

# CHARMED MESONS ( $C = \pm 1$ )

$$D^+ = c\bar{d}, D^0 = c\bar{u}, \bar{D}^0 = \bar{c}u, D^- = \bar{c}d, \text{ similarly for } D^{*'}\text{'s}$$

**$D^\pm$**

$$I(J^P) = \frac{1}{2}(0^-)$$

$$\text{Mass } m = 1869.3 \pm 0.5 \text{ MeV} \quad (S = 1.1)$$

$$\text{Mean life } \tau = (1051 \pm 13) \times 10^{-15} \text{ s}$$

$$c\tau = 315 \mu\text{m}$$

### c-quark decays

$$\Gamma(c \rightarrow \ell^+ \text{ anything}) / \Gamma(c \rightarrow \text{ anything}) = 0.096 \pm 0.004 \text{ } [nn]$$

$$\Gamma(c \rightarrow D^*(2010)^+ \text{ anything}) / \Gamma(c \rightarrow \text{ anything}) = 0.255 \pm 0.017$$

### CP-violation decay-rate asymmetries

$$A_{CP}(K_S^0 \pi^\pm) = -0.016 \pm 0.017$$

$$A_{CP}(K_S^0 K^\pm) = 0.07 \pm 0.06$$

$$A_{CP}(K^+ K^- \pi^\pm) = 0.002 \pm 0.011$$

$$A_{CP}(K^\pm K^{*0}) = -0.02 \pm 0.05$$

$$A_{CP}(\phi \pi^\pm) = -0.014 \pm 0.033$$

$$A_{CP}(\pi^+ \pi^- \pi^\pm) = -0.02 \pm 0.04$$

### $D^+ \rightarrow \bar{K}^*(892)^0 \ell^+ \nu_\ell$ form factors

$$r_V = 1.82 \pm 0.09$$

$$r_2 = 0.78 \pm 0.07$$

$$r_3 = 0.0 \pm 0.4$$

$$\Gamma_L / \Gamma_T = 1.14 \pm 0.08$$

$$\Gamma_+ / \Gamma_- = 0.21 \pm 0.04 \quad (S = 1.3)$$

$D^-$  modes are charge conjugates of the modes below.

$D^+$ DECAY MODES	Fraction ( $\Gamma_i / \Gamma$ )	Scale factor/ Confidence level	$p$ (MeV/c)
<b>Inclusive modes</b>			
$e^+$ anything	(17.2 $\pm$ 1.9 ) %		—
$K^-$ anything	(24.2 $\pm$ 2.8 ) %	S=1.4	—
$\bar{K}^0$ anything + $K^0$ anything	(59 $\pm$ 7 ) %		—
$K^+$ anything	( 5.8 $\pm$ 1.4 ) %		—
$\eta$ anything	[oo] < 13 %	CL=90%	—
$\phi$ anything	< 1.8 %	CL=90%	—
$\phi e^+$ anything	< 1.6 %	CL=90%	—

### Leptonic and semileptonic modes

$\mu^+ \nu_\mu$		$( 8 \begin{smallmatrix} +17 \\ -5 \end{smallmatrix} ) \times 10^{-4}$	932
$\bar{K}^0 \ell^+ \nu_\ell$	[pp]	$( 6.7 \pm 0.8 ) \%$	—
$\bar{K}^0 e^+ \nu_e$		$( 6.6 \pm 0.9 ) \%$	868
$\bar{K}^0 \mu^+ \nu_\mu$		$( 7.0 \begin{smallmatrix} +3.0 \\ -2.0 \end{smallmatrix} ) \%$	865
$K^- \pi^+ e^+ \nu_e$		$( 4.1 \begin{smallmatrix} +0.9 \\ -0.7 \end{smallmatrix} ) \%$	863
$\bar{K}^*(892)^0 e^+ \nu_e$ $\times B(\bar{K}^{*0} \rightarrow K^- \pi^+)$		$( 3.2 \pm 0.33 ) \%$	720
$K^- \pi^+ e^+ \nu_e$ nonresonant		$< 7 \times 10^{-3}$ CL=90%	863
$K^- \pi^+ \mu^+ \nu_\mu$		$( 3.2 \pm 0.4 ) \%$ S=1.1	851
$\bar{K}^*(892)^0 \mu^+ \nu_\mu$ $\times B(\bar{K}^{*0} \rightarrow K^- \pi^+)$		$( 3.0 \pm 0.4 ) \%$	715
$K^- \pi^+ \mu^+ \nu_\mu$ nonresonant		$( 2.7 \pm 1.1 ) \times 10^{-3}$	851
$(\bar{K}^*(892)\pi)^0 e^+ \nu_e$		$< 1.2 \%$ CL=90%	714
$(\bar{K}\pi\pi)^0 e^+ \nu_e$ non- $\bar{K}^*(892)$		$< 9 \times 10^{-3}$ CL=90%	846
$K^- \pi^+ \pi^0 \mu^+ \nu_\mu$		$< 1.4 \times 10^{-3}$ CL=90%	825
$\pi^0 \ell^+ \nu_\ell$	[qq]	$( 3.1 \pm 1.5 ) \times 10^{-3}$	930

Fractions of some of the following modes with resonances have already appeared above as submodes of particular charged-particle modes.

$\bar{K}^*(892)^0 \ell^+ \nu_\ell$	[pp]	$( 4.8 \pm 0.4 ) \%$	—
$\bar{K}^*(892)^0 e^+ \nu_e$		$( 4.8 \pm 0.5 ) \%$	720
$\bar{K}^*(892)^0 \mu^+ \nu_\mu$		$( 4.5 \pm 0.6 ) \%$ S=1.1	715
$\bar{K}_1(1270)^0 \mu^+ \nu_\mu$		$< 3.5 \%$ CL=95%	493
$\bar{K}_2^*(1430)^0 \mu^+ \nu_\mu$		$< 8 \times 10^{-3}$ CL=95%	374
$\rho^0 e^+ \nu_e$		$( 2.2 \pm 0.8 ) \times 10^{-3}$	776
$\rho^0 \mu^+ \nu_\mu$		$( 2.7 \pm 0.7 ) \times 10^{-3}$	772
$\phi e^+ \nu_e$		$< 2.09 \%$ CL=90%	657
$\phi \mu^+ \nu_\mu$		$< 3.72 \%$ CL=90%	651
$\eta \ell^+ \nu_\ell$		$< 5 \times 10^{-3}$ CL=90%	—
$\eta'(958) \mu^+ \nu_\mu$		$< 9 \times 10^{-3}$ CL=90%	684

### Hadronic modes with a $\bar{K}$ or $\bar{K}K\bar{K}$

$\bar{K}^0 \pi^+$		$( 2.77 \pm 0.18 ) \%$	862
$K^- \pi^+ \pi^+$	[rr]	$( 9.1 \pm 0.6 ) \%$	845
$\bar{K}^*(892)^0 \pi^+$ $\times B(\bar{K}^{*0} \rightarrow K^- \pi^+)$		$( 1.28 \pm 0.13 ) \%$	712
$\bar{K}_0^*(1430)^0 \pi^+$ $\times B(\bar{K}_0^{*0}(1430)^0 \rightarrow K^- \pi^+)$		$( 2.3 \pm 0.3 ) \%$	368
$\bar{K}^*(1680)^0 \pi^+$ $\times B(\bar{K}^*(1680)^0 \rightarrow K^- \pi^+)$		$( 3.7 \pm 0.8 ) \times 10^{-3}$	65
$K^- \pi^+ \pi^+$ nonresonant		$( 8.6 \pm 0.8 ) \%$	845

