$c\overline{c}$ MESONS

$\eta_c(1S)$

$I^G(J^{PC}) = 0^+(0^{-+})$

Mass $m = 2980.3 \pm 1.2$ MeV (S = 1.6)
Full width $\Gamma = 28.6 \pm 2.2$ MeV (S = 2.0)

$\eta_c(1S)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
Decays involving hadronic resonances			
$\eta'(958)\pi\pi$	(4.1 ± 1.7) %		1321
$\rho\rho$	(2.0 ± 0.7) %		1272
$K^*(892)^0 K^-\pi^+ +$ c.c.	(2.0 ± 0.7) %		1276
$K^*(892)\overline{K}^*(892)$	$(9.2 \pm 3.4) \times 10^{-3}$		1194
$K^{*0}\overline{K}^{*0}\pi^+\pi^-$	(1.1 ± 0.5) %		1071
$\phi K^+ K^-$	$(2.9 \pm 1.4) \times 10^{-3}$		1102
$\phi\phi$	$(2.7 \pm 0.9) \times 10^{-3}$		1087
$\phi 2(\pi^+\pi^-)$	$< 3.5 \times 10^{-3}$	90%	1249
$a_0(980)\pi$	< 2 %	90%	1325
$a_2(1320)\pi$	< 2 %	90%	1194
$K^*(892)\overline{K} +$ c.c.	< 1.28 %	90%	1308
$f_2(1270)\eta$	< 1.1 %	90%	1143
$\omega\omega$	$< 3.1 \times 10^{-3}$	90%	1268
$\omega\phi$	$< 1.7 \times 10^{-3}$	90%	1183
$f_2(1270) f_2(1270)$	$(7.6\ ^{+3.0}_{-3.4}) \times 10^{-3}$		771
$f_2(1270) f_2'(1525)$	(2.7 ± 1.5) %		509
Decays into stable hadrons			
$K\overline{K}\pi$	(7.0 ± 1.2) %		1379
$\eta\pi\pi$	(4.9 ± 1.8) %		1427
$\pi^+\pi^- K^+ K^-$	(1.5 ± 0.6) %		1343
$K^+ K^- 2(\pi^+\pi^-)$	$(7.1 \pm 2.9) \times 10^{-3}$		1252
$2(K^+ K^-)$	$(1.6 \pm 0.7) \times 10^{-3}$		1053
$2(\pi^+\pi^-)$	(1.20 ± 0.30) %		1457
$3(\pi^+\pi^-)$	(1.5 ± 0.5) %		1405
$p\overline{p}$	$(1.3 \pm 0.4) \times 10^{-3}$		1158
$\Lambda\overline{\Lambda}$	$(1.04 \pm 0.31) \times 10^{-3}$		988
$K\overline{K}\eta$	< 3.1 %	90%	1263
$\pi^+\pi^- p\overline{p}$	< 1.2 %	90%	1024
Radiative decays			
$\gamma\gamma$	$(6.3 \pm 2.9) \times 10^{-5}$		1490

Charge conjugation (C), Parity (P), Lepton family number (LF) violating modes

$\pi^+\pi^-$	P,CP	< 6	$\times 10^{-4}$	90%	1484
$\pi^0\pi^0$	P,CP	< 4	$\times 10^{-4}$	90%	1484
K^+K^-	P,CP	< 6	$\times 10^{-4}$	90%	1406
$K^0_S K^0_S$	P,CP	< 3.1	$\times 10^{-4}$	90%	1405

$J/\psi(1S)$

$I^G(J^{PC}) = 0^-(1^{--})$

Mass $m = 3096.916 \pm 0.011$ MeV
Full width $\Gamma = 92.9 \pm 2.8$ keV (S = 1.1)
$\Gamma_{ee} = 5.55 \pm 0.14 \pm 0.02$ keV

$J/\psi(1S)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
hadrons	(87.7 ±0.5) %		–
virtual $\gamma \rightarrow$ hadrons	(13.50 ±0.30) %		–
ggg	(64.1 ±1.0) %		–
γgg	(8.8 ±0.5) %		–
e^+e^-	(5.94 ±0.06) %		1548
$\mu^+\mu^-$	(5.93 ±0.06) %		1545
Decays involving hadronic resonances			
$\rho\pi$	(1.69 ±0.15) %	S=2.4	1448
$\rho^0\pi^0$	(5.6 ±0.7) $\times 10^{-3}$		1448
$a_2(1320)\rho$	(1.09 ±0.22) %		1123
$\omega\pi^+\pi^+\pi^-\pi^-$	(8.5 ±3.4) $\times 10^{-3}$		1392
$\omega\pi^+\pi^-\pi^0$	(4.0 ±0.7) $\times 10^{-3}$		1418
$\omega\pi^+\pi^-$	(8.6 ±0.7) $\times 10^{-3}$	S=1.1	1435
$\omega f_2(1270)$	(4.3 ±0.6) $\times 10^{-3}$		1142
$K^*(892)^0\overline{K}{}^*_2(1430)^0 +$ c.c.	(6.0 ±0.6) $\times 10^{-3}$		1012
$K^*(892)^0\overline{K}_2(1770)^0 +$ c.c. $\rightarrow$ $K^*(892)^0 K^-\pi^+ +$ c.c.	(6.9 ±0.9) $\times 10^{-4}$		–
$\omega K^*(892)\overline{K} +$ c.c.	(6.1 ±0.9) $\times 10^{-3}$		1097
$K^+\overline{K}{}^*(892)^- +$ c.c.	(5.12 ±0.30) $\times 10^{-3}$		1373
$K^+\overline{K}{}^*(892)^- +$ c.c. $\rightarrow$ $K^+K^-\pi^0$	(1.97 ±0.20) $\times 10^{-3}$		–
$K^+\overline{K}{}^*(892)^- +$ c.c. $\rightarrow$ $K^0\overline{K}{}^0\pi^-$	(3.0 ±0.4) $\times 10^{-3}$		–
$K^0\overline{K}{}^*(892)^0 +$ c.c.	(4.39 ±0.31) $\times 10^{-3}$		1373
$K^0\overline{K}{}^*(892)^0 +$ c.c. $\rightarrow$ $K^0K^\pm\pi^\mp$	(3.2 ±0.4) $\times 10^{-3}$		–
$K_1(1400)^\pm K^\mp$	(3.8 ±1.4) $\times 10^{-3}$		1170
$\overline{K}{}^*(892)^0 K^+\pi^- +$ c.c.	seen		1343
$\omega\pi^0\pi^0$	(3.4 ±0.8) $\times 10^{-3}$		1436

$b_1(1235)^{\pm}\pi^{\mp}$	[a]	(3.0	± 0.5)	$\times 10^{-3}$		1300
$\omega K^{\pm} K_S^0 \pi^{\mp}$	[a]	(3.4	± 0.5)	$\times 10^{-3}$		1210
$b_1(1235)^0\pi^0$		(2.3	± 0.6)	$\times 10^{-3}$		1300
$\eta K^{\pm} K_S^0 \pi^{\mp}$	[a]	(2.2	± 0.4)	$\times 10^{-3}$		1278
$\phi K^*(892)\overline{K}$ + c.c.		(2.18	± 0.23)	$\times 10^{-3}$		969
$\omega K\overline{K}$		(1.6	± 0.5)	$\times 10^{-4}$		1268
$\omega f_0(1710) \rightarrow \omega K\overline{K}$		(4.8	± 1.1)	$\times 10^{-4}$		878
$\phi 2(\pi^+\pi^-)$		(1.66	± 0.23)	$\times 10^{-3}$		1318
$\Delta(1232)^{++}\overline{p}\pi^-$		(1.6	± 0.5)	$\times 10^{-3}$		1030
$\omega\eta$		(1.74	± 0.20)	$\times 10^{-3}$	S=1.6	1394
$\phi K\overline{K}$		(1.83	± 0.24)	$\times 10^{-3}$	S=1.5	1179
$\phi f_0(1710) \rightarrow \phi K\overline{K}$		(3.6	± 0.6)	$\times 10^{-4}$		875
$\Delta(1232)^{++}\overline{\Delta}(1232)^{--}$		(1.10	± 0.29)	$\times 10^{-3}$		938
$\Sigma(1385)^-\overline{\Sigma}(1385)^+$ (or c.c.)	[a]	(1.03	± 0.13)	$\times 10^{-3}$		697
$\phi f_2'(1525)$		(8	± 4)	$\times 10^{-4}$	S=2.7	871
$\phi\pi^+\pi^-$		(8.7	± 0.8)	$\times 10^{-4}$		1365
$\phi\pi^0\pi^0$		(5.6	± 1.6)	$\times 10^{-4}$		1366
$\phi K^{\pm} K_S^0 \pi^{\mp}$	[a]	(7.2	± 0.8)	$\times 10^{-4}$		1114
$\omega f_1(1420)$		(6.8	± 2.4)	$\times 10^{-4}$		1062
$\phi\eta$		(7.5	± 0.8)	$\times 10^{-4}$	S=1.5	1320
$\Xi^0\overline{\Xi}^0$		(1.20	± 0.24)	$\times 10^{-3}$		818
$\Xi(1530)^-\overline{\Xi}^+$		(5.9	± 1.5)	$\times 10^{-4}$		600
$pK^-\overline{\Sigma}(1385)^0$		(5.1	± 3.2)	$\times 10^{-4}$		646
$\omega\pi^0$		(4.5	± 0.5)	$\times 10^{-4}$	S=1.4	1446
$\phi\eta'(958)$		(4.0	± 0.7)	$\times 10^{-4}$	S=2.1	1192
$\phi f_0(980)$		(3.2	± 0.9)	$\times 10^{-4}$	S=1.9	1182
$\phi f_0(980) \rightarrow \phi\pi^+\pi^-$		(2.2	± 0.4)	$\times 10^{-4}$		–
$\phi f_0(980) \rightarrow \phi\pi^0\pi^0$		(1.7	± 0.7)	$\times 10^{-4}$		–
$\Xi(1530)^0\overline{\Xi}^0$		(3.2	± 1.4)	$\times 10^{-4}$		608
$\Sigma(1385)^-\overline{\Sigma}^+$ (or c.c.)	[a]	(3.1	± 0.5)	$\times 10^{-4}$		855
$\phi f_1(1285)$		(2.6	± 0.5)	$\times 10^{-4}$	S=1.1	1032
$\eta\pi^+\pi^-$		(4.0	± 1.7)	$\times 10^{-4}$		1487
$\rho\eta$		(1.93	± 0.23)	$\times 10^{-4}$		1396
$\omega\eta'(958)$		(1.82	± 0.21)	$\times 10^{-4}$		1279
$\omega f_0(980)$		(1.4	± 0.5)	$\times 10^{-4}$		1271
$\rho\eta'(958)$		(1.05	± 0.18)	$\times 10^{-4}$		1281
$a_2(1320)^{\pm}\pi^{\mp}$	[a]	$<$ 4.3		$\times 10^{-3}$	CL=90%	1263
$K\overline{K}_2^*(1430)$ + c.c.		$<$ 4.0		$\times 10^{-3}$	CL=90%	1159
$K_1(1270)^{\pm}K^{\mp}$		$<$ 3.0		$\times 10^{-3}$	CL=90%	1231
$K_2^*(1430)^0\overline{K}_2^*(1430)^0$		$<$ 2.9		$\times 10^{-3}$	CL=90%	604
$K^*(892)^0\overline{K}^*(892)^0$		(2.3	± 0.7)	$\times 10^{-4}$		1266
$\phi f_2(1270)$		(7.2	± 1.3)	$\times 10^{-4}$		1036
$\phi\eta(1405) \rightarrow \phi\eta\pi\pi$		$<$ 2.5		$\times 10^{-4}$	CL=90%	946
$\omega f_2'(1525)$		$<$ 2.2		$\times 10^{-4}$	CL=90%	1003

