A02;DTYPE=v;CLUMP=P

NODE=S034A12;DTYPE=v;CLUMP=P

NODE=S034A03;DTYPE=v;CLUMP=P

NODE=S034A04;DTYPE=v;CLUMP=P

CLUMP=T

NODE=S034TV0;DTYPE=t;CLUMP=T

CLUMP=F

NODE=S034FR2;DTYPE=f;CLUMP=F

NODE=S034FRV;DTYPE=f;CLUMP=F

NODE=S034GLT;DTYPE=f;CLUMP=F

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.

NODE=S034215;NODE=S034

$D_S^+$ DECAY MODES	Fraction ( $\Gamma_i/\Gamma$ )	Scale factor/ Confidence level	$p$ (MeV/c)	
<b>Inclusive modes</b>				
$e^+$ semileptonic	[b] ( 6.5 $\pm$ 0.4 ) %		—	NODE=S034;CLUMP=D DESIG=25
$\pi^+$ anything	(119.3 $\pm$ 1.4 ) %		—	DESIG=133
$\pi^-$ anything	( 43.2 $\pm$ 0.9 ) %		—	DESIG=134
$\pi^0$ anything	(123 $\pm$ 7 ) %		—	DESIG=135
$K^-$ anything	( 18.7 $\pm$ 0.5 ) %		—	DESIG=32
$K^+$ anything	( 28.9 $\pm$ 0.7 ) %		—	DESIG=33
$K_S^0$ anything	( 19.0 $\pm$ 1.1 ) %		—	DESIG=138
$\eta$ anything	[c] ( 29.9 $\pm$ 2.8 ) %		—	DESIG=2
$\omega$ anything	( 6.1 $\pm$ 1.4 ) %		—	DESIG=136
$\eta'$ anything	[d] ( 11.7 $\pm$ 1.8 ) %		—	DESIG=117
$f_0(980)$ anything, $f_0 \rightarrow \pi^+ \pi^-$	< 1.3 %	CL=90%	—	DESIG=137
$\phi$ anything	( 15.7 $\pm$ 1.0 ) %		—	DESIG=92
$K^+ K^-$ anything	( 15.8 $\pm$ 0.7 ) %		—	DESIG=139
$K_S^0 K^+$ anything	( 5.8 $\pm$ 0.5 ) %		—	DESIG=140
$K_S^0 K^-$ anything	( 1.9 $\pm$ 0.4 ) %		—	DESIG=141
$2K_S^0$ anything	( 1.70 $\pm$ 0.32 ) %		—	DESIG=142
$2K^+$ anything	< 2.6 $\times 10^{-3}$	CL=90%	—	DESIG=143
$2K^-$ anything	< 6 $\times 10^{-4}$	CL=90%	—	DESIG=144
<b>Leptonic and semileptonic modes</b>				
$e^+ \nu_e$	< 1.2 $\times 10^{-4}$	CL=90%	984	NODE=S034;CLUMP=C DESIG=118
$\mu^+ \nu_\mu$	( 5.90 $\pm$ 0.33 ) $\times 10^{-3}$		981	DESIG=7
$\tau^+ \nu_\tau$	( 5.43 $\pm$ 0.31 ) %		182	DESIG=89
$K^+ K^- e^+ \nu_e$	—		851	DESIG=125;OUR EVAL
$\phi e^+ \nu_e$	[e] ( 2.49 $\pm$ 0.14 ) %		720	DESIG=30
$\eta e^+ \nu_e + \eta'(958) e^+ \nu_e$	[e] ( 3.66 $\pm$ 0.37 ) %		—	DESIG=85;OUR EVAL
$\eta e^+ \nu_e$	[e] ( 2.67 $\pm$ 0.29 ) %	S=1.1	908	DESIG=86
$\eta'(958) e^+ \nu_e$	[e] ( 9.9 $\pm$ 2.3 ) $\times 10^{-3}$		751	DESIG=87
$\omega e^+ \nu_e$	[f] < 2.0 $\times 10^{-3}$	CL=90%	829	DESIG=153
$K^0 e^+ \nu_e$	( 3.7 $\pm$ 1.0 ) $\times 10^{-3}$		921	DESIG=145
$K^*(892)^0 e^+ \nu_e$	[e] ( 1.8 $\pm$ 0.7 ) $\times 10^{-3}$		782	DESIG=146
$f_0(980) e^+ \nu_e, f_0 \rightarrow \pi^+ \pi^-$	( 2.00 $\pm$ 0.32 ) $\times 10^{-3}$		—	DESIG=147
<b>Hadronic modes with a <math>K\bar{K}</math> pair</b>				
$K^+ K_S^0$	( 1.48 $\pm$ 0.08 ) %		850	NODE=S034;CLUMP=A DESIG=22
$K^+ K^- \pi^+$	[g] ( 5.49 $\pm$ 0.27 ) %		805	DESIG=40
$\phi \pi^+$	[e,h] ( 4.5 $\pm$ 0.4 ) %		712	DESIG=6
$\phi \pi^+, \phi \rightarrow K^+ K^-$	[h] ( 2.28 $\pm$ 0.12 ) %		712	DESIG=114
$K^+ \bar{K}^*(892)^0, \bar{K}^{*0} \rightarrow K^- \pi^+$	( 2.63 $\pm$ 0.13 ) %		416	DESIG=115
$f_0(980) \pi^+, f_0 \rightarrow K^+ K^-$	( 1.16 $\pm$ 0.32 ) %		732	DESIG=79
$f_0(1370) \pi^+, f_0 \rightarrow K^+ K^-$	( 7 $\pm$ 5 ) $\times 10^{-4}$		—	DESIG=148
$f_0(1710) \pi^+, f_0 \rightarrow K^+ K^-$	( 6.7 $\pm$ 2.9 ) $\times 10^{-4}$		198	DESIG=88
$K^+ \bar{K}_0^*(1430)^0, \bar{K}_0^* \rightarrow K^- \pi^+$	( 1.9 $\pm$ 0.4 ) $\times 10^{-3}$		218	DESIG=80
$K^0 \bar{K}_0^0 \pi^+$	—		802	DESIG=46;OUR EVAL
$K^*(892)^+ \bar{K}^0$	[e] ( 5.4 $\pm$ 1.2 ) %		683	DESIG=24
$K^+ K^- \pi^+ \pi^0$	( 5.6 $\pm$ 0.5 ) %		748	DESIG=41
$\phi \rho^+$	[e] ( 8.4 $\pm$ 1.9 ) %		401	DESIG=5