$\overline{K}^0 \pi^+ \pi^0$	[rr]	( 9.7 ± 3.0 ) %	S=1.1	845
$\overline{K}^0 \rho^+$		( 6.6 ± 2.5 ) %		680
$\overline{K}^*(892)^0 \pi^+$		( 6.4 ± 0.6 ) × 10 <sup>-3</sup>		712
× B( $\overline{K}^{*0} \rightarrow \overline{K}^0 \pi^0$ )				
$\overline{K}^0 \pi^+ \pi^0$ nonresonant		( 1.3 ± 1.1 ) %		845
$K^- \pi^+ \pi^+ \pi^0$	[rr]	( 6.4 ± 1.1 ) %		816
$\overline{K}^*(892)^0 \rho^+$ total		( 1.4 ± 0.9 ) %		423
× B( $\overline{K}^{*0} \rightarrow K^- \pi^+$ )				
$\overline{K}_1(1400)^0 \pi^+$		( 2.1 ± 0.5 ) %		390
× B( $\overline{K}_1(1400)^0 \rightarrow K^- \pi^+ \pi^0$ )				
$K^- \rho^+ \pi^+$ total		( 3.1 ± 1.1 ) %		616
$K^- \rho^+ \pi^+$ 3-body		( 1.1 ± 0.4 ) %		616
$\overline{K}^*(892)^0 \pi^+ \pi^0$ total		( 4.5 ± 0.9 ) %		687
× B( $\overline{K}^{*0} \rightarrow K^- \pi^+$ )				
$\overline{K}^*(892)^0 \pi^+ \pi^0$ 3-body		( 2.8 ± 0.9 ) %		687
× B( $\overline{K}^{*0} \rightarrow K^- \pi^+$ )				
$K^*(892)^- \pi^+ \pi^+$ 3-body		( 7 ± 3 ) × 10 <sup>-3</sup>		688
× B( $K^{*-} \rightarrow K^- \pi^0$ )				
$K^- \pi^+ \pi^+ \pi^0$ nonresonant	[ss]	( 1.2 ± 0.6 ) %		816
$\overline{K}^0 \pi^+ \pi^+ \pi^-$	[rr]	( 7.0 ± 0.9 ) %		814
$\overline{K}^0 a_1(1260)^+$		( 4.0 ± 0.9 ) %		328
× B( $a_1(1260)^+ \rightarrow \pi^+ \pi^+ \pi^-$ )				
$\overline{K}_1(1400)^0 \pi^+$		( 2.1 ± 0.5 ) %		390
× B( $\overline{K}_1(1400)^0 \rightarrow \overline{K}^0 \pi^+ \pi^-$ )				
$K^*(892)^- \pi^+ \pi^+$ 3-body		( 1.4 ± 0.6 ) %		688
× B( $K^{*-} \rightarrow \overline{K}^0 \pi^-$ )				
$\overline{K}^0 \rho^0 \pi^+$ total		( 4.2 ± 0.9 ) %		614
$\overline{K}^0 \rho^0 \pi^+$ 3-body		( 5 ± 5 ) × 10 <sup>-3</sup>		614
$\overline{K}^0 \pi^+ \pi^+ \pi^-$ nonresonant		( 8 ± 4 ) × 10 <sup>-3</sup>		814
$K^- \pi^+ \pi^+ \pi^+ \pi^-$	[rr]	( 7.3 ± 1.0 ) × 10 <sup>-3</sup>		772
$\overline{K}^*(892)^0 \pi^+ \pi^+ \pi^-$		( 5.5 ± 2.3 ) × 10 <sup>-3</sup>		642
× B( $\overline{K}^{*0} \rightarrow K^- \pi^+$ )				
$\overline{K}^*(892)^0 \rho^0 \pi^+$		( 1.9 ± 1.1 ) × 10 <sup>-3</sup>		242
× B( $\overline{K}^{*0} \rightarrow K^- \pi^+$ )				
$\overline{K}^*(892)^0 \pi^+ \pi^+ \pi^-$ no- $\rho$		( 2.9 ± 1.1 ) × 10 <sup>-3</sup>		642
× B( $\overline{K}^{*0} \rightarrow K^- \pi^+$ )				
$K^- \rho^0 \pi^+ \pi^+$		( 3.1 ± 1.0 ) × 10 <sup>-3</sup>		529
$K^- \pi^+ \pi^+ \pi^+ \pi^-$ nonresonant		< 2.4 × 10 <sup>-3</sup>	CL=90%	772
$\overline{K}^0 \overline{K}^0 K^+$		( 1.8 ± 0.8 ) %		545
$K^+ K^- \overline{K}^0 \pi^+$		( 5.4 ± 1.4 ) × 10 <sup>-4</sup>		435

Fractions of some of the following modes with resonances have already appeared above as submodes of particular charged-particle modes.

$\bar{K}^0 \rho^+$	( 6.6 ± 2.5 ) %		680
$\bar{K}^0 a_1(1260)^+$	( 8.1 ± 1.7 ) %		328
$\bar{K}^0 a_2(1320)^+$	< 3	× 10 <sup>-3</sup> CL=90%	199
$\bar{K}^*(892)^0 \pi^+$	( 1.92 ± 0.19 ) %		712
$\bar{K}^*(892)^0 \rho^+$ total	[ss] ( 2.1 ± 1.4 ) %		423
$\bar{K}^*(892)^0 \rho^+$ S-wave	[ss] ( 1.7 ± 1.6 ) %		423
$\bar{K}^*(892)^0 \rho^+$ P-wave	< 1	× 10 <sup>-3</sup> CL=90%	423
$\bar{K}^*(892)^0 \rho^+$ D-wave	( 10 ± 7 ) × 10 <sup>-3</sup>		423
$\bar{K}^*(892)^0 \rho^+$ D-wave longitu- dinal	< 7	× 10 <sup>-3</sup> CL=90%	423
$\bar{K}_1(1270)^0 \pi^+$	< 7	× 10 <sup>-3</sup> CL=90%	487
$\bar{K}_1(1400)^0 \pi^+$	( 4.9 ± 1.2 ) %		390
$\bar{K}_0^*(1430)^0 \pi^+$	( 3.7 ± 0.4 ) %		368
$\bar{K}^*(1680)^0 \pi^+$	( 1.45 ± 0.31 ) %		65
$\bar{K}^*(892)^0 \pi^+ \pi^0$ total	( 6.7 ± 1.4 ) %		687
$\bar{K}^*(892)^0 \pi^+ \pi^0$ 3-body	[ss] ( 4.2 ± 1.4 ) %		687
$K^*(892)^- \pi^+ \pi^+$ 3-body	( 2.1 ± 0.9 ) %		688
$K^- \rho^+ \pi^+$ total	( 3.1 ± 1.1 ) %		616
$K^- \rho^+ \pi^+$ 3-body	( 1.1 ± 0.4 ) %		616
$\bar{K}^0 \rho^0 \pi^+$ total	( 4.2 ± 0.9 ) %	CL=90%	614
$\bar{K}^0 \rho^0 \pi^+$ 3-body	( 5 ± 5 ) × 10 <sup>-3</sup>		614
$\bar{K}^*(892)^0 \pi^+ \pi^+ \pi^-$	( 8.2 ± 3.4 ) × 10 <sup>-3</sup>	S=1.7	642
$\bar{K}^*(892)^0 \rho^0 \pi^+$	( 2.9 <sup>+ 1.7</sup> <sub>- 1.5</sub> ) × 10 <sup>-3</sup>	S=1.8	242
$\bar{K}^*(892)^0 \pi^+ \pi^+ \pi^-$ no- $\rho$	( 4.3 ± 1.7 ) × 10 <sup>-3</sup>		642
$K^- \rho^0 \pi^+ \pi^+$	( 3.1 ± 1.0 ) × 10 <sup>-3</sup>		529
<b>Pionic modes</b>			
$\pi^+ \pi^0$	( 2.5 ± 0.7 ) × 10 <sup>-3</sup>		925
$\pi^+ \pi^+ \pi^-$	( 3.1 ± 0.4 ) × 10 <sup>-3</sup>	S=1.5	908
$\sigma \pi^+$	( 2.1 ± 0.5 ) × 10 <sup>-3</sup>		—
$\rho^0 \pi^+$	( 1.04 ± 0.18 ) × 10 <sup>-3</sup>		769
$f_0(980) \pi^+$	[tt] ( 1.9 ± 0.5 ) × 10 <sup>-4</sup>		669
× B( $f_0 \rightarrow \pi^+ \pi^-$ )			
$f_2(1270) \pi^+$	( 6.0 ± 1.1 ) × 10 <sup>-4</sup>		485
× B( $f_2 \rightarrow \pi^+ \pi^-$ )			
$\pi^+ \pi^+ \pi^-$ nonresonant	( 2.4 ± 2.1 ) × 10 <sup>-4</sup>		908
$\pi^+ \pi^+ \pi^- \pi^0$	—		882
$\eta \pi^+ \times B(\eta \rightarrow \pi^+ \pi^- \pi^0)$	( 6.9 ± 1.4 ) × 10 <sup>-4</sup>		848
$\omega \pi^+ \times B(\omega \rightarrow \pi^+ \pi^- \pi^0)$	< 6	× 10 <sup>-3</sup> CL=90%	764
$\pi^+ \pi^+ \pi^+ \pi^- \pi^-$	( 2.1 ± 0.4 ) × 10 <sup>-3</sup>		845