$\Sigma(1385)^0\overline{\Lambda}$	$<$	2	$\times 10^{-4}$	CL=90%	912
$\Delta(1232)^+\overline{p}$	$<$	1	$\times 10^{-4}$	CL=90%	1100
$\Theta(1540)\overline{\Theta}(1540) \rightarrow$ $K^0_S p K^- \overline{n}+$ c.c.	$<$	1.1	$\times 10^{-5}$	CL=90%	–
$\Theta(1540) K^- \overline{n} \rightarrow K^0_S p K^- \overline{n}$	$<$	2.1	$\times 10^{-5}$	CL=90%	–
$\Theta(1540) K^0_S \overline{p} \rightarrow K^0_S \overline{p} K^+ n$	$<$	1.6	$\times 10^{-5}$	CL=90%	–
$\overline{\Theta}(1540) K^+ n \rightarrow K^0_S \overline{p} K^+ n$	$<$	5.6	$\times 10^{-5}$	CL=90%	–
$\overline{\Theta}(1540) K^0_S p \rightarrow K^0_S p K^- \overline{n}$	$<$	1.1	$\times 10^{-5}$	CL=90%	–
$\Sigma^0\overline{\Lambda}$	$<$	9	$\times 10^{-5}$	CL=90%	1032
$\phi\pi^0$	$<$	6.4	$\times 10^{-6}$	CL=90%	1377

Decays into stable hadrons

$2(\pi^+\pi^-)\pi^0$		(5.5	± 0.4) %		1496
$3(\pi^+\pi^-)\pi^0$		(2.9	± 0.6) %		1433
$\pi^+\pi^-\pi^0$		(2.07	± 0.12) %	S=1.6	1533
$\pi^+\pi^-\pi^0 K^+ K^-$		(1.94	± 0.15) %		1368
$4(\pi^+\pi^-)\pi^0$		(9.0	± 3.0) $\times 10^{-3}$		1345
$\pi^+\pi^- K^+ K^-$		(6.6	± 0.5) $\times 10^{-3}$		1407
$\pi^+\pi^- K^+ K^- \eta$		(1.84	± 0.28) $\times 10^{-3}$		1221
$\pi^0\pi^0 K^+ K^-$		(2.45	± 0.31) $\times 10^{-3}$		1410
$\eta\phi f_0(980) \rightarrow \eta\phi\pi^+\pi^-$		(3.2	± 1.0) $\times 10^{-4}$		–
$K\overline{K}\pi$		(6.1	± 1.0) $\times 10^{-3}$		1442
$2(\pi^+\pi^-)$		(3.55	± 0.23) $\times 10^{-3}$		1517
$3(\pi^+\pi^-)$		(4.3	± 0.4) $\times 10^{-3}$		1466
$2(\pi^+\pi^-\pi^0)$		(1.61	± 0.21) %		1468
$2(\pi^+\pi^-)\eta$		(2.29	± 0.24) $\times 10^{-3}$		1446
$3(\pi^+\pi^-)\eta$		(7.2	± 1.5) $\times 10^{-4}$		1379
$p\overline{p}$		(2.17	± 0.07) $\times 10^{-3}$		1232
$p\overline{p}\pi^0$		(1.19	± 0.08) $\times 10^{-3}$	S=1.1	1176
$p\overline{p}\pi^+\pi^-$		(6.0	± 0.5) $\times 10^{-3}$	S=1.3	1107
$p\overline{p}\pi^+\pi^-\pi^0$	[b]	(2.3	± 0.9) $\times 10^{-3}$	S=1.9	1033
$p\overline{p}\eta$		(2.00	± 0.12) $\times 10^{-3}$		948
$p\overline{p}\rho$	$<$	3.1	$\times 10^{-4}$	CL=90%	774
$p\overline{p}\omega$		(1.10	± 0.15) $\times 10^{-3}$	S=1.3	768
$p\overline{p}\eta'(958)$		(2.1	± 0.4) $\times 10^{-4}$		596
$p\overline{p}\phi$		(4.5	± 1.5) $\times 10^{-5}$		527
$n\overline{n}$		(2.2	± 0.4) $\times 10^{-3}$		1231
$n\overline{n}\pi^+\pi^-$		(4	± 4) $\times 10^{-3}$		1106
$\Sigma^+\overline{\Sigma}^-$		(1.50	± 0.24) $\times 10^{-3}$		992
$\Sigma^0\overline{\Sigma}^0$		(1.29	± 0.09) $\times 10^{-3}$		988
$2(\pi^+\pi^-)K^+K^-$		(5.0	± 0.5) $\times 10^{-3}$		1320
$p\overline{n}\pi^-$		(2.12	± 0.09) $\times 10^{-3}$		1174
$nN(1440)$		seen			978
$nN(1520)$		seen			924

$nN(1535)$		seen				914
$\Xi^-\overline{\Xi}^+$		(8.5	± 1.6)	$\times 10^{-4}$	S=1.5	807
$\Lambda\overline{\Lambda}$		(1.61	± 0.15)	$\times 10^{-3}$	S=1.9	1074
$\Lambda\overline{\Sigma}^-\pi^+$ (or c.c.)	[a]	(8.3	± 0.7)	$\times 10^{-4}$	S=1.2	950
$pK^-\overline{\Lambda}$		(8.9	± 1.6)	$\times 10^{-4}$		876
$2(K^+K^-)$		(7.6	± 0.9)	$\times 10^{-4}$		1131
$pK^-\overline{\Sigma}^0$		(2.9	± 0.8)	$\times 10^{-4}$		819
K^+K^-		(2.37	± 0.31)	$\times 10^{-4}$		1468
$K^0_S K^0_L$		(1.46	± 0.26)	$\times 10^{-4}$	S=2.7	1466
$\Lambda\overline{\Lambda}\eta$		(2.6	± 0.7)	$\times 10^{-4}$		672
$\Lambda\overline{\Lambda}\pi^0$		< 6.4		$\times 10^{-5}$	CL=90%	998
$\overline{\Lambda}nK^0_S$ + c.c.		(6.5	± 1.1)	$\times 10^{-4}$		872
$\pi^+\pi^-$		(1.47	± 0.23)	$\times 10^{-4}$		1542
$\Lambda\overline{\Sigma}$ + c.c.		< 1.5		$\times 10^{-4}$	CL=90%	1034
$K^0_S K^0_S$		< 1		$\times 10^{-6}$	CL=95%	1466

Radiative decays

3γ		(1.2	± 0.4)	$\times 10^{-5}$		1548
4γ		< 9		$\times 10^{-6}$	CL=90%	1548
5γ		< 1.5		$\times 10^{-5}$	CL=90%	1548
$\gamma\eta_c(1S)$		(1.7	± 0.4)	%	S=1.6	114
$\gamma\eta_c(1S) \rightarrow 3\gamma$		(1.2	$^{+2.7}_{-1.1}$)	$\times 10^{-6}$		–
$\gamma\pi^+\pi^- 2\pi^0$		(8.3	± 3.1)	$\times 10^{-3}$		1518
$\gamma\eta\pi\pi$		(6.1	± 1.0)	$\times 10^{-3}$		1487
$\gamma\eta_2(1870) \rightarrow \gamma\eta\pi^+\pi^-$		(6.2	± 2.4)	$\times 10^{-4}$		–
$\gamma\eta(1405/1475) \rightarrow \gamma K\overline{K}\pi$	[c]	(2.8	± 0.6)	$\times 10^{-3}$	S=1.6	1223
$\gamma\eta(1405/1475) \rightarrow \gamma\gamma\rho^0$		(7.8	± 2.0)	$\times 10^{-5}$	S=1.8	1223
$\gamma\eta(1405/1475) \rightarrow \gamma\eta\pi^+\pi^-$		(3.0	± 0.5)	$\times 10^{-4}$		–
$\gamma\eta(1405/1475) \rightarrow \gamma\gamma\phi$		< 8.2		$\times 10^{-5}$	CL=95%	–
$\gamma\rho\rho$		(4.5	± 0.8)	$\times 10^{-3}$		1340
$\gamma\rho\omega$		< 5.4		$\times 10^{-4}$	CL=90%	1338
$\gamma\rho\phi$		< 8.8		$\times 10^{-5}$	CL=90%	1258
$\gamma\eta'(958)$		(5.28	± 0.15)	$\times 10^{-3}$		1400
$\gamma 2\pi^+ 2\pi^-$		(2.8	± 0.5)	$\times 10^{-3}$	S=1.9	1517
$\gamma f_2(1270) f_2(1270)$		(9.5	± 1.7)	$\times 10^{-4}$		879
$\gamma f_2(1270) f_2(1270)$ (non resonant)		(8.2	± 1.9)	$\times 10^{-4}$		–
$\gamma K^+K^-\pi^+\pi^-$		(2.1	± 0.6)	$\times 10^{-3}$		1407
$\gamma f_4(2050)$		(2.7	± 0.7)	$\times 10^{-3}$		891
$\gamma\omega\omega$		(1.61	± 0.33)	$\times 10^{-3}$		1336
$\gamma\eta(1405/1475) \rightarrow \gamma\rho^0\rho^0$		(1.7	± 0.4)	$\times 10^{-3}$	S=1.3	1223
$\gamma f_2(1270)$		(1.43	± 0.11)	$\times 10^{-3}$		1286
$\gamma f_0(1710) \rightarrow \gamma K\overline{K}$		(8.5	$^{+1.2}_{-0.9}$)	$\times 10^{-4}$	S=1.2	1075