$K_S^0 K^- 2\pi^+$	( 1.64±0.12 ) %		744	DESIG=26
$K^*(892)^+ \bar{K}^*(892)^0$	[e] ( 7.2 ± 2.6 ) %		417	DESIG=27
$K^+ K_S^0 \pi^+ \pi^-$	( 9.6 ± 1.3 ) × 10 <sup>-3</sup>		744	DESIG=43
$K^+ K^- 2\pi^+ \pi^-$	( 8.8 ± 1.6 ) × 10 <sup>-3</sup>		673	DESIG=42
$\phi 2\pi^+ \pi^-$	[e] ( 1.21±0.16 ) %		640	DESIG=8
$K^+ K^- \rho^0 \pi^+$ non- $\phi$	< 2.6 × 10 <sup>-4</sup>	CL=90%	249	DESIG=104
$\phi \rho^0 \pi^+, \phi \rightarrow K^+ K^-$	( 6.6 ± 1.3 ) × 10 <sup>-3</sup>		181	DESIG=105
$\phi a_1(1260)^+, \phi \rightarrow K^+ K^-, a_1^+ \rightarrow \rho^0 \pi^+$	( 7.5 ± 1.3 ) × 10 <sup>-3</sup>		†	DESIG=106
$K^+ K^- 2\pi^+ \pi^-$ nonresonant	( 9 ± 7 ) × 10 <sup>-4</sup>		673	DESIG=107
$2K_S^0 2\pi^+ \pi^-$	( 8.3 ± 3.5 ) × 10 <sup>-4</sup>		669	DESIG=112
<b>Hadronic modes without <math>K</math>'s</b>				NODE=S034;CLUMP=B
$\pi^+ \pi^0$	< 3.4 × 10 <sup>-4</sup>	CL=90%	975	DESIG=119
$2\pi^+ \pi^-$	( 1.10±0.06 ) %		959	DESIG=15
$\rho^0 \pi^+$	( 2.0 ± 1.2 ) × 10 <sup>-4</sup>		825	DESIG=10
$\pi^+ (\pi^+ \pi^-)_{S\text{-wave}}$	[i] ( 9.2 ± 0.6 ) × 10 <sup>-3</sup>		959	DESIG=113
$f_2(1270)\pi^+, f_2 \rightarrow \pi^+ \pi^-$	( 1.11±0.20 ) × 10 <sup>-3</sup>		559	DESIG=90
$\rho(1450)^0 \pi^+, \rho^0 \rightarrow \pi^+ \pi^-$	( 3.0 ± 2.0 ) × 10 <sup>-4</sup>		421	DESIG=103
$\pi^+ 2\pi^0$	( 6.5 ± 1.3 ) × 10 <sup>-3</sup>		961	DESIG=149
$2\pi^+ \pi^- \pi^0$	—		935	DESIG=18;OUR EVAL
$\eta \pi^+$	[e] ( 1.83±0.15 ) %		902	DESIG=1
$\omega \pi^+$	[e] ( 2.5 ± 0.7 ) × 10 <sup>-3</sup>		822	DESIG=19
$3\pi^+ 2\pi^-$	( 8.0 ± 0.9 ) × 10 <sup>-3</sup>		899	DESIG=17
$2\pi^+ \pi^- 2\pi^0$	—		902	DESIG=57;OUR EVAL
$\eta \rho^+$	[e] ( 8.9 ± 0.8 ) %		724	DESIG=58
$\eta \pi^+ \pi^0$ 3-body	[e] < 5 %	CL=90%	886	DESIG=64
$\omega \pi^+ \pi^0$	[e] ( 2.8 ± 0.7 ) %		802	DESIG=126
$3\pi^+ 2\pi^- \pi^0$	( 4.9 ± 3.2 ) %		856	DESIG=59