Fractions of some of the following modes with resonances have already appeared above as submodes of particular charged-particle modes.

$\eta\pi^+$	$(3.0 \pm 0.6) \times 10^{-3}$		848
$\rho^0\pi^+$	$(1.04 \pm 0.18) \times 10^{-3}$		769
$\omega\pi^+$	$< 7 \times 10^{-3}$	CL=90%	764
$\eta\rho^+$	$< 7 \times 10^{-3}$	CL=90%	658
$\eta'(958)\pi^+$	$(5.0 \pm 1.0) \times 10^{-3}$		680
$\eta'(958)\rho^+$	$< 5 \times 10^{-3}$	CL=90%	355
$f_2(1270)\pi^+$	$(1.06 \pm 0.20) \times 10^{-3}$		485

### Hadronic modes with a $K\bar{K}$ pair

$K^+\bar{K}^0$	$(5.8 \pm 0.6) \times 10^{-3}$	S=1.2	792
$K^+K^-\pi^+$	[rr] $(8.8 \pm 0.8) \times 10^{-3}$		744
$\phi\pi^+ \times B(\phi \rightarrow K^+K^-)$	$(3.0 \pm 0.3) \times 10^{-3}$		647
$K^+\bar{K}^*(892)^0$ $\times B(\bar{K}^{*0} \rightarrow K^-\pi^+)$	$(2.8 \pm 0.4) \times 10^{-3}$		610
$K^+K^-\pi^+$ nonresonant	$(4.5 \pm 0.9) \times 10^{-3}$		744
$K^0\bar{K}^0\pi^+$	—		741
$K^*(892)^+\bar{K}^0$ $\times B(K^{*+} \rightarrow K^0\pi^+)$	$(2.1 \pm 0.9) \%$		611
$K^+K^-\pi^+\pi^0$	—		682
$\phi\pi^+\pi^0 \times B(\phi \rightarrow K^+K^-)$	$(1.1 \pm 0.5) \%$		619
$\phi\rho^+ \times B(\phi \rightarrow K^+K^-)$	$< 7 \times 10^{-3}$	CL=90%	268
$K^+K^-\pi^+\pi^0$ non- $\phi$	$(1.5 \pm 0.7) \%$		682
$K^+\bar{K}^0\pi^+\pi^-$	$(4.0 \pm 0.7) \times 10^{-3}$		678
$K^0K^-\pi^+\pi^+$	$(5.4 \pm 0.8) \times 10^{-3}$		678
$K^*(892)^+\bar{K}^*(892)^0$ $\times B^2(K^{*+} \rightarrow K^0\pi^+)$	$(1.2 \pm 0.5) \%$		273
$K^0K^-\pi^+\pi^+$ non- $K^*\bar{K}^{*0}$	$< 7.9 \times 10^{-3}$	CL=90%	678
$K^+K^-\pi^+\pi^+\pi^-$	—		600
$\phi\pi^+\pi^+\pi^-$ $\times B(\phi \rightarrow K^+K^-)$	$< 1 \times 10^{-3}$	CL=90%	565
$K^+K^-\pi^+\pi^+\pi^-$ nonresonant	$< 3 \%$	CL=90%	600

Fractions of the following modes with resonances have already appeared above as submodes of particular charged-particle modes.

$\phi\pi^+$	$(6.1 \pm 0.6) \times 10^{-3}$		647
$\phi\pi^+\pi^0$	$(2.3 \pm 1.0) \%$		619
$\phi\rho^+$	$< 1.4 \%$	CL=90%	268
$\phi\pi^+\pi^+\pi^-$	$< 2 \times 10^{-3}$	CL=90%	565
$K^+\bar{K}^*(892)^0$	$(4.2 \pm 0.5) \times 10^{-3}$		610
$K^*(892)^+\bar{K}^0$	$(3.1 \pm 1.4) \%$		611
$K^*(892)^+\bar{K}^*(892)^0$	$(2.6 \pm 1.1) \%$		273

**Doubly Cabibbo suppressed (*DC*) modes,  
 $\Delta C = 1$  weak neutral current (*C1*) modes, or  
 Lepton Family number (*LF*) or Lepton number (*L*) violating modes**