$\gamma f_0(1710) \rightarrow \gamma\pi\pi$	(4.0	± 1.0)	$\times 10^{-4}$		–
$\gamma f_0(1710) \rightarrow \gamma\omega\omega$	(3.1	± 1.0)	$\times 10^{-4}$		–
$\gamma\eta$	(1.104	± 0.034)	$\times 10^{-3}$		1500
$\gamma f_1(1420) \rightarrow \gamma K\overline{K}\pi$	(7.9	± 1.3)	$\times 10^{-4}$		1220
$\gamma f_1(1285)$	(6.1	± 0.8)	$\times 10^{-4}$		1283
$\gamma f_1(1510) \rightarrow \gamma\eta\pi^+\pi^-$	(4.5	± 1.2)	$\times 10^{-4}$		–
$\gamma f_2'(1525)$	(4.5	$^{+0.7}_{-0.4}$)	$\times 10^{-4}$		1173
$\gamma f_2(1640) \rightarrow \gamma\omega\omega$	(2.8	± 1.8)	$\times 10^{-4}$		–
$\gamma f_2(1910) \rightarrow \gamma\omega\omega$	(2.0	± 1.4)	$\times 10^{-4}$		–
$\gamma f_2(1950) \rightarrow \gamma K^*(892)\overline{K}^*(892)$	(7.0	± 2.2)	$\times 10^{-4}$		–
$\gamma K^*(892)\overline{K}^*(892)$	(4.0	± 1.3)	$\times 10^{-3}$		1266
$\gamma\phi\phi$	(4.0	± 1.2)	$\times 10^{-4}$	S=2.1	1166
$\gamma p\overline{p}$	(3.8	± 1.0)	$\times 10^{-4}$		1232
$\gamma\eta(2225)$	(3.3	± 0.5)	$\times 10^{-4}$		749
$\gamma\eta(1760) \rightarrow \gamma\rho^0\rho^0$	(1.3	± 0.9)	$\times 10^{-4}$		1048
$\gamma\eta(1760) \rightarrow \gamma\omega\omega$	(1.98	± 0.33)	$\times 10^{-3}$		–
$\gamma X(1835)$	(2.2	± 0.6)	$\times 10^{-4}$		1006
$\gamma(K\overline{K}\pi)$ $[J^{PC} = 0^{-+}]$	(7	± 4)	$\times 10^{-4}$	S=2.1	1442
$\gamma\pi^0$	(3.49	$^{+0.33}_{-0.30}$)	$\times 10^{-5}$		1546
$\gamma p\overline{p}\pi^+\pi^-$	$<$ 7.9		$\times 10^{-4}$	CL=90%	1107
$\gamma\Lambda\overline{\Lambda}$	$<$ 1.3		$\times 10^{-4}$	CL=90%	1074
$\gamma f_J(2220)$	$>$ 2.50		$\times 10^{-3}$	CL=99.9%	745
$\gamma f_J(2220) \rightarrow \gamma\pi\pi$	(8	± 4)	$\times 10^{-5}$		–
$\gamma f_J(2220) \rightarrow \gamma K\overline{K}$	(8.1	± 3.0)	$\times 10^{-5}$		–
$\gamma f_J(2220) \rightarrow \gamma p\overline{p}$	(1.5	± 0.8)	$\times 10^{-5}$		–
$\gamma f_0(1500)$	(1.01	± 0.32)	$\times 10^{-4}$		1183
γe^+e^-	(8.8	± 1.4)	$\times 10^{-3}$		1548

Weak decays

$D^- e^+\nu_e$ + c.c.	$<$ 1.2	$\times 10^{-5}$	CL=90%	984
$\overline{D}^0 e^+e^-$ + c.c.	$<$ 1.1	$\times 10^{-5}$	CL=90%	987
$D_s^- e^+\nu_e$ + c.c.	$<$ 3.6	$\times 10^{-5}$	CL=90%	923
$D^-\pi^+$ + c.c.	$<$ 7.5	$\times 10^{-5}$	CL=90%	977
$\overline{D}^0\overline{K}^0$ + c.c.	$<$ 1.7	$\times 10^{-4}$	CL=90%	898
$D_s^-\pi^+$ + c.c.	$<$ 1.3	$\times 10^{-4}$	CL=90%	915

Charge conjugation (C), Parity (P), Lepton Family number (LF) violating modes

$\gamma\gamma$	C	$<$ 5	$\times 10^{-6}$	CL=90%	1548
$e^\pm\mu^\mp$	LF	$<$ 1.1	$\times 10^{-6}$	CL=90%	1547
$e^\pm\tau^\mp$	LF	$<$ 8.3	$\times 10^{-6}$	CL=90%	1039
$\mu^\pm\tau^\mp$	LF	$<$ 2.0	$\times 10^{-6}$	CL=90%	1035

Other decays

invisible	< 7	$\times 10^{-4}$	CL=90%	–

$\chi_{c0}(1P)$ $I^G(J^{PC}) = 0^+(0^{++})$

Mass $m = 3414.75 \pm 0.31$ MeV
Full width $\Gamma = 10.3 \pm 0.6$ MeV

$\chi_{c0}(1P)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
Hadronic decays			
$2(\pi^+\pi^-)$	(2.27 ± 0.19) %		1679
$\rho^0\pi^+\pi^-$	$(8.9\ \pm2.8\ )\times10^{-3}$		1607
$f_0(980)f_0(980)$	$(6.8\ \pm2.2\ )\times10^{-4}$		1398
$\pi^+\pi^-\pi^0\pi^0$	$(3.4\ \pm0.4\ )$ %		1680
$\rho^+\pi^-\pi^0$ + c.c.	$(2.9\ \pm0.4\ )$ %		1607
$\pi^+\pi^-K^+K^-$	(1.80 ± 0.15) %		1580
$K_0^*(1430)^0\overline{K}_0^*(1430)^0 \to \pi^+\pi^-K^+K^-$	$(1.00^{+0.40}_{-0.29})\times10^{-3}$		–
$K_0^*(1430)^0\overline{K}_2^*(1430)^0$ + c.c. $\to \pi^+\pi^-K^+K^-$	$(8.1\ ^{+2.0}_{-2.5}\ )\times10^{-4}$		–
$K_1(1270)^+K^-$ + c.c. $\to \pi^+\pi^-K^+K^-$	$(6.4\ \pm1.9\ )\times10^{-3}$		–
$K_1(1400)^+K^-$ + c.c. $\to \pi^+\pi^-K^+K^-$	$< 2.7 \times10^{-3}$	CL=90%	–
$f_0(980)f_0(980)$	$(1.7\ ^{+1.1}_{-0.9}\ )\times10^{-4}$		1398
$f_0(980)f_0(2200)$	$(8.1\ ^{+2.1}_{-2.6}\ )\times10^{-4}$		595
$f_0(1370)f_0(1370)$	$< 2.8 \times10^{-4}$	CL=90%	1019
$f_0(1370)f_0(1500)$	$< 1.7 \times10^{-4}$	CL=90%	920
$f_0(1370)f_0(1710)$	$(6.8\ ^{+4.0}_{-2.4}\ )\times10^{-4}$		723
$f_0(1500)f_0(1370)$	$< 1.3 \times10^{-4}$	CL=90%	920
$f_0(1500)f_0(1500)$	$< 5 \times10^{-5}$	CL=90%	805
$f_0(1500)f_0(1710)$	$< 7 \times10^{-5}$	CL=90%	559
$K^+K^-\pi^0\pi^0$	$(5.7\ \pm0.9\ )\times10^{-3}$		1582
$K^+\pi^-K^0\pi^0$ + c.c.	(2.53 ± 0.34) %		1581
$\rho^+K^-K^0$ + c.c.	(1.23 ± 0.22) %		1458
$K^*(892)^-K^+\pi^0 \to K^+\pi^-K^0\pi^0$ + c.c.	$(4.7\ \pm1.2\ )\times10^{-3}$		–
$K_S^0K_S^0\pi^+\pi^-$	$(5.8\ \pm1.1\ )\times10^{-3}$		1579
$K^+K^-\eta\pi^0$	$(3.1\ \pm0.7\ )\times10^{-3}$		1468
$3(\pi^+\pi^-)$	(1.20 ± 0.18) %		1633
$K^+\overline{K}^*(892)^0\pi^-$ + c.c.	$(7.3\ \pm1.6\ )\times10^{-3}$		1523