$\omega 2\pi^+ \pi^-$	[e] ( 1.6 ± 0.5 ) %		766	DESIG=127
$\eta'(958)\pi^+$	[d,e] ( 3.94±0.33 ) %		743	DESIG=13
$3\pi^+ 2\pi^- 2\pi^0$	—		803	DESIG=61;OUR EVAL
$\omega \eta \pi^+$	[e] < 2.13 %	CL=90%	654	DESIG=128
$\eta'(958)\rho^+$	[d,e] ( 12.5 ± 2.2 ) %		465	DESIG=62
$\eta'(958)\pi^+ \pi^0$ 3-body	[e] < 1.8 %	CL=90%	720	DESIG=65
<b>Modes with one or three <math>K</math>'s</b>				NODE=S034;CLUMP=K
$K^+ \pi^0$	( 6.2 ± 2.1 ) × 10 <sup>-4</sup>		917	DESIG=120
$K_S^0 \pi^+$	( 1.21±0.08 ) × 10 <sup>-3</sup>		916	DESIG=23
$K^+ \eta$	[e] ( 1.75±0.35 ) × 10 <sup>-3</sup>		835	DESIG=121
$K^+ \omega$	[e] < 2.4 × 10 <sup>-3</sup>	CL=90%	741	DESIG=129
$K^+ \eta'(958)$	[e] ( 1.8 ± 0.6 ) × 10 <sup>-3</sup>		646	DESIG=122
$K^+ \pi^+ \pi^-$	( 6.9 ± 0.5 ) × 10 <sup>-3</sup>		900	DESIG=45
$K^+ \rho^0$	( 2.7 ± 0.5 ) × 10 <sup>-3</sup>		745	DESIG=82
$K^+ \rho(1450)^0, \rho^0 \rightarrow \pi^+ \pi^-$	( 7.3 ± 2.6 ) × 10 <sup>-4</sup>		—	DESIG=108
$K^*(892)^0 \pi^+, K^{*0} \rightarrow K^+ \pi^-$	( 1.50±0.26 ) × 10 <sup>-3</sup>		775	DESIG=83
$K^*(1410)^0 \pi^+, K^{*0} \rightarrow K^+ \pi^-$	( 1.30±0.31 ) × 10 <sup>-3</sup>		—	DESIG=109
$K^*(1430)^0 \pi^+, K^{*0} \rightarrow K^+ \pi^-$	( 5 ± 4 ) × 10 <sup>-4</sup>		—	DESIG=110
$K^+ \pi^+ \pi^-$ nonresonant	( 1.1 ± 0.4 ) × 10 <sup>-3</sup>		900	DESIG=111
$K^0 \pi^+ \pi^0$	( 1.00±0.18 ) %		900	DESIG=150
$K_S^0 2\pi^+ \pi^-$	( 2.9 ± 1.1 ) × 10 <sup>-3</sup>		870	DESIG=123
$K^+ \omega \pi^0$	[e] < 8.2 × 10 <sup>-3</sup>	CL=90%	684	DESIG=130
$K^+ \omega \pi^+ \pi^-$	[e] < 5.4 × 10 <sup>-3</sup>	CL=90%	603	DESIG=131
$K^+ \omega \eta$	[e] < 7.9 × 10 <sup>-3</sup>	CL=90%	367	DESIG=132
$2K^+ K^-$	( 2.20±0.23 ) × 10 <sup>-4</sup>		628	DESIG=67
$\phi K^+, \phi \rightarrow K^+ K^-$	( 9.0 ± 2.1 ) × 10 <sup>-5</sup>		—	DESIG=154