$K^+ \pi^+ \pi^-$	<i>DC</i>	$(6.8 \pm 1.5) \times 10^{-4}$	845
$K^+ \rho^0$	<i>DC</i>	$(2.5 \pm 1.2) \times 10^{-4}$	681
$K^*(892)^0 \pi^+$	<i>DC</i>	$(3.6 \pm 1.6) \times 10^{-4}$	712
$K^+ \pi^+ \pi^-$ nonresonant	<i>DC</i>	$(2.5 \pm 1.2) \times 10^{-4}$	845
$K^+ K^+ K^-$	<i>DC</i>	$< 1.4 \times 10^{-4}$	CL=90% 550
$\phi K^+$	<i>DC</i>	$< 1.3 \times 10^{-4}$	CL=90% 527
$\pi^+ e^+ e^-$	<i>C1</i>	$< 5.2 \times 10^{-5}$	CL=90% 929
$\pi^+ \mu^+ \mu^-$	<i>C1</i>	$< 1.5 \times 10^{-5}$	CL=90% 917
$\rho^+ \mu^+ \mu^-$	<i>C1</i>	$< 5.6 \times 10^{-4}$	CL=90% 759
$K^+ e^+ e^-$	[ <i>uu</i> ]	$< 2.0 \times 10^{-4}$	CL=90% 869
$K^+ \mu^+ \mu^-$	[ <i>uu</i> ]	$< 4.4 \times 10^{-5}$	CL=90% 856
$\pi^+ e^\pm \mu^\mp$	<i>LF</i> [ <i>ff</i> ]	$< 3.4 \times 10^{-5}$	CL=90% 926
$K^+ e^\pm \mu^\mp$	<i>LF</i> [ <i>ff</i> ]	$< 6.8 \times 10^{-5}$	CL=90% 866
$\pi^- e^+ e^+$	<i>L</i>	$< 9.6 \times 10^{-5}$	CL=90% 929
$\pi^- \mu^+ \mu^+$	<i>L</i>	$< 1.7 \times 10^{-5}$	CL=90% 917
$\pi^- e^+ \mu^+$	<i>L</i>	$< 5.0 \times 10^{-5}$	CL=90% 926
$\rho^- \mu^+ \mu^+$	<i>L</i>	$< 5.6 \times 10^{-4}$	CL=90% 759
$K^- e^+ e^+$	<i>L</i>	$< 1.2 \times 10^{-4}$	CL=90% 869
$K^- \mu^+ \mu^+$	<i>L</i>	$< 1.2 \times 10^{-4}$	CL=90% 856
$K^- e^+ \mu^+$	<i>L</i>	$< 1.3 \times 10^{-4}$	CL=90% 866
$K^*(892)^- \mu^+ \mu^+$	<i>L</i>	$< 8.5 \times 10^{-4}$	CL=90% 703

**$D^0$**

$$I(J^P) = \frac{1}{2}(0^-)$$

Mass  $m = 1864.5 \pm 0.5$  MeV ( $S = 1.1$ )

$m_{D^\pm} - m_{D^0} = 4.78 \pm 0.10$  MeV ( $S = 1.1$ )

Mean life  $\tau = (411.7 \pm 2.7) \times 10^{-15}$  s

$c\tau = 123.4$   $\mu$ m

$|m_{D_1^0} - m_{D_2^0}| < 7 \times 10^{10} \hbar s^{-1}$ , CL = 95% [ $\nu\nu$ ]

$(\Gamma_{D_1^0} - \Gamma_{D_2^0})/\Gamma = 2y = -0.003 \pm 0.022$  ( $S = 1.4$ )

$\Gamma(K^+ \ell^- \bar{\nu}_\ell \text{ (via } \bar{D}^0))/\Gamma(K^- \ell^+ \nu_\ell) < 0.005$ , CL = 90%

$\Gamma(K^+ \pi^- \text{ (via } \bar{D}^0))/\Gamma(K^- \pi^+) < 4.1 \times 10^{-4}$ , CL = 95%

**CP-violation decay-rate asymmetries**

$$\begin{aligned}
 A_{CP}(K^+ K^-) &= 0.005 \pm 0.016 \\
 A_{CP}(K_S^0 K_S^0) &= -0.23 \pm 0.19 \\
 A_{CP}(\pi^+ \pi^-) &= 0.021 \pm 0.026 \\
 A_{CP}(\pi^0 \pi^0) &= 0.00 \pm 0.05 \\
 A_{CP}(K_S^0 \phi) &= -0.03 \pm 0.09 \\
 A_{CP}(K_S^0 \pi^0) &= 0.001 \pm 0.013 \\
 A_{CP}(K^\pm \pi^\mp) &= 0.02 \pm 0.20 \\
 A_{CP}(K^\mp \pi^\pm \pi^0) &= -0.03 \pm 0.09 \\
 A_{CP}(K^\pm \pi^\mp \pi^0) &= 0.09_{-0.22}^{+0.25}
 \end{aligned}$$

$\bar{D}^0$  modes are charge conjugates of the modes below.

<b>D<sup>0</sup> DECAY MODES</b>	Fraction ( $\Gamma_i/\Gamma$ )	Scale factor/ Confidence level	$p$ (MeV/c)
<b>Inclusive modes</b>			
$e^+$ anything	[ <i>ww</i> ] ( 6.87±0.28 ) %		—
$\mu^+$ anything	( 6.5 ±0.8 ) %		—
$K^-$ anything	( 53 ±4 ) %	S=1.3	—
$\bar{K}^0$ anything + $K^0$ anything	( 42 ±5 ) %		—
$K^+$ anything	( 3.4 $_{-0.4}^{+0.6}$ ) %		—
$\eta$ anything	[ <i>oo</i> ] < 13 %	CL=90%	—
$\phi$ anything	( 1.7 ±0.8 ) %		—
<b>Semileptonic modes</b>			
$K^- \ell^+ \nu_\ell$	[ <i>pp</i> ] ( 3.43±0.15 ) %	S=1.2	867
$K^- e^+ \nu_e$	( 3.58±0.18 ) %	S=1.1	867
$K^- \mu^+ \nu_\mu$	( 3.19±0.17 ) %		863
$K^- \pi^0 e^+ \nu_e$	( 1.1 $_{-0.6}^{+0.8}$ ) %	S=1.6	861
$\bar{K}^0 \pi^- e^+ \nu_e$	( 1.8 ±0.8 ) %	S=1.6	860
$\bar{K}^*(892)^- e^+ \nu_e$	( 1.43±0.23 ) %		719
$\times B(K^{*-} \rightarrow \bar{K}^0 \pi^-)$			
$K^- \pi^+ \pi^- \mu^+ \nu_\mu$	< 1.2 $\times 10^{-3}$	CL=90%	821
$(\bar{K}^*(892)\pi)^- \mu^+ \nu_\mu$	< 1.4 $\times 10^{-3}$	CL=90%	693
$\pi^- e^+ \nu_e$	( 3.6 ±0.6 ) $\times 10^{-3}$		927

A fraction of the following resonance mode has already appeared above as a submode of a charged-particle mode.

$K^*(892)^- e^+ \nu_e$	( 2.14±0.35 ) %		719
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### Hadronic modes with a $\bar{K}$ or $\bar{K}K\bar{K}$