$K^*(892)^0\overline{K}^*(892)^0$	$(1.7\ \pm0.6\ )\times10^{-3}$		1456
$\pi\pi$	$(8.4\ \pm0.4\ )\times10^{-3}$		1702
$\pi^0\eta$	$<1.8\times10^{-4}$		1661
$\pi^0\eta'$	$<1.1\times10^{-3}$		1570
$\eta\eta$	$(2.68\pm0.28)\times10^{-3}$		1617
$\eta\eta'$	$<2.4\times10^{-4}$	CL=90%	1521
$\eta'\eta'$	$(2.03\pm0.22)\times10^{-3}$		1413
$\omega\omega$	$(2.2\ \pm0.7\ )\times10^{-3}$		1517
K^+K^-	$(6.10\pm0.35)\times10^{-3}$		1634
$K^0_SK^0_S$	$(3.16\pm0.18)\times10^{-3}$		1633
$\pi^+\pi^-\eta$	$<2.0\times10^{-4}$	CL=90%	1651
$\pi^+\pi^-\eta'$	$<4\times10^{-4}$	CL=90%	1560
$\overline{K}^0K^+\pi^-$ + c.c.	$<1.0\times10^{-4}$	CL=90%	1610
$K^+K^-\pi^0$	$<6\times10^{-5}$	CL=90%	1611
$K^+K^-\eta$	$<2.3\times10^{-4}$	CL=90%	1512
$K^+K^-K^0_SK^0_S$	$(1.4\ \pm0.5\ )\times10^{-3}$		1331
$K^+K^-K^+K^-$	$(2.81\pm0.30)\times10^{-3}$		1333
$K^+K^-\phi$	$(9.9\ \pm2.5\ )\times10^{-4}$		1381
$\phi\phi$	$(9.2\ \pm1.9\ )\times10^{-4}$		1370
$p\overline{p}$	$(2.28\pm0.13)\times10^{-4}$		1426
$p\overline{p}\pi^0$	$(5.7\ \pm1.2\ )\times10^{-4}$		1379
$p\overline{p}\eta$	$(3.7\ \pm1.1\ )\times10^{-4}$		1187
$\pi^+\pi^-p\overline{p}$	$(2.1\ \pm0.7\ )\times10^{-3}$	S=1.4	1320
$\pi^0\pi^0p\overline{p}$	$(1.05\pm0.28)\times10^{-3}$		1324
$K^0_SK^0_Sp\overline{p}$	$<8.8\times10^{-4}$	CL=90%	884
$p\overline{n}\pi^-$	$(1.14\pm0.31)\times10^{-3}$		1376
$\Lambda\overline{\Lambda}$	$(3.3\ \pm0.4\ )\times10^{-4}$		1292
$\Lambda\overline{\Lambda}\pi^+\pi^-$	$<4.0\times10^{-3}$	CL=90%	1153
$K^+\overline{p}\Lambda$ + c.c.	$(1.03\pm0.20)\times10^{-3}$		1132
$\Sigma^0\overline{\Sigma}^0$	$(4.2\ \pm0.7\ )\times10^{-4}$		1222
$\Sigma^+\overline{\Sigma}^-$	$(3.1\ \pm0.7\ )\times10^{-4}$		1225
$\Xi^0\overline{\Xi}^0$	$(3.2\ \pm0.8\ )\times10^{-4}$		1089
$\Xi^-\overline{\Xi}^+$	$(4.9\ \pm0.7\ )\times10^{-4}$		1081

Radiative decays

$\gamma J/\psi(1S)$	(1.16 ± 0.08) %		303
$\gamma\rho^0$	$<9\times10^{-6}$	CL=90%	1619
$\gamma\omega$	$<8\times10^{-6}$	CL=90%	1618
$\gamma\phi$	$<6\times10^{-6}$	CL=90%	1555
$\gamma\gamma$	$(2.22\pm0.17)\times10^{-4}$		1707

$\chi_{c1}(1P)$

$I^G(J^{PC}) = 0^+(1^{++})$

Mass $m = 3510.66 \pm 0.07$ MeV (S = 1.5)
Full width $\Gamma = 0.86 \pm 0.05$ MeV

$\chi_{c1}(1P)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
Hadronic decays			
$3(\pi^+\pi^-)$	$(5.8 \pm 1.4) \times 10^{-3}$	S=1.2	1683
$2(\pi^+\pi^-)$	$(7.6 \pm 2.6) \times 10^{-3}$		1728
$\pi^+\pi^-\pi^0\pi^0$	(1.26±0.17) %		1729
$\rho^+\pi^-\pi^0$ + c.c.	(1.53±0.26) %		1658
$\rho^0\pi^+\pi^-$	$(3.9 \pm 3.5) \times 10^{-3}$		1657
$\pi^+\pi^- K^+ K^-$	$(4.5 \pm 1.0) \times 10^{-3}$		1632
$K^+ K^-\pi^0\pi^0$	$(1.18\pm0.29) \times 10^{-3}$		1634
$K^+\pi^- K^0\pi^0$ + c.c.	$(9.0 \pm 1.5) \times 10^{-3}$		1632
$\rho^+ K^- K^0$ + c.c.	$(5.3 \pm 1.3) \times 10^{-3}$		1514
$K^*(892)^0 K^0\pi^0 \to$ $K^+\pi^- K^0\pi^0$ + c.c.	$(2.5 \pm 0.7) \times 10^{-3}$		–
$K^+ K^-\eta\pi^0$	$(1.2 \pm 0.4) \times 10^{-3}$		1523
$\pi^+\pi^- K^0_S K^0_S$	$(7.2 \pm 3.1) \times 10^{-4}$		1630
$K^+ K^-\eta$	$(3.3 \pm 1.0) \times 10^{-4}$		1566
$K^0 K^+\pi^-$ + c.c.	$(7.3 \pm 0.6) \times 10^{-3}$		1661
$K^*(892)^0\overline{K}^0$ + c.c.	$(1.0 \pm 0.4) \times 10^{-3}$		1602
$K^*(892)^+ K^-$ + c.c.	$(1.5 \pm 0.7) \times 10^{-3}$		1602
$K^*_J(1430)^0\overline{K}^0$ + c.c. $\to$ $K^0_S K^+\pi^-$ + c.c.	$< 8 \times 10^{-4}$	CL=90%	–
$K^*_J(1430)^+ K^-$ + c.c. $\to$ $K^0_S K^+\pi^-$ + c.c.	$< 2.3 \times 10^{-3}$	CL=90%	–
$K^+ K^-\pi^0$	$(1.91\pm0.26) \times 10^{-3}$		1662
$\eta\pi^+\pi^-$	$(5.0 \pm 0.5) \times 10^{-3}$		1701
$a_0(980)^+\pi^-$ + c.c. $\to$ $\eta\pi^+\pi^-$	$(1.9 \pm 0.7) \times 10^{-3}$		–
$f_2(1270)\eta$	$(2.8 \pm 0.8) \times 10^{-3}$		1468
$\pi^+\pi^-\eta'$	$(2.4 \pm 0.5) \times 10^{-3}$		1612
$K^+\overline{K}^*(892)^0\pi^-$ + c.c.	$(3.2 \pm 2.1) \times 10^{-3}$		1577
$K^*(892)^0\overline{K}^*(892)^0$	$(1.5 \pm 0.4) \times 10^{-3}$		1512
$K^+ K^- K^0_S K^0_S$	$< 5 \times 10^{-4}$	CL=90%	1390
$K^+ K^- K^+ K^-$	$(5.6 \pm 1.2) \times 10^{-4}$		1393
$K^+ K^-\phi$	$(4.3 \pm 1.6) \times 10^{-4}$		1440
$p\overline{p}$	$(7.3 \pm 0.4) \times 10^{-5}$		1484
$p\overline{p}\pi^0$	$(1.2 \pm 0.5) \times 10^{-4}$		1438
$p\overline{p}\eta$	$< 1.6 \times 10^{-4}$	CL=90%	1254
$\pi^+\pi^- p\overline{p}$	$(5.0 \pm 1.9) \times 10^{-4}$		1381

$K^0_S K^0_S p\overline{p}$	$<$ 4.5	$\times 10^{-4}$	CL=90%	968
$\Lambda\overline{\Lambda}$	(1.18±0.19)	$\times 10^{-4}$		1355
$\Lambda\overline{\Lambda}\pi^+\pi^-$	$<$ 1.5	$\times 10^{-3}$	CL=90%	1223
$K^+\overline{p}\Lambda$	(3.2 ±1.0)	$\times 10^{-4}$		1203
$\Sigma^0\overline{\Sigma}^0$	$<$ 4	$\times 10^{-5}$	CL=90%	1288
$\Sigma^+\overline{\Sigma}^-$	$<$ 6	$\times 10^{-5}$	CL=90%	1291
$\Xi^0\overline{\Xi}^0$	$<$ 6	$\times 10^{-5}$	CL=90%	1163
$\Xi^-\overline{\Xi}^+$	(8.4 ±2.3)	$\times 10^{-5}$		1155
$\pi^+\pi^- + K^+K^-$	$<$ 2.1	$\times 10^{-3}$		–
$K^0_S K^0_S$	$<$ 6	$\times 10^{-5}$	CL=90%	1683

Radiative decays

$\gamma J/\psi(1S)$	(34.4 ±1.5) %			389
$\gamma\rho^0$	(2.29±0.27)	$\times 10^{-4}$		1670
$\gamma\omega$	(7.8 ±1.8)	$\times 10^{-5}$		1668
$\gamma\phi$	$<$ 2.4	$\times 10^{-5}$	CL=90%	1607

$h_c(1P)$

$I^G(J^{PC}) = ?^?(1^{+-})$

Mass $m = 3525.42 \pm 0.29$ MeV (S = 1.7)
Full width $\Gamma < 1$ MeV

$h_c(1P)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$J/\psi(1S)\pi\pi$	not seen	312
$\eta_c\gamma$	seen	503
$\pi^+\pi^-\pi^0$	not seen	1749
$2\pi^+2\pi^-\pi^0$	seen	1716
$3\pi^+3\pi^-\pi^0$	not seen	1661

$\chi_{c2}(1P)$

$I^G(J^{PC}) = 0^+(2^{++})$

Mass $m = 3556.20 \pm 0.09$ MeV
Full width $\Gamma = 1.97 \pm 0.11$ MeV

$\chi_{c2}(1P)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)

