

LIGHT UNFLAVORED MESONS

($S = C = B = 0$)

For $I = 1$ (π, b, ρ, a): $u\bar{d}, (u\bar{u}-d\bar{d})/\sqrt{2}, d\bar{u}$;
for $I = 0$ ($\eta, \eta', h, h', \omega, \phi, f, f'$): $c_1(u\bar{u} + d\bar{d}) + c_2(s\bar{s})$

$f_0(500)$

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

also known as σ ; was $f_0(600)$, $f_0(400-1200)$

See the review on "Scalar Mesons below 1 GeV."

Mass (T-Matrix Pole $\sqrt{s}$) = (400–550)– i (200–350) MeV

Mass (Breit-Wigner) = 400 to 800 MeV

Full width (Breit-Wigner) = 100 to 800 MeV

$f_0(500)$ DECAY MODES

	Fraction (Γ_i/Γ)	p (MeV/c)
$\pi\pi$	seen	–
$\gamma\gamma$	seen	–

$\rho(770)$

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

See the review on "Spectroscopy of Light Meson Resonances."

T-Matrix Pole $\sqrt{s} = (761-765) - i(71-74)$ MeV

ρ^0 mass (Breit-Wigner) = 775.26 ± 0.23 MeV ^[a]

$\rho^\pm$ mass (Breit-Wigner) = 775.11 ± 0.34 MeV ^[b]

ρ^0 full width (Breit-Wigner) = 147.4 ± 0.8 MeV ^[a] ($S = 2.0$)

$\rho^\pm$ full width (Breit-Wigner) = 149.1 ± 0.8 MeV ^[b]

$\rho(770)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
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$\pi\pi$	~ 100	%	363
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$\rho(770)^\pm$ decays

$\pi^\pm\gamma$	(4.5 ± 0.5) $\times 10^{-4}$	$S=2.2$	375
$\pi^\pm\eta$	< 6	CL=84%	152
$\pi^\pm\pi^+\pi^-\pi^0$	< 2.0	CL=84%	254

$\rho(770)^0$ decays

$\pi^+\pi^-\gamma$	(9.9 ± 1.6) $\times 10^{-3}$		362
$\pi^0\gamma$	(4.7 ± 0.8) $\times 10^{-4}$	$S=1.7$	376
$\eta\gamma$	(3.00 ± 0.21) $\times 10^{-4}$		194
$\pi^0\pi^0\gamma$	(4.5 ± 0.8) $\times 10^{-5}$		363
$\mu^+\mu^-$	[c] (4.55 ± 0.28) $\times 10^{-5}$		373
e^+e^-	[c] (4.72 ± 0.05) $\times 10^{-5}$		388
$\pi^+\pi^-\pi^0$	(9 ± 4) $\times 10^{-5}$		323
$\pi^+\pi^-\pi^+\pi^-$	(1.8 ± 0.9) $\times 10^{-5}$		251
$\pi^+\pi^-\pi^0\pi^0$	(1.6 ± 0.8) $\times 10^{-5}$		256
$\pi^0e^+e^-$	< 1.2	CL=90%	376

$\omega(782)$

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

Mass $m = 782.66 \pm 0.13$ MeV ($S = 2.0$)

Full width $\Gamma = 8.68 \pm 0.13$ MeV

NODE=MXXX005

NODE=M014

NODE=M014PP;DTYPE=p;OUR EST;
→ UNCHECKED ←
NODE=M014M;DTYPE=M;OUR EST;
→ UNCHECKED ←
NODE=M014W;DTYPE=G;OUR EST;
→ UNCHECKED ←

NODE=M014215;DESIG=1;OUR EST;
→ UNCHECKED ←
DESIG=5;OUR EST;→ UNCHECKED ←

NODE=M009

NODE=M009PP;DTYPE=p;OUR EST;
→ UNCHECKED ←
NODE=M009M0;DTYPE=M
NODE=M009M5;DTYPE=M
NODE=M009W0;DTYPE=G
NODE=M009W5;DTYPE=G