$K^- \pi^+$		( 3.80 ± 0.09 ) %		861
$\bar{K}^0 \pi^0$		( 2.28 ± 0.22 ) %		860
$\bar{K}^0 \pi^+ \pi^-$	[rr]	( 5.92 ± 0.35 ) %	S=1.1	842
$\bar{K}^0 \rho^0$		( 1.47 ± 0.29 ) %		676
$\bar{K}^0 f_0(980)$		( 3.2 ± 0.9 ) × 10 <sup>-3</sup>		549
× B( $f_0 \rightarrow \pi^+ \pi^-$ )				
$\bar{K}^0 f_2(1270)$		( 2.5 ± 1.0 ) × 10 <sup>-3</sup>		263
× B( $f_2 \rightarrow \pi^+ \pi^-$ )				
$\bar{K}^0 f_0(1370)$		( 4.7 ± 1.4 ) × 10 <sup>-3</sup>		—
× B( $f_0 \rightarrow \pi^+ \pi^-$ )				
$K^*(892)^- \pi^+$		( 4.0 ± 0.4 ) %		711
× B( $K^{*-} \rightarrow \bar{K}^0 \pi^-$ )				
$K_0^*(1430)^- \pi^+$		( 7.3 ± 1.6 ) × 10 <sup>-3</sup>		364
× B( $K_0^{*-}(1430)^- \rightarrow \bar{K}^0 \pi^-$ )				
$K^- \pi^+ \pi^0$	[rr]	(13.1 ± 0.9 ) %	S=1.3	844
$K^- \rho^+$		(10.2 ± 0.9 ) %		678
$K^- \rho(1700)^+$		( 7.5 ± 1.7 ) × 10 <sup>-3</sup>		—
× B( $\rho(1700)^+ \rightarrow \pi^+ \pi^0$ )				
$K^*(892)^- \pi^+$		( 2.0 ± 0.2 ) %		711
× B( $K^{*-} \rightarrow K^- \pi^0$ )				
$\bar{K}^*(892)^0 \pi^0$		( 1.87 ± 0.27 ) %		709
× B( $\bar{K}^{*0} \rightarrow K^- \pi^+$ )				
$K_0^*(1430)^- \pi^+$		( 3.6 ± 0.8 ) × 10 <sup>-3</sup>		364
× B( $K_0^{*-}(1430)^- \rightarrow K^- \pi^0$ )				
$\bar{K}_0^*(1430)^0 \pi^0$		( 5.3 $^{+4.2}_{-1.4}$ ) × 10 <sup>-3</sup>		365
× B( $\bar{K}_0^{*0}(1430)^0 \rightarrow K^- \pi^+$ )				
$K^*(1680)^- \pi^+$		( 1.7 ± 0.6 ) × 10 <sup>-3</sup>		115
× B( $K^*(1680)^- \rightarrow K^- \pi^0$ )				
$K^- \pi^+ \pi^0$ nonresonant		( 1.05 $^{+0.51}_{-0.19}$ ) %		844
$\bar{K}^0 \pi^0 \pi^0$		—		843
$\bar{K}^*(892)^0 \pi^0$		( 9.3 ± 1.3 ) × 10 <sup>-3</sup>		709
× B( $\bar{K}^{*0} \rightarrow \bar{K}^0 \pi^0$ )				
$\bar{K}^0 \pi^0 \pi^0$ nonresonant		( 8.4 ± 2.2 ) × 10 <sup>-3</sup>		843
$K^- \pi^+ \pi^+ \pi^-$	[rr]	( 7.46 ± 0.31 ) %		812
$K^- \pi^+ \rho^0$ total		( 6.2 ± 0.4 ) %		612
$K^- \pi^+ \rho^0$ 3-body		( 4.7 ± 2.1 ) × 10 <sup>-3</sup>		612
$\bar{K}^*(892)^0 \rho^0$		( 9.7 ± 2.1 ) × 10 <sup>-3</sup>		418
× B( $\bar{K}^{*0} \rightarrow K^- \pi^+$ )				
$K^- a_1(1260)^+$		( 3.6 ± 0.6 ) %		327
× B( $a_1(1260)^+ \rightarrow \pi^+ \pi^+ \pi^-$ )				



$\bar{K}^*(892)^0 \pi^+ \pi^-$ total	( 1.5 ± 0.4 ) %	683
× B( $\bar{K}^{*0} \rightarrow K^- \pi^+$ )		
$\bar{K}^*(892)^0 \pi^+ \pi^-$ 3-body	( 9.5 ± 2.1 ) × 10 <sup>-3</sup>	683
× B( $\bar{K}^{*0} \rightarrow K^- \pi^+$ )		
$K_1(1270)^- \pi^+$	[ss] ( 3.7 ± 1.0 ) × 10 <sup>-3</sup>	483
× B( $K_1(1270)^- \rightarrow K^- \pi^+ \pi^-$ )		
$K^- \pi^+ \pi^+ \pi^-$ nonresonant	( 1.74 ± 0.25 ) %	812
$\bar{K}^0 \pi^+ \pi^- \pi^0$	[rr] ( 10.8 ± 1.3 ) %	812
$\bar{K}^0 \eta$ × B( $\eta \rightarrow \pi^+ \pi^- \pi^0$ )	( 1.7 ± 0.3 ) × 10 <sup>-3</sup>	772
$\bar{K}^0 \omega$ × B( $\omega \rightarrow \pi^+ \pi^- \pi^0$ )	( 2.2 ± 0.4 ) %	670
$K^*(892)^- \rho^+$	( 4.3 ± 1.7 ) %	422
× B( $K^{*-} \rightarrow \bar{K}^0 \pi^-$ )		
$\bar{K}^*(892)^0 \rho^0$	( 4.8 ± 1.1 ) × 10 <sup>-3</sup>	418
× B( $\bar{K}^{*0} \rightarrow \bar{K}^0 \pi^0$ )		
$K_1(1270)^- \pi^+$	[ss] ( 5.3 ± 1.5 ) × 10 <sup>-3</sup>	483
× B( $K_1(1270)^- \rightarrow \bar{K}^0 \pi^- \pi^0$ )		
$\bar{K}^*(892)^0 \pi^+ \pi^-$ 3-body	( 4.7 ± 1.0 ) × 10 <sup>-3</sup>	683
× B( $\bar{K}^{*0} \rightarrow \bar{K}^0 \pi^0$ )		
$\bar{K}^0 \pi^+ \pi^- \pi^0$ nonresonant	( 2.3 ± 2.3 ) %	812
$K^- \pi^+ \pi^+ \pi^- \pi^0$	( 4.0 ± 0.4 ) %	771
$\bar{K}^*(892)^0 \pi^+ \pi^- \pi^0$	( 1.2 ± 0.6 ) %	641
× B( $\bar{K}^{*0} \rightarrow K^- \pi^+$ )		
$\bar{K}^*(892)^0 \eta$	( 2.8 ± 0.6 ) × 10 <sup>-3</sup>	580
× B( $\bar{K}^{*0} \rightarrow K^- \pi^+$ )		
× B( $\eta \rightarrow \pi^+ \pi^- \pi^0$ )		
$K^- \pi^+ \omega$ × B( $\omega \rightarrow \pi^+ \pi^- \pi^0$ )	( 2.7 ± 0.5 ) %	605
$\bar{K}^*(892)^0 \omega$	( 6.5 ± 2.4 ) × 10 <sup>-3</sup>	406
× B( $\bar{K}^{*0} \rightarrow K^- \pi^+$ )		
× B( $\omega \rightarrow \pi^+ \pi^- \pi^0$ )		
$\bar{K}^0 \pi^+ \pi^+ \pi^- \pi^-$	( 6.3 ± 1.8 ) × 10 <sup>-3</sup>	768
$\bar{K}^0 K^+ K^-$	( 1.02 ± 0.10 ) %	544
$\bar{K}^0 \phi$ × B( $\phi \rightarrow K^+ K^-$ )	( 4.7 ± 0.6 ) × 10 <sup>-3</sup>	520
$\bar{K}^0 K^+ K^-$ non- $\phi$	( 5.5 ± 0.9 ) × 10 <sup>-3</sup>	544
$K_S^0 K_S^0 K_S^0$	( 9.1 ± 1.6 ) × 10 <sup>-4</sup>	538
$K^+ K^- K^- \pi^+$	( 2.4 ± 0.7 ) × 10 <sup>-4</sup>	434

Fractions of many of the following modes with resonances have already appeared above as submodes of particular charged-particle modes. (Modes for which there are only upper limits and  $\bar{K}^*(892)\rho$  submodes only appear below.)