Hadronic decays

$2(\pi^+\pi^-)$	(1.11±0.11) %		1751
$\pi^+\pi^-\pi^0\pi^0$	(2.00±0.26) %		1752
$\rho^+\pi^-\pi^0$ + c.c.	(2.4 ±0.4) %		1682
$K^+K^-\pi^0\pi^0$	(2.2 ±0.4) × 10^{-3}		1658
$K^+\pi^-K^0\pi^0$ + c.c.	(1.50±0.22) %		1657
$\rho^+K^-K^0$ + c.c.	(4.5 ±1.4) × 10^{-3}		1540
$K^*(892)^0K^+\pi^-$ → $K^+\pi^-K^0\pi^0$ + c.c.	(3.2 ±0.9) × 10^{-3}		–
$K^*(892)^0K^0\pi^0$ → $K^+\pi^-K^0\pi^0$ + c.c.	(4.2 ±0.9) × 10^{-3}		–
$K^*(892)^-K^+\pi^0$ → $K^+\pi^-K^0\pi^0$ + c.c.	(4.1 ±0.9) × 10^{-3}		–
$K^*(892)^+K^0\pi^-$ → $K^+\pi^-K^0\pi^0$ + c.c.	(3.2 ±0.9) × 10^{-3}		–
$K^+K^-\eta\pi^0$	(1.4 ±0.5) × 10^{-3}		1549
$\pi^+\pi^-K^+K^-$	(9.2 ±1.1) × 10^{-3}		1656
$K^+\overline{K}^*(892)^0\pi^-$ + c.c.	(2.3 ±1.2) × 10^{-3}		1602
$K^*(892)^0\overline{K}^*(892)^0$	(2.5 ±0.5) × 10^{-3}		1538
$3(\pi^+\pi^-)$	(8.6 ±1.8) × 10^{-3}		1707
$\phi\phi$	(1.48±0.28) × 10^{-3}		1457
$\omega\omega$	(1.9 ±0.6) × 10^{-3}		1597
$\pi\pi$	(2.39±0.14) × 10^{-3}		1773
$\rho^0\pi^+\pi^-$	(4.0 ±1.7) × 10^{-3}		1681
$\pi^+\pi^-\eta$	(5.2 ±1.4) × 10^{-4}		1724
$\pi^+\pi^-\eta'$	(5.4 ±2.0) × 10^{-4}		1636
$\eta\eta$	(5.4 ±0.8) × 10^{-4}		1692
K^+K^-	(1.09±0.08) × 10^{-3}		1708
$K^0_SK^0_S$	(5.8 ±0.5) × 10^{-4}		1707
$\overline{K}^0K^+\pi^-$ + c.c.	(1.32±0.20) × 10^{-3}		1685
$K^+K^-\pi^0$	(3.3 ±0.8) × 10^{-4}		1686
$K^+K^-\eta$	< 3.5 × 10^{-4}	90%	1592
$\eta\eta'$	< 6 × 10^{-5}	90%	1600
$\eta'\eta'$	< 1.1 × 10^{-4}	90%	1498
$\pi^+\pi^-K^0_SK^0_S$	(2.4 ±0.6) × 10^{-3}		1655
$K^+K^-K^0_SK^0_S$	< 4 × 10^{-4}	90%	1418
$K^+K^-K^+K^-$	(1.78±0.22) × 10^{-3}		1421
$K^+K^-\phi$	(1.55±0.32) × 10^{-3}		1468
$K^0_SK^0_Sp\overline{p}$	< 7.9 × 10^{-4}	90%	1007
$p\overline{p}$	(7.2 ±0.4) × 10^{-5}		1510
$p\overline{p}\pi^0$	(4.7 ±1.0) × 10^{-4}		1465
$p\overline{p}\eta$	(2.0 ±0.8) × 10^{-4}		1285
$\pi^+\pi^-p\overline{p}$	(1.32±0.34) × 10^{-3}		1410
$\pi^0\pi^0p\overline{p}$	(8.5 ±2.6) × 10^{-4}		1414

$p\overline{n}\pi^-$	(1.1 ±0.4)	$\times 10^{-3}$		1463
$\Lambda\overline{\Lambda}$	(1.86±0.27)	$\times 10^{-4}$		1385
$\Lambda\overline{\Lambda}\pi^+\pi^-$	< 3.5	$\times 10^{-3}$	90%	1255
$K^+\overline{p}\Lambda$ + c.c.	(9.1 ±1.8)	$\times 10^{-4}$		1236
$\Sigma^0\overline{\Sigma}^0$	< 8	$\times 10^{-5}$	90%	1319
$\Sigma^+\overline{\Sigma}^-$	< 7	$\times 10^{-5}$	90%	1322
$\Xi^0\overline{\Xi}^0$	< 1.1	$\times 10^{-4}$	90%	1197
$\Xi^-\overline{\Xi}^+$	(1.55±0.35)	$\times 10^{-4}$		1189
$J/\psi(1S)\pi^+\pi^-\pi^0$	< 1.5	%	90%	185

Radiative decays

$\gamma J/\psi(1S)$	(19.5 ±0.8)	%		430
$\gamma\rho^0$	< 5	$\times 10^{-5}$	90%	1694
$\gamma\omega$	< 6	$\times 10^{-6}$	90%	1692
$\gamma\phi$	< 1.2	$\times 10^{-5}$	90%	1632
$\gamma\gamma$	(2.56±0.16)	$\times 10^{-4}$		1778

$\eta_c(2S)$

$I^G(J^{PC}) = 0^+(0^{-+})$

Quantum numbers are quark model predictions.

Mass $m = 3637 \pm 4$ MeV (S = 1.7)
Full width $\Gamma = 14 \pm 7$ MeV

$\eta_c(2S)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
hadrons	not seen		–
$K\overline{K}\pi$	(1.9±1.2) %		1729
$2\pi^+2\pi^-$	not seen		1792
$3\pi^+3\pi^-$	not seen		1749
$K^+K^-\pi^+\pi^-$	not seen		1700
$K^+K^-\pi^+\pi^-\pi^0$	not seen		1667
$K^+K^-2\pi^+2\pi^-$	not seen		1627
$K^0_S K^-2\pi^+\pi^-$ + c.c.	not seen		1666
$2K^+2K^-$	not seen		1470
$p\overline{p}$	not seen		1558
$\gamma\gamma$	< 5 $\times 10^{-4}$	90%	1819
$\pi^+\pi^-\eta$	not seen		1766
$\pi^+\pi^-\eta'$	not seen		1680
$K^+K^-\eta$	not seen		1637
$\pi^+\pi^-\eta_c(1S)$	not seen		541

$\psi(2S)$

$I^G(J^{PC}) = 0^-(1^{--})$

Mass $m = 3686.09 \pm 0.04$ MeV (S = 1.6)
Full width $\Gamma = 304 \pm 9$ keV
$\Gamma_{ee} = 2.35 \pm 0.04$ keV

$\psi(2S)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
hadrons	(97.85±0.13) %		–
virtual $\gamma \rightarrow$ hadrons	(1.73±0.14) %	S=1.5	–
ggg	(10.6 ±1.6) %		–
γgg	(1.02±0.29) %		–
light hadrons	(15.4 ±1.5) %		–
e^+e^-	(7.72±0.17) $\times 10^{-3}$		1843
$\mu^+\mu^-$	(7.7 ±0.8) $\times 10^{-3}$		1840
$\tau^+\tau^-$	(3.0 ±0.4) $\times 10^{-3}$		490
Decays into $J/\psi(1S)$ and anything			
$J/\psi(1S)$ anything	(59.5 ±0.8) %		–
$J/\psi(1S)$ neutrals	(24.5 ±0.4) %		–
$J/\psi(1S)\pi^+\pi^-$	(33.6 ±0.4) %		477
$J/\psi(1S)\pi^0\pi^0$	(17.73±0.34) %		481
$J/\psi(1S)\eta$	(3.28±0.07) %		199
$J/\psi(1S)\pi^0$	(1.30±0.10) $\times 10^{-3}$	S=1.4	528
Hadronic decays			
$\pi^0 h_c(1P)$	seen		85
$3(\pi^+\pi^-)\pi^0$	(3.5 ±1.6) $\times 10^{-3}$		1746
$2(\pi^+\pi^-)\pi^0$	(2.9 ±1.0) $\times 10^{-3}$	S=4.6	1799
$\rho a_2(1320)$	(2.6 ±0.9) $\times 10^{-4}$		1500
$p\overline{p}$	(2.76±0.12) $\times 10^{-4}$		1586
$\Delta^{++}\overline{\Delta}^{--}$	(1.28±0.35) $\times 10^{-4}$		1371
$\Lambda\overline{\Lambda}\pi^0$	$<$ 1.2 $\times 10^{-4}$	CL=90%	1412
$\Lambda\overline{\Lambda}\eta$	$<$ 4.9 $\times 10^{-5}$	CL=90%	1197
$\Lambda\overline{p}K^+$	(1.00±0.14) $\times 10^{-4}$		1327
$\Lambda\overline{p}K^+\pi^+\pi^-$	(1.8 ±0.4) $\times 10^{-4}$		1167
$\Lambda\overline{\Lambda}\pi^+\pi^-$	(2.8 ±0.6) $\times 10^{-4}$		1346
$\Lambda\overline{\Lambda}$	(2.8 ±0.5) $\times 10^{-4}$	S=2.6	1467
$\Sigma^+\overline{\Sigma}^-$	(2.6 ±0.8) $\times 10^{-4}$		1408
$\Sigma^0\overline{\Sigma}^0$	(2.2 ±0.4) $\times 10^{-4}$	S=1.5	1405
$\Sigma(1385)^+\overline{\Sigma}(1385)^-$	(1.1 ±0.4) $\times 10^{-4}$		1218
$\Xi^-\overline{\Xi}^+$	(1.8 ±0.6) $\times 10^{-4}$	S=2.8	1284
$\Xi^0\overline{\Xi}^0$	(2.8 ±0.9) $\times 10^{-4}$		1291
$\Xi(1530)^0\overline{\Xi}(1530)^0$	$<$ 8.1 $\times 10^{-5}$	CL=90%	1025
$\Omega^-\overline{\Omega}^+$	$<$ 7.3 $\times 10^{-5}$	CL=90%	774