NODE=M009225;DESIG=1;OUR EVAL;
→ UNCHECKED ←

NODE=M009;CLUMP=A
DESIG=3
DESIG=5
DESIG=21

NODE=M009;CLUMP=B
DESIG=60
DESIG=40
DESIG=8
DESIG=80
DESIG=6
DESIG=4
DESIG=7
DESIG=22
DESIG=30
DESIG=9

NODE=M001

NODE=M001M;DTYPE=M
NODE=M001W;DTYPE=G

$\omega(782)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)	
$\pi^+\pi^-\pi^0$	(89.2 $\pm$ 0.7) %		327	NODE=M001215;DESIG=1
$\pi^0\gamma$	(8.33 $\pm$ 0.25) %	S=2.1	380	DESIG=3
$\pi^+\pi^-$	(1.53 $\pm$ 0.12) %	S=1.2	366	DESIG=2
neutrals (excluding $\pi^0\gamma$)	(7 $^{+7}_{-5}$) $\times 10^{-3}$	S=1.1	—	DESIG=13
$\eta\gamma$	(4.5 $\pm$ 0.4) $\times 10^{-4}$	S=1.1	200	DESIG=6
$\pi^0 e^+ e^-$	(7.7 $\pm$ 0.6) $\times 10^{-4}$		380	DESIG=14
$\pi^0 \mu^+ \mu^-$	(1.34 $\pm$ 0.18) $\times 10^{-4}$	S=1.5	349	DESIG=11
$e^+ e^-$	(7.41 $\pm$ 0.19) $\times 10^{-5}$	S=1.8	391	DESIG=7
$\pi^+\pi^-\pi^0\pi^0$	< 2 $\times 10^{-4}$	CL=90%	262	DESIG=12
$\pi^+\pi^-\gamma$	< 3.6 $\times 10^{-3}$	CL=95%	366	DESIG=4
$\pi^+\pi^-\pi^+\pi^-$	< 1 $\times 10^{-3}$	CL=90%	256	DESIG=15
$\pi^0\pi^0\gamma$	(6.7 $\pm$ 1.1) $\times 10^{-5}$		367	DESIG=5
$\eta\pi^0\gamma$	< 3.3 $\times 10^{-5}$	CL=90%	162	DESIG=17
$\mu^+\mu^-$	(7.4 $\pm$ 1.8) $\times 10^{-5}$		377	DESIG=8
3γ	< 1.9 $\times 10^{-4}$	CL=95%	391	DESIG=10
Charge conjugation (C) violating modes				
$\eta\pi^0$	C < 2.1 $\times 10^{-4}$	CL=90%	162	NODE=M001;CLUMP=A
$2\pi^0$	C < 2.2 $\times 10^{-4}$	CL=90%	367	DESIG=9
$3\pi^0$	C < 2.3 $\times 10^{-4}$	CL=90%	330	DESIG=193
invisible	< 7 $\times 10^{-5}$	CL=90%	—	DESIG=16
				DESIG=194