$\bar{K}^0 \eta$	$( 7.6 \pm 1.1 ) \times 10^{-3}$		772
$\bar{K}^0 \rho^0$	$( 1.47 \pm 0.29 ) \%$		676
$K^- \rho^+$	$(10.2 \pm 0.8 ) \%$	S=1.2	678
$\bar{K}^0 \omega$	$( 2.2 \pm 0.4 ) \%$		670
$\bar{K}^0 \eta'(958)$	$( 1.87 \pm 0.28 ) \%$		565
$\bar{K}^0 \phi$	$( 9.4 \pm 1.1 ) \times 10^{-3}$		520
$K^- a_1(1260)^+$	$( 7.2 \pm 1.1 ) \%$		327
$\bar{K}^0 a_1(1260)^0$	$< 1.9 \%$	CL=90%	322
$\bar{K}^0 f_2(1270)$	$( 4.5 \pm 1.7 ) \times 10^{-3}$		263
$K^- a_2(1320)^+$	$< 2 \times 10^{-3}$	CL=90%	197
$K^*(892)^- \pi^+$	$( 6.0 \pm 0.5 ) \%$	S=1.2	711
$\bar{K}^*(892)^0 \pi^0$	$( 2.8 \pm 0.4 ) \%$	S=1.1	709
$\bar{K}^*(892)^0 \pi^+ \pi^-$ total	$( 2.2 \pm 0.5 ) \%$		683
$\bar{K}^*(892)^0 \pi^+ \pi^-$ 3-body	$( 1.42 \pm 0.31 ) \%$		683
$K^- \pi^+ \rho^0$ total	$( 6.2 \pm 0.4 ) \%$		612
$K^- \pi^+ \rho^0$ 3-body	$( 4.7 \pm 2.1 ) \times 10^{-3}$		612
$\bar{K}^*(892)^0 \rho^0$	$( 1.45 \pm 0.32 ) \%$		418
$\bar{K}^*(892)^0 \rho^0$ transverse	$( 1.5 \pm 0.5 ) \%$		418
$\bar{K}^*(892)^0 \rho^0$ S-wave	$( 2.8 \pm 0.6 ) \%$		418
$\bar{K}^*(892)^0 \rho^0$ S-wave long.	$< 3 \times 10^{-3}$	CL=90%	418
$\bar{K}^*(892)^0 \rho^0$ P-wave	$< 3 \times 10^{-3}$	CL=90%	418
$\bar{K}^*(892)^0 \rho^0$ D-wave	$( 1.9 \pm 0.6 ) \%$		418
$K^*(892)^- \rho^+$	$( 6.5 \pm 2.6 ) \%$		422
$K^*(892)^- \rho^+$ longitudinal	$( 3.1 \pm 1.3 ) \%$		422
$K^*(892)^- \rho^+$ transverse	$( 3.4 \pm 2.0 ) \%$		422
$K^*(892)^- \rho^+$ P-wave	$< 1.5 \%$	CL=90%	422
$K_1(1270)^- \pi^+$	[ss] $( 1.13 \pm 0.31 ) \%$		483
$K_1(1400)^- \pi^+$	$< 1.2 \%$	CL=90%	386
$\bar{K}_1(1400)^0 \pi^0$	$< 3.7 \%$	CL=90%	387
$K_0^*(1430)^- \pi^+$	$( 1.18 \pm 0.25 ) \%$		364
$\bar{K}_0^*(1430)^0 \pi^0$	$( 8.6 \begin{smallmatrix} +6.8 \\ -2.3 \end{smallmatrix} ) \times 10^{-3}$		—
$K_2^*(1430)^- \pi^+$	$< 9 \times 10^{-3}$	CL=90%	367
$\bar{K}_2^*(1430)^0 \pi^0$	$< 3.4 \times 10^{-3}$	CL=90%	363
$K^*(1680)^- \pi^+$	$( 1.3 \pm 0.5 ) \%$		—
$\bar{K}^*(892)^0 \pi^+ \pi^- \pi^0$	$( 1.8 \pm 0.9 ) \%$		641
$\bar{K}^*(892)^0 \eta$	$( 1.8 \pm 0.4 ) \%$		580
$K^- \pi^+ \omega$	$( 3.0 \pm 0.6 ) \%$		605

$\bar{K}^*(892)^0 \omega$	( 1.1 $\pm$ 0.4 ) %		406
$K^- \pi^+ \eta'(958)$	( 6.9 $\pm$ 1.8 ) $\times 10^{-3}$		479
$\bar{K}^*(892)^0 \eta'(958)$	< 1.0 $\times 10^{-3}$	CL=90%	99
$K^- \pi^+ \phi$	( 3.3 $\pm$ 1.7 ) $\times 10^{-4}$		—

### Pionic modes

$\pi^+ \pi^-$	( 1.43 $\pm$ 0.07 ) $\times 10^{-3}$		922
$\pi^0 \pi^0$	( 8.4 $\pm$ 2.2 ) $\times 10^{-4}$		922
$\pi^+ \pi^- \pi^0$	( 1.1 $\pm$ 0.4 ) %		907
$\pi^+ \pi^+ \pi^- \pi^-$	( 7.3 $\pm$ 0.5 ) $\times 10^{-3}$		879

### Hadronic modes with a $K\bar{K}$ pair

$K^+ K^-$	( 4.12 $\pm$ 0.14 ) $\times 10^{-3}$		791
$K^0 \bar{K}^0$	( 7.1 $\pm$ 1.9 ) $\times 10^{-4}$	S=1.2	788
$K^0 K^- \pi^+$	( 6.9 $\pm$ 1.0 ) $\times 10^{-3}$	S=1.1	739
$\bar{K}^*(892)^0 K^0$ $\times B(\bar{K}^{*0} \rightarrow K^- \pi^+)$	< 1.1 $\times 10^{-3}$	CL=90%	605
$K^*(892)^+ K^-$ $\times B(K^{*+} \rightarrow K^0 \pi^+)$	( 2.5 $\pm$ 0.5 ) $\times 10^{-3}$		610
$K^0 K^- \pi^+$ nonresonant	( 2.3 $\pm$ 2.3 ) $\times 10^{-3}$		739
$\bar{K}^0 K^+ \pi^-$	( 5.2 $\pm$ 1.0 ) $\times 10^{-3}$		739
$K^*(892)^0 \bar{K}^0$ $\times B(K^{*0} \rightarrow K^+ \pi^-)$	< 6 $\times 10^{-4}$	CL=90%	605
$K^*(892)^- K^+$ $\times B(K^{*-} \rightarrow \bar{K}^0 \pi^-)$	( 1.3 $\pm$ 0.7 ) $\times 10^{-3}$		610
$\bar{K}^0 K^+ \pi^-$ nonresonant	( 3.8 $^{+2.3}_{-1.9}$ ) $\times 10^{-3}$		739
$K^+ K^- \pi^0$	( 1.24 $\pm$ 0.35 ) $\times 10^{-3}$		742
$K_S^0 K_S^0 \pi^0$	< 5.9 $\times 10^{-4}$		739
$K^+ K^- \pi^+ \pi^-$	[xx] ( 2.49 $\pm$ 0.23 ) $\times 10^{-3}$		676
$\phi \pi^+ \pi^- \times B(\phi \rightarrow K^+ K^-)$	( 5.3 $\pm$ 1.4 ) $\times 10^{-4}$		614
$\phi \rho^0 \times B(\phi \rightarrow K^+ K^-)$	( 2.9 $\pm$ 1.5 ) $\times 10^{-4}$		260
$K^+ K^- \rho^0$ 3-body	( 9.0 $\pm$ 2.3 ) $\times 10^{-4}$		309
$K^*(892)^0 K^- \pi^+ + c.c.$	[yy] < 5 $\times 10^{-4}$		528
$\times B(K^{*0} \rightarrow K^+ \pi^-)$			
$K^*(892)^0 \bar{K}^*(892)^0$ $\times B^2(K^{*0} \rightarrow K^+ \pi^-)$	( 6 $\pm$ 2 ) $\times 10^{-4}$		257
$K^+ K^- \pi^+ \pi^-$ nonresonant	< 8 $\times 10^{-4}$	CL=90%	676
$K^0 \bar{K}^0 \pi^+ \pi^-$	( 7.5 $\pm$ 2.9 ) $\times 10^{-3}$		673
$K^+ K^- \pi^+ \pi^- \pi^0$	( 3.1 $\pm$ 2.0 ) $\times 10^{-3}$		600