$\pi^0 p\overline{p}$	$(\ 1.33\pm0.17)\times10^{-4}$		1543
$\eta p\overline{p}$	$(\ 6.0\ \pm1.2\ )\times10^{-5}$		1373
$\omega p\overline{p}$	$(\ 6.9\ \pm2.1\ )\times10^{-5}$		1247
$\phi p\overline{p}$	$<\ 2.4\ \times10^{-5}$	CL=90%	1109
$\pi^+\pi^- p\overline{p}$	$(\ 6.0\ \pm0.4\ )\times10^{-4}$		1491
$p\overline{n}\pi^-$ or c.c.	$(\ 2.48\pm0.17)\times10^{-4}$		–
$p\overline{n}\pi^-\pi^0$	$(\ 3.2\ \pm0.7\ )\times10^{-4}$		1492
$2(\pi^+\pi^-\pi^0)$	$(\ 4.8\ \pm1.5\ )\times10^{-3}$		1776
$\eta\pi^+\pi^-$	$<\ 1.6\ \times10^{-4}$	CL=90%	1791
$\eta\pi^+\pi^-\pi^0$	$(\ 9.5\ \pm1.7\ )\times10^{-4}$		1778
$2(\pi^+\pi^-)\eta$	$(\ 1.2\ \pm0.6\ )\times10^{-3}$		1758
$\eta'\pi^+\pi^-\pi^0$	$(\ 4.5\ \pm2.1\ )\times10^{-4}$		1692
$\omega\pi^+\pi^-$	$(\ 7.3\ \pm1.2\ )\times10^{-4}$	S=2.1	1748
$\quad b_1^\pm\pi^\mp$	$(\ 4.0\ \pm0.6\ )\times10^{-4}$	S=1.1	1635
$\quad b_1^0\pi^0$	$(\ 2.4\ \pm0.6\ )\times10^{-4}$		–
$\quad \omega f_2(1270)$	$(\ 2.2\ \pm0.4\ )\times10^{-4}$		1515
$\pi^+\pi^- K^+K^-$	$(\ 7.5\ \pm0.9\ )\times10^{-4}$	S=1.9	1726
$\quad \rho^0 K^+K^-$	$(\ 2.2\ \pm0.4\ )\times10^{-4}$		1616
$\quad K^*(892)^0\overline{K}_2^*(1430)^0$	$(\ 1.9\ \pm0.5\ )\times10^{-4}$		1418
$K^+K^-\pi^+\pi^-\eta$	$(\ 1.3\ \pm0.7\ )\times10^{-3}$		1574
$K^+K^-2(\pi^+\pi^-)\pi^0$	$(\ 1.00\pm0.31)\times10^{-3}$		1611
$K^+K^-2(\pi^+\pi^-)$	$(\ 1.9\ \pm0.9\ )\times10^{-3}$		1654
$K_1(1270)^\pm K^\mp$	$(\ 1.00\pm0.28)\times10^{-3}$		1581
$K_S^0 K_S^0\pi^+\pi^-$	$(\ 2.2\ \pm0.4\ )\times10^{-4}$		1724
$\quad \rho^0 p\overline{p}$	$(\ 5.0\ \pm2.2\ )\times10^{-5}$		1251
$K^+\overline{K}^*(892)^0\pi^-$ + c.c.	$(\ 6.7\ \pm2.5\ )\times10^{-4}$		1674
$2(\pi^+\pi^-)$	$(\ 2.4\ \pm0.6\ )\times10^{-4}$	S=2.2	1817
$\quad \rho^0\pi^+\pi^-$	$(\ 2.2\ \pm0.6\ )\times10^{-4}$	S=1.4	1750
$K^+K^-\pi^+\pi^-\pi^0$	$(\ 1.26\pm0.09)\times10^{-3}$		1694
$\quad \omega f_0(1710)\rightarrow\ \omega K^+K^-$	$(\ 5.9\ \pm2.2\ )\times10^{-5}$		–
$\quad K^*(892)^0 K^-\pi^+\pi^0\ +$ c.c.	$(\ 8.6\ \pm2.2\ )\times10^{-4}$		–
$\quad K^*(892)^+ K^-\pi^+\pi^-\ +$ c.c.	$(\ 9.6\ \pm2.8\ )\times10^{-4}$		–
$\quad K^*(892)^+ K^-\rho^0\ +$ c.c.	$(\ 7.3\ \pm2.6\ )\times10^{-4}$		–
$\quad K^*(892)^0 K^-\rho^+\ +$ c.c.	$(\ 6.1\ \pm1.8\ )\times10^{-4}$		–
ηK^+K^-	$<\ 1.3\ \times10^{-4}$	CL=90%	1664
ωK^+K^-	$(\ 1.85\pm0.25)\times10^{-4}$	S=1.1	1614
$3(\pi^+\pi^-)$	$(\ 3.5\ \pm2.0\ )\times10^{-4}$	S=2.8	1774
$p\overline{p}\pi^+\pi^-\pi^0$	$(\ 7.3\ \pm0.7\ )\times10^{-4}$		1435
K^+K^-	$(\ 6.3\ \pm0.7\ )\times10^{-5}$		1776
$K_S^0 K_L^0$	$(\ 5.4\ \pm0.5\ )\times10^{-5}$		1775
$\pi^+\pi^-\pi^0$	$(\ 1.68\pm0.26)\times10^{-4}$	S=1.4	1830
$\quad \rho(2150)\pi\rightarrow\ \pi^+\pi^-\pi^0$	$(\ 1.9\ {}^{+1.2}_{-0.4}\ )\times10^{-4}$		–
$\quad \rho(770)\pi\rightarrow\ \pi^+\pi^-\pi^0$	$(\ 3.2\ \pm1.2\ )\times10^{-5}$	S=1.8	–

$\pi^+\pi^-$	(8 $\pm$5) $\times 10^{-5}$			1838
$K_1(1400)^\pm K^\mp$	< 3.1	$\times 10^{-4}$	CL=90%	1532
$K^+K^-\pi^0$	< 2.96	$\times 10^{-5}$	CL=90%	1754
$K^+\overline{K}^*(892)^-$ + c.c.	(1.7 $^{+0.8}_{-0.7}$) $\times 10^{-5}$			1698
$K^*(892)^0\overline{K}^0$ + c.c.	(1.09$\pm$0.20) $\times 10^{-4}$			1697
$\phi\pi^+\pi^-$	(1.17$\pm$0.29) $\times 10^{-4}$		S=1.7	1690
$\phi f_0(980) \rightarrow \pi^+\pi^-$	(6.8 $\pm$2.4) $\times 10^{-5}$		S=1.1	–
$2(K^+K^-)$	(6.0 $\pm$1.4) $\times 10^{-5}$			1499
ϕK^+K^-	(7.0 $\pm$1.6) $\times 10^{-5}$			1546
$2(K^+K^-)\pi^0$	(1.10$\pm$0.28) $\times 10^{-4}$			1440
$\phi\eta$	(2.8 $^{+1.0}_{-0.8}$) $\times 10^{-5}$			1654
$\phi\eta'$	(3.1 $\pm$1.6) $\times 10^{-5}$			1555
$\omega\eta'$	(3.2 $^{+2.5}_{-2.1}$) $\times 10^{-5}$			1623
$\omega\pi^0$	(2.1 $\pm$0.6) $\times 10^{-5}$			1757
$\rho\eta'$	(1.9 $^{+1.7}_{-1.2}$) $\times 10^{-5}$			1625
$\rho\eta$	(2.2 $\pm$0.6) $\times 10^{-5}$		S=1.1	1717
$\omega\eta$	< 1.1	$\times 10^{-5}$	CL=90%	1715
$\phi\pi^0$	< 4	$\times 10^{-6}$	CL=90%	1699
$\eta_c\pi^+\pi^-\pi^0$	< 1.0	$\times 10^{-3}$	CL=90%	–
$p\overline{p}K^+K^-$	(2.7 $\pm$0.7) $\times 10^{-5}$			1118
$\overline{\Lambda}nK^0_S$ + c.c.	(8.1 $\pm$1.8) $\times 10^{-5}$			1324
$\phi f'_2(1525)$	(4.4 $\pm$1.6) $\times 10^{-5}$			1321
$\Theta(1540)\overline{\Theta}(1540) \rightarrow K^0_S pK^-\overline{n}$ + c.c.	< 8.8	$\times 10^{-6}$	CL=90%	–
$\Theta(1540)K^-\overline{n} \rightarrow K^0_S pK^-\overline{n}$	< 1.0	$\times 10^{-5}$	CL=90%	–
$\Theta(1540)K^0_S\overline{p} \rightarrow K^0_S\overline{p}K^+n$	< 7.0	$\times 10^{-6}$	CL=90%	–
$\overline{\Theta}(1540)K^+n \rightarrow K^0_S\overline{p}K^+n$	< 2.6	$\times 10^{-5}$	CL=90%	–
$\overline{\Theta}(1540)K^0_S p \rightarrow K^0_S pK^-\overline{n}$	< 6.0	$\times 10^{-6}$	CL=90%	–
$K^0_S K^0_S$	< 4.6	$\times 10^{-6}$		1775

Radiative decays

$\gamma\chi_{c0}(1P)$	(9.62$\pm$0.31) %			261
$\gamma\chi_{c1}(1P)$	(9.2 $\pm$0.4) %			171
$\gamma\chi_{c2}(1P)$	(8.74$\pm$0.35) %			128
$\pi^0 h_c \rightarrow \gamma\eta_c(1S)\pi^0$	(4.2 $\pm$0.5) $\times 10^{-4}$			–
$\gamma\eta_c(1S)$	(3.4 $\pm$0.5) $\times 10^{-3}$		S=1.3	638
$\gamma\eta_c(2S)$	< 8	$\times 10^{-4}$	CL=90%	48
$\gamma\pi^0$	< 5	$\times 10^{-6}$	CL=90%	1841
$\gamma\eta'(958)$	(1.21$\pm$0.08) $\times 10^{-4}$			1719
$\gamma f_2(1270)$	(2.1 $\pm$0.4) $\times 10^{-4}$			1622
$\gamma f_0(1710) \rightarrow \gamma\pi\pi$	(3.0 $\pm$1.3) $\times 10^{-5}$			–
$\gamma f_0(1710) \rightarrow \gamma K\overline{K}$	(6.0 $\pm$1.6) $\times 10^{-5}$			–