 $\eta'(958)$

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

Mass $m = 957.78 \pm 0.06$ MeV
 Full width $\Gamma = 0.188 \pm 0.006$ MeV

NODE=M002
 NODE=M002M;DTYPE=M
 NODE=M002W;DTYPE=G

$\eta'(958)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)	
$\pi^+\pi^-\eta$	(42.5 $\pm$ 0.5) %		232	NODE=M002215;DESIG=1
$\rho^0\gamma$ (including non-resonant)	(29.48 $\pm$ 0.35) %		165	DESIG=9
$\pi^+\pi^-\pi^0\gamma$				
$\pi^0\pi^0\eta$	(22.4 $\pm$ 0.5) %		239	DESIG=2
$\omega\gamma$	(2.52 $\pm$ 0.07) %		159	DESIG=7
$\omega e^+ e^-$	(2.0 $\pm$ 0.4) $\times 10^{-4}$		159	DESIG=205
$\gamma\gamma$	(2.307 $\pm$ 0.033) %		479	DESIG=6
$3\pi^0$	(2.50 $\pm$ 0.17) $\times 10^{-3}$		430	DESIG=8
$\mu^+\mu^-\gamma$	(1.13 $\pm$ 0.28) $\times 10^{-4}$		467	DESIG=20
$\pi^+\pi^-\mu^+\mu^-$	(2.13 $\pm$ 0.13) $\times 10^{-5}$		401	DESIG=201
$\pi^+\pi^-\pi^0$	(3.61 $\pm$ 0.17) $\times 10^{-3}$		428	DESIG=121
($\pi^+\pi^-\pi^0$) S-wave	(3.8 $\pm$ 0.5) $\times 10^{-3}$		428	DESIG=211
$\pi^\mp\rho^\pm$	(7.4 $\pm$ 2.3) $\times 10^{-4}$		106	DESIG=210
$2(\pi^+\pi^-)$	(8.51 $\pm$ 0.33) $\times 10^{-5}$		372	DESIG=131
$\pi^+\pi^-2\pi^0$	(2.11 $\pm$ 0.15) $\times 10^{-4}$		376	DESIG=202
$2(\pi^+\pi^-)$ neutrals	< 1 %	95%	—	DESIG=132
$2(\pi^+\pi^-)\pi^0$	< 1.8 $\times 10^{-3}$	90%	298	DESIG=141
$2(\pi^+\pi^-)2\pi^0$	< 1 %	95%	197	DESIG=15
$3(\pi^+\pi^-)$	< 3.1 $\times 10^{-5}$	90%	189	DESIG=203
$K^\pm\pi^\mp$	< 4 $\times 10^{-5}$	90%	334	DESIG=207
$\pi^+\pi^-e^+e^-$	(2.43 $\pm$ 0.06) $\times 10^{-3}$		458	DESIG=10
$\pi^+e^-\nu_e + \text{c.c.}$	< 2.1 $\times 10^{-4}$	90%	469	DESIG=204
$\gamma e^+ e^-$	(4.80 $\pm$ 0.15) $\times 10^{-4}$		479	DESIG=28
$\pi^0\gamma\gamma$	(3.20 $\pm$ 0.24) $\times 10^{-3}$		469	DESIG=24
$\pi^0\gamma\gamma$ (non resonant)	(6.2 $\pm$ 0.9) $\times 10^{-4}$		—	DESIG=212
$\eta\gamma\gamma$	< 1.33 $\times 10^{-4}$	90%	322	DESIG=214
$4\pi^0$	< 1.2 $\times 10^{-5}$	90%	380	DESIG=26
$e^+ e^-$	< 5.6 $\times 10^{-9}$	90%	479	DESIG=150
$e^+ e^- e^+ e^-$	(4.5 $\pm$ 1.1) $\times 10^{-6}$		479	DESIG=215
$e^+ e^- \mu^+ \mu^-$	< 1.8 $\times 10^{-6}$	90%	467	DESIG=219
$\mu^+ \mu^- \mu^+ \mu^-$	< 5 $\times 10^{-7}$	90%	419	DESIG=220
invisible	< 2.1 $\times 10^{-4}$	90%	—	DESIG=200
γ Dark Photon	5×10^{-7} to 3.5×10^{-6}	90%	—	DESIG=217

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

$\pi^+ \pi^-$	P, CP	< 1.8	$\times 10^{-5}$	90%	458	DESIG=111
$\pi^0 \pi^0$	P, CP	< 4	$\times 10^{-4}$	90%	459	DESIG=25
$\pi^0 e^+ e^-$	C	$[d] < 1.4$	$\times 10^{-3}$	90%	469	DESIG=16
$\pi^0 \rho^0$	C	< 4	%	90%	111	DESIG=18
$\eta e^+ e^-$	C	$[d] < 2.4$	$\times 10^{-3}$	90%	322	DESIG=17
3γ	C	< 1.0	$\times 10^{-4}$	90%	479	DESIG=23
$\mu^+ \mu^- \pi^0$	C	$[d] < 6.0$	$\times 10^{-5}$	90%	445	DESIG=22
$\mu^+ \mu^- \eta$	C	$[d] < 1.5$	$\times 10^{-5}$	90%	273	DESIG=21
$e \mu$	LF	< 4.7	$\times 10^{-4}$	90%	473	DESIG=27
$\pi^+ \pi^- \text{ALP} \rightarrow \pi^+ \pi^- e^+ e^-$		< 1.9	$\times 10^{-5}$	90%	—	DESIG=218

 $f_0(980)$

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

NODE=M003

See the review on "Scalar Mesons below 1 GeV."

T-matrix pole $\sqrt{s} = (980-1010) - i(20-35) \text{ MeV} [^e]$ Mass (Breit-Wigner) = $990 \pm 20 \text{ MeV} [^e]$

Full width (Breit-Wigner) = 10 to 100 MeV [e]

NODE=M003PP;DTYPE=p;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$
 NODE=M003M1;DTYPE=M;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$
 NODE=M003W1;DTYPE=G;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$

$f_0(980)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\pi \pi$	seen	476
$K \bar{K}$	seen	36
$\gamma \gamma$	seen	495

NODE=M003215;DESIG=2;OUR EVAL;
 $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=1;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=5;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$

 $a_0(980)$

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

NODE=M036

See the review on "Scalar Mesons below 1 GeV."