Fractions of most of the following modes with resonances have already appeared above as submodes of particular charged-particle modes.

$\bar{K}^*(892)^0 K^0$	< 1.7	$\times 10^{-3}$	CL=90%	605
$K^*(892)^+ K^-$	( 3.8 $\pm$ 0.8 )	$\times 10^{-3}$		610
$K^*(892)^0 \bar{K}^0$	< 9	$\times 10^{-4}$	CL=90%	605
$K^*(892)^- K^+$	( 2.0 $\pm$ 1.1 )	$\times 10^{-3}$		610
$\phi \pi^0$	< 1.4	$\times 10^{-3}$	CL=90%	644
$\phi \eta$	< 2.8	$\times 10^{-3}$	CL=90%	489
$\phi \omega$	< 2.1	$\times 10^{-3}$	CL=90%	239
$\phi \pi^+ \pi^-$	( 1.07 $\pm$ 0.28 )	$\times 10^{-3}$		614
$\phi \rho^0$	( 5.7 $\pm$ 3.0 )	$\times 10^{-4}$		260
$\phi \pi^+ \pi^-$ 3-body	( 7 $\pm$ 5 )	$\times 10^{-4}$		614
$K^*(892)^0 K^- \pi^+ + \text{c.c.}$	[yy] < 7	$\times 10^{-4}$	CL=90%	528
$K^*(892)^0 \bar{K}^*(892)^0$	( 1.4 $\pm$ 0.5 )	$\times 10^{-3}$		257

#### Radiative modes

$\rho^0 \gamma$	< 2.4	$\times 10^{-4}$	CL=90%	773
$\omega \gamma$	< 2.4	$\times 10^{-4}$	CL=90%	768
$\phi \gamma$	< 1.9	$\times 10^{-4}$	CL=90%	654
$\bar{K}^*(892)^0 \gamma$	< 7.6	$\times 10^{-4}$	CL=90%	717

#### Doubly Cabibbo suppressed (DC) modes, $\Delta C = 2$ forbidden via mixing (C2M) modes, $\Delta C = 1$ weak neutral current (C1) modes, Lepton Family number (LF) violating modes, or Lepton number (L) violating modes

$K^+ \ell^- \bar{\nu}_\ell$ (via $\bar{D}^0$ )	C2M	< 1.7	$\times 10^{-4}$	CL=90%	—
$K^+ \pi^-$	DC	( 1.48 $\pm$ 0.21 )	$\times 10^{-4}$		861
$K^+ \pi^-$ (via $\bar{D}^0$ )	C2M	< 1.6	$\times 10^{-5}$	CL=95%	861
$K^+ \pi^- \pi^0$		( 5.6 $\pm$ 1.7 )	$\times 10^{-4}$		844
$K^+ \pi^- \pi^+ \pi^-$	DC	( 3.1 $\pm$ 1.0 )	$\times 10^{-4}$		812
$K^+ \pi^- \pi^+ \pi^-$ (via $\bar{D}^0$ )	C2M	< 4	$\times 10^{-4}$	CL=90%	812
$K^+ \pi^-$ or $K^+ \pi^- \pi^+ \pi^-$ (via $\bar{D}^0$ )		< 1.0	$\times 10^{-3}$	CL=90%	—
$\mu^-$ anything (via $\bar{D}^0$ )	C2M	< 4	$\times 10^{-4}$	CL=90%	—
$e^+ e^-$	C1	< 6.2	$\times 10^{-6}$	CL=90%	932
$\mu^+ \mu^-$	C1	< 4.1	$\times 10^{-6}$	CL=90%	926
$\pi^0 e^+ e^-$	C1	< 4.5	$\times 10^{-5}$	CL=90%	927
$\pi^0 \mu^+ \mu^-$	C1	< 1.8	$\times 10^{-4}$	CL=90%	915
$\eta e^+ e^-$	C1	< 1.1	$\times 10^{-4}$	CL=90%	852
$\eta \mu^+ \mu^-$	C1	< 5.3	$\times 10^{-4}$	CL=90%	838
$\pi^+ \pi^- e^+ e^-$	C1	< 3.73	$\times 10^{-4}$	CL=90%	922
$\rho^0 e^+ e^-$	C1	< 1.0	$\times 10^{-4}$	CL=90%	773
$\pi^+ \pi^- \mu^+ \mu^-$	C1	< 3.0	$\times 10^{-5}$	CL=90%	894
$\rho^0 \mu^+ \mu^-$	C1	< 2.2	$\times 10^{-5}$	CL=90%	756