$\gamma\gamma$	$<$ 1.4		$\times 10^{-4}$	CL=90%	1843
$\gamma\eta$	$<$ 2		$\times 10^{-6}$	CL=90%	1802
$\gamma\eta\pi^+\pi^-$	(8.7	$\pm$2.1)	$\times 10^{-4}$		1791
$\gamma\eta(1405) \rightarrow \gamma K\overline{K}\pi$	$<$ 9		$\times 10^{-5}$	CL=90%	1569
$\gamma\eta(1405) \rightarrow \eta\pi^+\pi^-$	(3.6	$\pm$2.5)	$\times 10^{-5}$		–
$\gamma\eta(1475) \rightarrow K\overline{K}\pi$	$<$ 1.4		$\times 10^{-4}$	CL=90%	–
$\gamma\eta(1475) \rightarrow \eta\pi^+\pi^-$	$<$ 8.8		$\times 10^{-5}$	CL=90%	–
$\gamma 2(\pi^+\pi^-)$	(4.0	$\pm$0.6)	$\times 10^{-4}$		1817
$\gamma K^{*0} K^+\pi^-$ + c.c.	(3.7	$\pm$0.9)	$\times 10^{-4}$		1674
$\gamma K^{*0}\overline{K}^{*0}$	(2.4	$\pm$0.7)	$\times 10^{-4}$		1613
$\gamma K^0_S K^+\pi^-$ + c.c.	(2.6	$\pm$0.5)	$\times 10^{-4}$		1753
$\gamma K^+ K^-\pi^+\pi^-$	(1.9	$\pm$0.5)	$\times 10^{-4}$		1726
$\gamma p\overline{p}$	(2.9	$\pm$0.6)	$\times 10^{-5}$		1586
$\gamma\pi^+\pi^- p\overline{p}$	(2.8	$\pm$1.4)	$\times 10^{-5}$		1491
$\gamma 2(\pi^+\pi^-) K^+ K^-$	$<$ 2.2		$\times 10^{-4}$	CL=90%	1654
$\gamma 3(\pi^+\pi^-)$	$<$ 1.7		$\times 10^{-4}$	CL=90%	1774
$\gamma K^+ K^- K^+ K^-$	$<$ 4		$\times 10^{-5}$	CL=90%	1499

$\psi(3770)$

$I^G(J^{PC}) = 0^-(1^{--})$

Mass $m = 3772.92 \pm 0.35$ MeV (S = 1.1)
Full width $\Gamma = 27.3 \pm 1.0$ MeV
$\Gamma_{ee} = 0.265 \pm 0.018$ keV (S = 1.3)

In addition to the dominant decay mode to $D\overline{D}$, $\psi(3770)$ was found to decay into the final states containing the J/ψ (BAI 05, ADAM 06). ADAMS 06 and HUANG 06A searched for various decay modes with light hadrons and found a statistically significant signal for the decay to $\phi\eta$ only (ADAMS 06).

$\psi(3770)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
$D\overline{D}$	(93 $^{+8}_{-9}$) %	S=2.0	285
$D^0\overline{D}^0$	(52 $\pm$5) %	S=2.0	285
D^+D^-	(41 $\pm$4) %	S=2.0	252
$J/\psi\pi^+\pi^-$	(1.93$\pm$0.28) $\times 10^{-3}$		560
$J/\psi\pi^0\pi^0$	(8.0 $\pm$3.0) $\times 10^{-4}$		564
$J/\psi\eta$	(9 $\pm$4) $\times 10^{-4}$		359
$J/\psi\pi^0$	$<$ 2.8 $\times 10^{-4}$	CL=90%	603
$\gamma\chi_{c0}$	(7.3 $\pm$0.9) $\times 10^{-3}$		341
$\gamma\chi_{c1}$	(2.9 $\pm$0.6) $\times 10^{-3}$		253
$\gamma\chi_{c2}$	$<$ 9 $\times 10^{-4}$	CL=90%	210
e^+e^-	(9.7 $\pm$0.7) $\times 10^{-6}$	S=1.2	1886
$K^0_S K^0_L$	$<$ 1.2 $\times 10^{-5}$	CL=90%	1820

$2(\pi^+\pi^-)$	$<$	1.12	$\times 10^{-3}$	CL=90%	1861
$2(\pi^+\pi^-)\pi^0$	$<$	1.06	$\times 10^{-3}$	CL=90%	1843
$2(\pi^+\pi^-\pi^0)$	$<$	5.85	%	CL=90%	1821
$\omega\pi^+\pi^-$	$<$	6.0	$\times 10^{-4}$	CL=90%	1794
$3(\pi^+\pi^-)$	$<$	9.1	$\times 10^{-3}$		1819
$3(\pi^+\pi^-)\pi^0$	$<$	1.37	%		1792
$3(\pi^+\pi^-)2\pi^0$	$<$	11.74	%	CL=90%	1759
$\eta\pi^+\pi^-$	$<$	1.24	$\times 10^{-3}$	CL=90%	1836
$\pi^+\pi^-2\pi^0$	$<$	8.9	$\times 10^{-3}$	CL=90%	1862
$\rho^0\pi^+\pi^-$	$<$	6.9	$\times 10^{-3}$	CL=90%	1796
$\eta 3\pi$	$<$	1.34	$\times 10^{-3}$	CL=90%	1824
$\eta 2(\pi^+\pi^-)$	$<$	2.43	%		1804
$\eta' 3\pi$	$<$	2.44	$\times 10^{-3}$	CL=90%	1740
$K^+K^-\pi^+\pi^-$	$<$	9.0	$\times 10^{-4}$	CL=90%	1772
$\phi\pi^+\pi^-$	$<$	4.1	$\times 10^{-4}$	CL=90%	1737
$K^+K^-2\pi^0$	$<$	4.2	$\times 10^{-3}$	CL=90%	1774
$\phi\pi^0$	not seen				1746
$\phi\eta$	(3.1 $\pm$0.7)		$\times 10^{-4}$		1703
$4(\pi^+\pi^-)$	$<$	1.67	%	CL=90%	1757
$4(\pi^+\pi^-)\pi^0$	$<$	3.06	%	CL=90%	1720
$\phi f_0(980)$	$<$	4.5	$\times 10^{-4}$	CL=90%	1600
$K^+K^-\pi^+\pi^-\pi^0$	$<$	2.36	$\times 10^{-3}$	CL=90%	1741
$K^+K^-\rho^0\pi^0$	$<$	8	$\times 10^{-4}$	CL=90%	1624
$K^+K^-\rho^+\pi^-$	$<$	1.46	%	CL=90%	1622
ωK^+K^-	$<$	3.4	$\times 10^{-4}$	CL=90%	1664
$\phi\pi^+\pi^-\pi^0$	$<$	3.8	$\times 10^{-3}$	CL=90%	1722
$K^{*0}K^-\pi^+\pi^0$ + c.c.	$<$	1.62	%	CL=90%	1693
$K^{*+}K^-\pi^+\pi^-$ + c.c.	$<$	3.23	%	CL=90%	1692
$K^+K^-\pi^+\pi^-2\pi^0$	$<$	2.67	%	CL=90%	1705
$K^+K^-2(\pi^+\pi^-)$	$<$	1.03	%	CL=90%	1702
$K^+K^-2(\pi^+\pi^-)\pi^0$	$<$	3.60	%	CL=90%	1660
ηK^+K^-	$<$	4.1	$\times 10^{-4}$	CL=90%	1711
$\rho^0 K^+K^-$	$<$	5.0	$\times 10^{-3}$	CL=90%	1665
$2(K^+K^-)$	$<$	6.0	$\times 10^{-4}$	CL=90%	1551
ϕK^+K^-	$<$	7.5	$\times 10^{-4}$	CL=90%	1597
$2(K^+K^-)\pi^0$	$<$	2.9	$\times 10^{-4}$	CL=90%	1493
$2(K^+K^-)\pi^+\pi^-$	$<$	3.2	$\times 10^{-3}$	CL=90%	1425
$K^0_S K^-\pi^+$	$<$	3.2	$\times 10^{-3}$	CL=90%	1799
$K^0_S K^-\pi^+\pi^0$	$<$	1.33	%	CL=90%	1773
$K^0_S K^-\rho^+$	$<$	6.6	$\times 10^{-3}$	CL=90%	1664
$K^0_S K^-2\pi^+\pi^-$	$<$	8.7	$\times 10^{-3}$	CL=90%	1739
$K^0_S K^-\pi^+\rho^0$	$<$	1.6	%	CL=90%	1621
$K^0_S K^-\pi^+\eta$	$<$	1.3	%	CL=90%	1669
$K^0_S K^-2\pi^+\pi^-\pi^0$	$<$	4.18	%	CL=90%	1703

$K^0_S K^- 2\pi^+ \pi^- \eta$	$<$	4.8	%	CL=90%	1570
$K^0_S K^- \pi^+ 2(\pi^+ \pi^-)$	$<$	1.22	%	CL=90%	1658
$K^0_S K^- \pi^+ 2\pi^0$	$<$	2.65	%	CL=90%	1741
$K^0_S K^- K^+ K^- \pi^+$	$<$	4.9	$\times 10^{-3}$	CL=90%	1490
$K^0_S K^- K^+ K^- \pi^+ \pi^0$	$<$	3.0	%	CL=90%	1427
$K^0_S K^- K^+ K^- \pi^+ \eta$	$<$	2.2	%	CL=90%	1214
$K^{*0} K^- \pi^+ +$ c.c.	$<$	9.7	$\times 10^{-3}$	CL=90%	1721
$p\overline{p}\pi^0$	$<$	1.2	$\times 10^{-3}$		1595
$p\overline{p}\pi^+ \pi^-$	$<$	5.8	$\times 10^{-4}$	CL=90%	1544
$\Lambda\overline{\Lambda}$	$<$	1.2	$\times 10^{-4}$	CL=90%	1521
$p\overline{p}\pi^+ \pi^- \pi^0$	$<$	1.85	$\times 10^{-3}$	CL=90%	1490
$\omega p\overline{p}$	$<$	2.9	$\times 10^{-4}$	CL=90%	1309
$\Lambda\overline{\Lambda}\pi^0$	$<$	1.2	$\times 10^{-3}$	CL=90%	1468
$p\overline{p}2(\pi^+ \pi^-)$	$<$	2.6	$\times 10^{-3}$	CL=90%	1425
$\eta p\overline{p}$	$<$	5.4	$\times 10^{-4}$	CL=90%	1430
$\rho^0 p\overline{p}$	$<$	1.7	$\times 10^{-3}$	CL=90%	1313
$p\overline{p}K^+ K^-$	$<$	3.2	$\times 10^{-4}$	CL=90%	1185
$\phi p\overline{p}$	$<$	1.3	$\times 10^{-4}$	CL=90%	1178
$\Lambda\overline{\Lambda}\pi^+ \pi^-$	$<$	2.5	$\times 10^{-4}$	CL=90%	1404
$\Lambda\overline{p}K^+$	$<$	2.8	$\times 10^{-4}$	CL=90%	1387
$\Lambda\overline{p}K^+ \pi^+ \pi^-$	$<$	6.3	$\times 10^{-4}$	CL=90%	1234
$\pi^+ \pi^- \pi^0$		not seen			1874
$\rho\pi$		not seen			1804
$\omega\pi^0$		not seen			1803
$\rho\eta$		not seen			1763
$\omega\eta$		not seen			1762
$\rho\eta'$		not seen			1674
$\omega\eta'$		not seen			1672
$\phi\eta'$		not seen			1606
$K^{*0}\overline{K}^0$		not seen			1744
$K^{*+} K^-$		not seen			1745
$b_1\pi$		not seen			1683
Radiative decays					
$\gamma\pi^0$	$<$	2	$\times 10^{-4}$	CL=90%	1884
$\gamma\eta$	$<$	1.5	$\times 10^{-4}$	CL=90%	1847
$\gamma\eta'$	$<$	1.8	$\times 10^{-4}$	CL=90%	1765

$X(3872)$

$I^G(J^{PC}) = 0^?(?^{?+})$

Quantum numbers not established.