T-matrix pole $\sqrt{s} = (970-1020) - i(30-70) \text{ MeV} [^e]$ Mass $m = 980 \pm 20 \text{ MeV} [^e]$ Full width $\Gamma = 50 \text{ to } 100 \text{ MeV} [^e]$

NODE=M036PP;DTYPE=p;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$
 NODE=M036MX;DTYPE=M;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$
 NODE=M036W1;DTYPE=G;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$

$a_0(980)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\eta \pi$	seen	319
$K \bar{K}$	seen	†
$\eta' \pi$	seen	†
$\rho \pi$	not seen	138
$\gamma \gamma$	seen	490

NODE=M036215;DESIG=1;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=3;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=8
 DESIG=2;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=5;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$

 $\phi(1020)$

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

NODE=M004

Mass $m = 1019.460 \pm 0.016 \text{ MeV}$ Full width $\Gamma = 4.249 \pm 0.013 \text{ MeV}$ ($S = 1.1$)

NODE=M004M;DTYPE=M

NODE=M004W;DTYPE=G

$\phi(1020)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)	
$K^+ K^-$	(50.1 $\pm$ 0.6) %	S=1.6	127	NODE=M004215;DESIG=1
$K_L^0 K_S^0$	(33.6 $\pm$ 0.4) %	S=1.3	110	DESIG=2
$\rho\pi^+ + \pi^+\pi^-\pi^0$	(14.7 $\pm$ 0.4) %	S=1.5	—	DESIG=24
$\eta\gamma$	(1.306 $\pm$ 0.024) %	S=1.2	363	DESIG=4
$\pi^0\gamma$	(1.33 $\pm$ 0.05) $\times 10^{-3}$		501	DESIG=7
$\ell^+\ell^-$	—		510	DESIG=256;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$
e^+e^-	(2.963 $\pm$ 0.034) $\times 10^{-4}$	S=1.4	510	DESIG=5
$\mu^+\mu^-$	(2.86 $\pm$ 0.22) $\times 10^{-4}$	S=1.2	499	DESIG=6
ηe^+e^-	(1.08 $\pm$ 0.04) $\times 10^{-4}$		363	DESIG=17
$\pi^+\pi^-$	(9.5 $\pm$ 1.9) $\times 10^{-5}$	S=2.0	490	DESIG=8
$\omega\pi^0$	(4.7 $\pm$ 0.5) $\times 10^{-5}$		171	DESIG=25
$\omega\gamma$	< 5 %	CL=84%	209	DESIG=10
$\rho\gamma$	< 1.2 $\times 10^{-5}$	CL=90%	215	DESIG=12
$\pi^+\pi^-\gamma$	(4.1 $\pm$ 1.3) $\times 10^{-5}$		490	DESIG=9
$f_0(980)\gamma$	(3.22 $\pm$ 0.19) $\times 10^{-4}$	S=1.1	29	DESIG=20
$\pi^0\pi^0\gamma$	(1.13 $\pm$ 0.06) $\times 10^{-4}$		492	DESIG=19
$\pi^+\pi^-\pi^+\pi^-$	(3.9 $\pm$ 2.8 $\pm$ 2.2) $\times 10^{-6}$		410	DESIG=15
$\pi^+\pi^+\pi^-\pi^-\pi^0$	< 4.6 $\times 10^{-6}$	CL=90%	342	DESIG=14
$\pi^0 e^+ e^-$	(1.33 $\pm$ 0.07 $\pm$ 0.10) $\times 10^{-5}$		501	DESIG=21
$\pi^0\eta\gamma$	(7.27 $\pm$ 0.30) $\times 10^{-5}$	S=1.5	346	DESIG=22
$a_0(980)\gamma$	(7.6 $\pm$ 0.6) $\times 10^{-5}$		39	DESIG=23
$K^0\bar{K}^0\gamma$	< 1.9 $\times 10^{-8}$	CL=90%	110	DESIG=257
$\eta'(958)\gamma$	(6.23 $\pm$ 0.21) $\times 10^{-5}$		60	DESIG=194
$\eta\pi^0\pi^0\gamma$	< 2 $\times 10^{-5}$	CL=90%	293	DESIG=195
$\mu^+\mu^-\gamma$	(1.4 $\pm$ 0.5) $\times 10^{-5}$		499	DESIG=196
$\rho\gamma\gamma$	< 1.2 $\times 10^{-4}$	CL=90%	215	DESIG=250
$\eta\pi^+\pi^-$	< 1.8 $\times 10^{-5}$	CL=90%	288	DESIG=255
$\eta\mu^+\mu^-$	< 9.4 $\times 10^{-6}$	CL=90%	321	DESIG=26
$\eta U \rightarrow \eta e^+ e^-$	< 1 $\times 10^{-6}$	CL=90%	—	DESIG=259
invisible	< 1.7 $\times 10^{-4}$	CL=90%	—	DESIG=260