**Doubly Cabibbo-suppressed modes**

$2K^+\pi^-$	$(1.28 \pm 0.14) \times 10^{-4}$	805	NODE=S034;CLUMP=F
$K^+K^*(892)^0, K^{*0} \rightarrow K^+\pi^-$	$(6.0 \pm 3.5) \times 10^{-5}$	—	DESIG=116 DESIG=155

**Baryon-antibaryon mode**

$p\bar{n}$	$(1.3 \pm 0.4) \times 10^{-3}$	295	NODE=S034;CLUMP=G DESIG=124
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 **$\Delta C = 1$  weak neutral current (C1) modes,  
Lepton family number (LF), or  
Lepton number (L) violating modes**

$\pi^+e^+e^-$	$[j] < 1.3$	$\times 10^{-5}$	CL=90%	979	DESIG=93
$\pi^+\phi, \phi \rightarrow e^+e^-$	$[k] (6 \pm_{-4}^8)$	$\times 10^{-6}$		—	DESIG=152
$\pi^+\mu^+\mu^-$	$[j] < 2.6$	$\times 10^{-5}$	CL=90%	968	DESIG=73
$K^+e^+e^-$	C1 < 3.7	$\times 10^{-6}$	CL=90%	922	DESIG=94
$K^+\mu^+\mu^-$	C1 < 2.1	$\times 10^{-5}$	CL=90%	909	DESIG=74
$K^*(892)^+\mu^+\mu^-$	C1 < 1.4	$\times 10^{-3}$	CL=90%	765	DESIG=75
$\pi^+e^+\mu^-$	LF < 1.2	$\times 10^{-5}$	CL=90%	976	DESIG=156
$\pi^+e^-\mu^+$	LF < 2.0	$\times 10^{-5}$	CL=90%	976	DESIG=157
$K^+e^+\mu^-$	LF < 1.4	$\times 10^{-5}$	CL=90%	919	DESIG=158
$K^+e^-\mu^+$	LF < 9.7	$\times 10^{-6}$	CL=90%	919	DESIG=159
$\pi^-2e^+$	L < 4.1	$\times 10^{-6}$	CL=90%	979	DESIG=97
$\pi^-2\mu^+$	L < 1.4	$\times 10^{-5}$	CL=90%	968	DESIG=76
$\pi^-e^+\mu^+$	L < 8.4	$\times 10^{-6}$	CL=90%	976	DESIG=98
$K^-2e^+$	L < 5.2	$\times 10^{-6}$	CL=90%	922	DESIG=99
$K^-2\mu^+$	L < 1.3	$\times 10^{-5}$	CL=90%	909	DESIG=77
$K^-e^+\mu^+$	L < 6.1	$\times 10^{-6}$	CL=90%	919	DESIG=100
$K^*(892)^-2\mu^+$	L < 1.4	$\times 10^{-3}$	CL=90%	765	DESIG=78