$\omega e^+ e^-$	<i>CI</i>	< 1.8	$\times 10^{-4}$	CL=90%	768
$\omega \mu^+ \mu^-$	<i>CI</i>	< 8.3	$\times 10^{-4}$	CL=90%	751
$K^- K^+ e^+ e^-$	<i>CI</i>	< 3.15	$\times 10^{-4}$	CL=90%	790
$\phi e^+ e^-$	<i>CI</i>	< 5.2	$\times 10^{-5}$	CL=90%	654
$K^- K^+ \mu^+ \mu^-$	<i>CI</i>	< 3.3	$\times 10^{-5}$	CL=90%	709
$\phi \mu^+ \mu^-$	<i>CI</i>	< 3.1	$\times 10^{-5}$	CL=90%	631
$\overline{K}^0 e^+ e^-$		[ <i>uu</i> ] < 1.1	$\times 10^{-4}$	CL=90%	866
$\overline{K}^0 \mu^+ \mu^-$		[ <i>uu</i> ] < 2.6	$\times 10^{-4}$	CL=90%	852
$K^- \pi^+ e^+ e^-$	<i>CI</i>	< 3.85	$\times 10^{-4}$	CL=90%	861
$\overline{K}^*(892)^0 e^+ e^-$		[ <i>uu</i> ] < 4.7	$\times 10^{-5}$	CL=90%	717
$K^- \pi^+ \mu^+ \mu^-$	<i>CI</i>	< 3.59	$\times 10^{-4}$	CL=90%	829
$\overline{K}^*(892)^0 \mu^+ \mu^-$		[ <i>uu</i> ] < 2.4	$\times 10^{-5}$	CL=90%	698
$\pi^+ \pi^- \pi^0 \mu^+ \mu^-$	<i>CI</i>	< 8.1	$\times 10^{-4}$	CL=90%	863
$\mu^\pm e^\mp$	<i>LF</i>	[ <i>ff</i> ] < 8.1	$\times 10^{-6}$	CL=90%	929
$\pi^0 e^\pm \mu^\mp$	<i>LF</i>	[ <i>ff</i> ] < 8.6	$\times 10^{-5}$	CL=90%	924
$\eta e^\pm \mu^\mp$	<i>LF</i>	[ <i>ff</i> ] < 1.0	$\times 10^{-4}$	CL=90%	848
$\pi^+ \pi^- e^\pm \mu^\mp$	<i>LF</i>	[ <i>ff</i> ] < 1.5	$\times 10^{-5}$	CL=90%	911
$\rho^0 e^\pm \mu^\mp$	<i>LF</i>	[ <i>ff</i> ] < 4.9	$\times 10^{-5}$	CL=90%	769
$\omega e^\pm \mu^\mp$	<i>LF</i>	[ <i>ff</i> ] < 1.2	$\times 10^{-4}$	CL=90%	764
$K^- K^+ e^\pm \mu^\mp$	<i>LF</i>	[ <i>ff</i> ] < 1.8	$\times 10^{-4}$	CL=90%	754
$\phi e^\pm \mu^\mp$	<i>LF</i>	[ <i>ff</i> ] < 3.4	$\times 10^{-5}$	CL=90%	648
$\overline{K}^0 e^\pm \mu^\mp$	<i>LF</i>	[ <i>ff</i> ] < 1.0	$\times 10^{-4}$	CL=90%	862
$K^- \pi^+ e^\pm \mu^\mp$	<i>LF</i>	[ <i>ff</i> ] < 5.53	$\times 10^{-4}$	CL=90%	848
$\overline{K}^*(892)^0 e^\pm \mu^\mp$	<i>LF</i>	[ <i>ff</i> ] < 8.3	$\times 10^{-5}$	CL=90%	712
$\pi^- \pi^- e^+ e^+ + \text{c.c.}$	<i>L</i>	< 1.12	$\times 10^{-4}$	CL=90%	922
$\pi^- \pi^- \mu^+ \mu^+ + \text{c.c.}$	<i>L</i>	< 2.9	$\times 10^{-5}$	CL=90%	894
$K^- \pi^- e^+ e^+ + \text{c.c.}$	<i>L</i>	< 2.06	$\times 10^{-4}$	CL=90%	861
$K^- \pi^- \mu^+ \mu^+ + \text{c.c.}$	<i>L</i>	< 3.9	$\times 10^{-4}$	CL=90%	829
$K^- K^- e^+ e^+ + \text{c.c.}$	<i>L</i>	< 1.52	$\times 10^{-4}$	CL=90%	790
$K^- K^- \mu^+ \mu^+ + \text{c.c.}$	<i>L</i>	< 9.4	$\times 10^{-5}$	CL=90%	709
$\pi^- \pi^- e^+ \mu^+ + \text{c.c.}$	<i>L</i>	< 7.9	$\times 10^{-5}$	CL=90%	911
$K^- \pi^- e^+ \mu^+ + \text{c.c.}$	<i>L</i>	< 2.18	$\times 10^{-4}$	CL=90%	848
$K^- K^- e^+ \mu^+ + \text{c.c.}$	<i>L</i>	< 5.7	$\times 10^{-5}$	CL=90%	754

## $D^*(2007)^0$

$$I(J^P) = \frac{1}{2}(1^-)$$

$I, J, P$  need confirmation.

Mass  $m = 2006.7 \pm 0.5$  MeV ( $S = 1.1$ )

$m_{D^{*0}} - m_{D^0} = 142.12 \pm 0.07$  MeV

Full width  $\Gamma < 2.1$  MeV, CL = 90%

$\bar{D}^*(2007)^0$  modes are charge conjugates of modes below.

$D^*(2007)^0$ DECAY MODES	Fraction ( $\Gamma_i/\Gamma$ )	$p$ (MeV/c)
$D^0 \pi^0$	(61.9±2.9) %	43
$D^0 \gamma$	(38.1±2.9) %	137

## $D^*(2010)^\pm$

$$I(J^P) = \frac{1}{2}(1^-)$$

$I, J, P$  need confirmation.

Mass  $m = 2010.0 \pm 0.5$  MeV ( $S = 1.1$ )

$m_{D^*(2010)^+} - m_{D^+} = 140.64 \pm 0.10$  MeV ( $S = 1.1$ )

$m_{D^*(2010)^+} - m_{D^0} = 145.421 \pm 0.010$  MeV ( $S = 1.1$ )

Full width  $\Gamma = 96 \pm 22$  keV

$D^*(2010)^-$  modes are charge conjugates of the modes below.

$D^*(2010)^\pm$ DECAY MODES	Fraction ( $\Gamma_i/\Gamma$ )	$p$ (MeV/c)
$D^0 \pi^+$	(67.7±0.5) %	39
$D^+ \pi^0$	(30.7±0.5) %	38
$D^+ \gamma$	( 1.6±0.4) %	136

## $D_1(2420)^0$

$$I(J^P) = \frac{1}{2}(1^+)$$

$I, J, P$  need confirmation.

Mass  $m = 2422.2 \pm 1.8$  MeV ( $S = 1.2$ )

Full width  $\Gamma = 18.9^{+4.6}_{-3.5}$  MeV

$\bar{D}_1(2420)^0$  modes are charge conjugates of modes below.

$D_1(2420)^0$ DECAY MODES	Fraction ( $\Gamma_i/\Gamma$ )	$p$ (MeV/c)
$D^*(2010)^+ \pi^-$	seen	355
$D^+ \pi^-$	not seen	474

## $D_2^*(2460)^0$

$$I(J^P) = \frac{1}{2}(2^+)$$

$J^P = 2^+$  assignment strongly favored (ALBRECHT 89B).

$$\text{Mass } m = 2458.9 \pm 2.0 \text{ MeV} \quad (S = 1.2)$$

$$\text{Full width } \Gamma = 23 \pm 5 \text{ MeV}$$

$\bar{D}_2^*(2460)^0$  modes are charge conjugates of modes below.

$D_2^*(2460)^0$ DECAY MODES	Fraction ( $\Gamma_i/\Gamma$ )	$p$ (MeV/c)
$D^+ \pi^-$	seen	503
$D^*(2010)^+ \pi^-$	seen	387

## $D_2^*(2460)^\pm$

$$I(J^P) = \frac{1}{2}(2^+)$$

$J^P = 2^+$  assignment strongly favored (ALBRECHT 89B).

$$\text{Mass } m = 2459 \pm 4 \text{ MeV} \quad (S = 1.7)$$

$$m_{D_2^*(2460)^\pm} - m_{D_2^*(2460)^0} = 0.9 \pm 3.3 \text{ MeV} \quad (S = 1.1)$$

$$\text{Full width } \Gamma = 25^{+8}_{-7} \text{ MeV}$$

$D_2^*(2460)^\pm$  modes are charge conjugates of modes below.

$D_2^*(2460)^\pm$ DECAY MODES	Fraction ( $\Gamma_i/\Gamma$ )	$p$ (MeV/c)
$D^0 \pi^+$	seen	508
$D^{*0} \pi^+$	seen	390