Mass $m = 3871.56 \pm 0.22$ MeV
$m_{X(3872)} - m_{J/\psi} = 775 \pm 4$ MeV
$m_{X(3872)} - m_{\psi(2S)}$
Full width $\Gamma < 2.3$ MeV, CL = 90%

$X(3872)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\pi^+\pi^- J/\psi(1S)$	>2.6 %	650
$D^0\overline{D}^0\pi^0$	$>3.2 \times 10^{-3}$	116
$\overline{D}^{*0} D^0$	$>5 \times 10^{-3}$	†
$\gamma J/\psi$	$>9 \times 10^{-3}$	697
$\gamma\psi(2S)$	>3.0 %	181

$\psi(4040)$ [d]

$I^G(J^{PC}) = 0^-(1^{--})$

Mass $m = 4039 \pm 1$ MeV
Full width $\Gamma = 80 \pm 10$ MeV
$\Gamma_{ee} = 0.86 \pm 0.07$ keV

$\psi(4040)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
e^+e^-	$(1.07\pm0.16) \times 10^{-5}$		2019
$D\overline{D}$	seen		775
$D^0\overline{D}^0$	seen		775
D^+D^-	seen		764
$D^*\overline{D}$ + c.c.	seen		569
$D^*(2007)^0\overline{D}^0$ + c.c.	seen		575
$D^*(2010)^+D^-$ + c.c.	seen		561
$D^*\overline{D}^*$	not seen		193
$D^*(2007)^0\overline{D}^*(2007)^0$	not seen		225
$D^*(2010)^+D^*(2010)^-$	not seen		193
$J/\psi\pi^+\pi^-$	$< 4 \times 10^{-3}$	90%	794
$J/\psi\pi^0\pi^0$	$< 2 \times 10^{-3}$	90%	797
$J/\psi\eta$	$< 7 \times 10^{-3}$	90%	675
$J/\psi\pi^0$	$< 2 \times 10^{-3}$	90%	823
$J/\psi\pi^+\pi^-\pi^0$	$< 2 \times 10^{-3}$	90%	746
$\chi_{c1}\gamma$	< 1.1 %	90%	494
$\chi_{c2}\gamma$	< 1.7 %	90%	454

$\chi_{c1}\pi^+\pi^-\pi^0$	< 1.1	%	90%	306
$\chi_{c2}\pi^+\pi^-\pi^0$	< 3.2	%	90%	233
$\phi\pi^+\pi^-$	< 3	$\times 10^{-3}$	90%	1880

$\psi(4160)$ [d]

$I^G(J^{PC}) = 0^-(1^{--})$

Mass $m = 4153 \pm 3$ MeV
Full width $\Gamma = 103 \pm 8$ MeV
$\Gamma_{ee} = 0.83 \pm 0.07$ keV

$\psi(4160)$ DECAY MODES	Fraction (Γ_i/Γ)		Confidence level	p (MeV/c)
e^+e^-	$(8.1\pm0.9) \times 10^{-6}$			2076
$D\overline{D}$	not seen			913
$D^0\overline{D}^0$	not seen			913
D^+D^-	not seen			904
$D^*\overline{D}$ + c.c.	not seen			746
$D^*(2007)^0\overline{D}^0$ + c.c.	not seen			751
$D^*(2010)^+D^-$ + c.c.	not seen			740
$D^*\overline{D}^*$	seen			520
$D^*(2007)^0\overline{D}^*(2007)^0$	seen			533
$D^*(2010)^+D^*(2010)^-$	seen			520
$J/\psi\pi^+\pi^-$	< 3	$\times 10^{-3}$	90%	888
$J/\psi\pi^0\pi^0$	< 3	$\times 10^{-3}$	90%	891
$J/\psi K^+K^-$	< 2	$\times 10^{-3}$	90%	324
$J/\psi\eta$	< 8	$\times 10^{-3}$	90%	786
$J/\psi\pi^0$	< 1	$\times 10^{-3}$	90%	914
$J/\psi\eta'$	< 5	$\times 10^{-3}$	90%	385
$J/\psi\pi^+\pi^-\pi^0$	< 1	$\times 10^{-3}$	90%	847
$\psi(2S)\pi^+\pi^-$	< 4	$\times 10^{-3}$	90%	353
$\chi_{c1}\gamma$	< 7	$\times 10^{-3}$	90%	593
$\chi_{c2}\gamma$	< 1.3	%	90%	554
$\chi_{c1}\pi^+\pi^-\pi^0$	< 2	$\times 10^{-3}$	90%	452
$\chi_{c2}\pi^+\pi^-\pi^0$	< 8	$\times 10^{-3}$	90%	398
$\phi\pi^+\pi^-$	< 2	$\times 10^{-3}$	90%	1941

$X(4260)$

$I^G(J^{PC}) = ?^?(1^{--})$

Mass $m = 4263^{+8}_{-9}$ MeV (S = 1.1)
Full width $\Gamma = 95 \pm 14$ MeV

***X*(4260) DECAY MODES**	Fraction (Γ_i/Γ)	p (MeV/c)
$J/\psi\pi^+\pi^-$	seen	976
$J/\psi\pi^0\pi^0$	[*e*] seen	978
$J/\psi K^+K^-$	[*e*] seen	530
$J/\psi\eta$	[*e*] not seen	886
$J/\psi\pi^0$	[*e*] not seen	999
$J/\psi\eta'$	[*e*] not seen	569
$J/\psi\pi^+\pi^-\pi^0$	[*e*] not seen	939
$J/\psi\eta\eta$	[*e*] not seen	339
$\psi(2S)\pi^+\pi^-$	[*e*] not seen	470
$\psi(2S)\eta$	[*e*] not seen	167
$\chi_{c0}\omega$	[*e*] not seen	292
$\chi_{c1}\gamma$	[*e*] not seen	686
$\chi_{c2}\gamma$	[*e*] not seen	648
$\chi_{c1}\pi^+\pi^-\pi^0$	[*e*] not seen	571
$\chi_{c2}\pi^+\pi^-\pi^0$	[*e*] not seen	524
$\phi\pi^+\pi^-$	[*e*] not seen	1999
$\phi f_0(980) \rightarrow \phi\pi^+\pi^-$	not seen	–
$D\overline{D}$	not seen	1032
$D^0 D^{*-}\pi^+$	not seen	716
$D^*\overline{D}$	not seen	887
$D^*\overline{D}^*$	not seen	708
$D^*\overline{D}\pi$	not seen	723
$D^*\overline{D}^*\pi$	not seen	474
$D_s^+ D_s^-$	not seen	817
$D_s^{*+} D_s^-$	not seen	615
$D_s^{*+} D_s^{*-}$	not seen	284
$p\overline{p}$	not seen	1914
$K_S^0 K^\pm\pi^\mp$	not seen	2054
$K^+K^-\pi^0$	not seen	2055

$\psi(4415)$ [*d*]

$I^G(J^{PC}) = 0^-(1^{--})$

Mass $m = 4421 \pm 4$ MeV
Full width $\Gamma = 62 \pm 20$ MeV
$\Gamma_{ee} = 0.58 \pm 0.07$ keV

$\psi(4415)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
hadrons	dominant		–
$D\overline{D}$	not seen		1187
$D^0\overline{D}^0$	not seen		1187
D^+D^-	not seen		1179
$D^*\overline{D}$ + c.c.	not seen		1063
$D^*(2007)^0\overline{D}^0$ + c.c.	not seen		1067
$D^*(2010)^+D^-$ + c.c.	not seen		1059
$D^*\overline{D}^*$	not seen		919
$D^*(2007)^0\overline{D}^*(2007)^0$ + c.c.	not seen		927
$D^*(2010)^+D^*(2010)^-$ + c.c.	not seen		919
$(D^0D^-\pi^+)_{non-res}$	< 2.3 %	90%	–
$D\overline{D}_2^*(2460) \rightarrow D^0D^-\pi^+$	(10 $\pm$4) %		–
$D^0D^{*-}\pi^+$	< 11 %	90%	926
e^+e^-	(9.4$\pm$3.2) $\times 10^{-6}$		2210

NOTES

[*a*] The value is for the sum of the charge states or particle/antiparticle states indicated.

[*b*] Includes $p\overline{p}\pi^+\pi^-\gamma$ and excludes $p\overline{p}\eta$, $p\overline{p}\omega$, $p\overline{p}\eta'$.

[*c*] See the "Note on the $\eta(1405)$" in the $\eta(1405)$ Particle Listings.

[*d*] J^{PC} known by production in e^+e^- via single photon annihilation. I^G is not known; interpretation of this state as a single resonance is unclear because of the expectation of substantial threshold effects in this energy region.

[*e*] See COAN 06 for details.