 **$D_s^{*\pm}$** 

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

NODE=S074

 $J^P$  is natural, width and decay modes consistent with  $1^-$ .

Mass  $m = 2112.3 \pm 0.5$  MeV ( $S = 1.1$ )

NODE=S074M;DTYPE=M

$m_{D_s^{*\pm}} - m_{D_s^\pm} = 143.8 \pm 0.4$  MeV

NODE=S074DM;DTYPE=D

Full width  $\Gamma < 1.9$  MeV, CL = 90%

NODE=S074W;DTYPE=G

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

NODE=S074215;NODE=S074

 **$D_s^{*+}$  DECAY MODES**

	Fraction ( $\Gamma_i/\Gamma$ )	$p$ (MeV/c)
$D_s^+\gamma$	$(94.2 \pm 0.7) \%$	139
$D_s^+\pi^0$	$(5.8 \pm 0.7) \%$	48

DESIG=1

DESIG=2

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

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

 $J, P$  need confirmation.

NODE=M172

 $J^P$  is natural, low mass consistent with  $0^+$ .

Mass  $m = 2317.8 \pm 0.6$  MeV ( $S = 1.1$ )

NODE=M172M;DTYPE=M

$m_{D_{s0}^{*}(2317)^\pm} - m_{D_s^\pm} = 349.3 \pm 0.6$  MeV ( $S = 1.1$ )

NODE=M172DM;DTYPE=D

Full width  $\Gamma < 3.8$  MeV, CL = 95%

NODE=M172W;DTYPE=G

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

NODE=M172215;NODE=M172

$D_{s0}^*(2317)^\pm$ DECAY MODES	Fraction ( $\Gamma_i/\Gamma$ )	$p$ (MeV/c)
$D_s^+ \pi^0$	seen	298
$D_s^+ \pi^0 \pi^0$	not seen	205

DESIG=1

DESIG=7;OUR EVAL;→ NOT CHECKED ←

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

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

Mass  $m = 2459.6 \pm 0.6$  MeV ( $S = 1.1$ )

$m_{D_{s1}(2460)^\pm} - m_{D_s^{*\pm}} = 347.2 \pm 0.7$  MeV ( $S = 1.2$ )

$m_{D_{s1}(2460)^\pm} - m_{D_s^\pm} = 491.1 \pm 0.7$  MeV ( $S = 1.1$ )

Full width  $\Gamma < 3.5$  MeV, CL = 95%

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

NODE=M173

NODE=M173M;DTYPE=M

NODE=M173MD;DTYPE=D

NODE=M173DM;DTYPE=D

NODE=M173W;DTYPE=G

NODE=M173215;NODE=M173

$D_{s1}(2460)^+$ DECAY MODES	Fraction ( $\Gamma_i/\Gamma$ )	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 <sup>+</sup> <sub>-2.4</sub> ) %		138

DESIG=1

DESIG=2

DESIG=3

DESIG=4

DESIG=5

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

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

$J, P$  need confirmation.

Mass  $m = 2535.12 \pm 0.13$  MeV

Full width  $\Gamma = 0.92 \pm 0.05$  MeV

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

NODE=M121

NODE=M121M;DTYPE=M

NODE=M121W;DTYPE=G

NODE=M121215;NODE=M121

$D_{s1}(2536)^+$ DECAY MODES	Fraction ( $\Gamma_i/\Gamma$ )	$p$ (MeV/c)
$D^*(2010)^+ K^0$	seen	149
$D^*(2007)^0 K^+$	seen	167
$D^+ K^0$	not seen	381
$D^0 K^+$	not seen	391
$D_s^{*+} \gamma$	possibly seen	388
$D_s^+ \pi^+ \pi^-$	seen	437

DESIG=1;OUR EST;→ NOT CHECKED ←

DESIG=4;OUR EST;→ NOT CHECKED ←

DESIG=2;OUR EST;→ NOT CHECKED ←

DESIG=5;OUR EST;→ NOT CHECKED ←

DESIG=3

DESIG=6

**$D_{s2}^*(2573)$**

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

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

Mass  $m = 2571.9 \pm 0.8$  MeV

Full width  $\Gamma = 17 \pm 4$  MeV ( $S = 1.3$ )

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

NODE=M148

NODE=M148M;DTYPE=M

NODE=M148W;DTYPE=G

NODE=M148215;NODE=M148

$D_{s2}^*(2573)^+$ DECAY MODES	Fraction ( $\Gamma_i/\Gamma$ )	$p$ (MeV/c)
$D^0 K^+$	seen	434
$D^*(2007)^0 K^+$	not seen	243

DESIG=1

DESIG=2;OUR EVAL;→ NOT CHECKED ←

## NOTES

- [a] See the Particle Listings for the (complicated) definition of this quantity. LINKAGE=DEF
- [b] This is the purely  $e^+$  semileptonic branching fraction: the  $e^+$  fraction from  $\tau^+$  decays has been subtracted off. The sum of our (non- $\tau$ )  $e^+$  exclusive fractions — an  $e^+\nu_e$  with an  $\eta$ ,  $\eta'$ ,  $\phi$ ,  $K^0$ ,  $K^{*0}$ , or  $f_0(980)$  — is  $7.0 \pm 0.4\%$  LINKAGE=SLE
- [c] This fraction includes  $\eta$  from  $\eta'$  decays. LINKAGE=EFR
- [d] Two times (to include  $\mu$  decays) the  $\eta' e^+\nu_e$  branching fraction, plus the  $\eta'\pi^+$ ,  $\eta'\rho^+$ , and  $\eta'K^+$  fractions, is  $(18.6 \pm 2.3)\%$ , which considerably exceeds the inclusive  $\eta'$  fraction of  $(11.7 \pm 1.8)\%$ . Our best guess is that the  $\eta'\rho^+$  fraction,  $(12.5 \pm 2.2)\%$ , is too large. LINKAGE=INC
- [e] This branching fraction includes all the decay modes of the final-state resonance. LINKAGE=DFR
- [f] A test for  $u\bar{u}$  or  $d\bar{d}$  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  $2 \times 10^{-4}$ . LINKAGE=MAR
- [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. LINKAGE=SDQ
- [h] We decouple the  $D_s^+ \rightarrow \phi\pi^+$  branching fraction obtained from mass projections (and used to get some of the other branching fractions) from the  $D_s^+ \rightarrow \phi\pi^+$ ,  $\phi \rightarrow K^+K^-$  branching fraction obtained from the Dalitz-plot analysis of  $D_s^+ \rightarrow K^+K^-\pi^+$ . That is, the ratio of these two branching fractions is not exactly the  $\phi \rightarrow K^+K^-$  branching fraction 0.491. LINKAGE=DBF
- [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. LINKAGE=KMP
- [j] This mode is not a useful test for a  $\Delta C=1$  weak neutral current because both quarks must change flavor in this decay. LINKAGE=FIX
- [k] This is *not* a test for the  $\Delta C=1$  weak neutral current, but leads to the  $\pi^+\ell^+\ell^-$  final state. LINKAGE=NTC