Lepton Family number (LF) violating modes

$e^\pm\mu^\mp$	LF	< 2	$\times 10^{-6}$	CL=90%	504	NODE=M004;CLUMP=A
$\pi^+\pi^+e^-e^-$	L	< 1.3	$\times 10^{-5}$	CL=90%	490	DESIG=258 DESIG=261

$h_1(1170)$

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

Mass $m = 1166 \pm 6$ MeV

Full width $\Gamma = 375 \pm 35$ MeV

NODE=M030

NODE=M030M;DTYPE=M

NODE=M030W;DTYPE=G

$h_1(1170)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\rho\pi$	seen	305

NODE=M030215;DESIG=1;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$

$b_1(1235)$

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

Mass $m = 1229.5 \pm 3.2$ MeV ($S = 1.6$)

Full width $\Gamma = 142 \pm 9$ MeV ($S = 1.2$)

NODE=M011

NODE=M011M;DTYPE=M

NODE=M011W;DTYPE=G

$b_1(1235)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$\omega\pi$	seen		348
[D/S amplitude ratio = 0.277 ± 0.027]			
$\pi^\pm\gamma$	(1.6 ± 0.4) $\times 10^{-3}$		607
$\eta\rho$	seen		†
$\pi^+\pi^+\pi^-\pi^0$	< 50 %	84%	535
$K^*(892)^\pm K^\mp$	seen		†
$(K\bar{K})^\pm\pi^0$	< 8 %	90%	248
$K_S^0 K_L^0 \pi^\pm$	< 6 %	90%	235
$K_S^0 K_S^0 \pi^\pm$	< 2 %	90%	235
$\phi\pi$	< 1.5 %	84%	147

NODE=M011215;DESIG=1;OUR EST;
→ UNCHECKED ←

DESIG=9

DESIG=8;OUR EST;→ UNCHECKED ←

DESIG=2;OUR EST;→ UNCHECKED ←

DESIG=74

DESIG=71;OUR EST;→ UNCHECKED ←

DESIG=73;OUR EST;→ UNCHECKED ←

DESIG=72;OUR EST;→ UNCHECKED ←

DESIG=5;OUR EST;→ UNCHECKED ←

$a_1(1260)$ ^[f]

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

T-Matrix Pole $\sqrt{s} = (1209^{+13}_{-10}) - i(288^{+45}_{-12})$ MeV

Mass (Breit-Wigner) = 1230 ± 40 MeV ^[e]

Full width (Breit-Wigner) = 250 to 600 MeV ^[e]

NODE=M010

NODE=M010PP;DTYPE=p;OUR EST;

→ UNCHECKED ←

NODE=M010M;DTYPE=M;OUR EST;

→ UNCHECKED ←

NODE=M010W;DTYPE=G;OUR EST;

→ UNCHECKED ←

$a_1(1260)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
3π	seen	577
$(\rho\pi)_{S\text{-wave}}, \rho \rightarrow \pi\pi$	seen	353
$(\rho\pi)_{D\text{-wave}}, \rho \rightarrow \pi\pi$	seen	353
$(\rho(1450)\pi)_{S\text{-wave}}, \rho \rightarrow \pi\pi$	seen	†
$(\rho(1450)\pi)_{D\text{-wave}}, \rho \rightarrow \pi\pi$	seen	†
$f_0(500)\pi, f_0 \rightarrow \pi\pi$	seen	—
$f_0(980)\pi, f_0 \rightarrow \pi\pi$	seen	179
$f_0(1370)\pi, f_0 \rightarrow \pi\pi$	seen	†
$f_2(1270)\pi, f_2 \rightarrow \pi\pi$	seen	†
$\pi^+\pi^-\pi^0$	seen	576
$\pi^0\pi^0\pi^0$	not seen	577
$KK\pi$	seen	250
$K^*(892)K$	seen	†
$\pi\gamma$	seen	608

NODE=M010215;DESIG=17;OUR EST;

→ UNCHECKED ←

DESIG=7;OUR EST;→ UNCHECKED ←

DESIG=8;OUR EST;→ UNCHECKED ←

DESIG=9;OUR EST;→ UNCHECKED ←

DESIG=10;OUR EST;→ UNCHECKED ←

DESIG=16;OUR EST;→ UNCHECKED ←

DESIG=11

DESIG=12;OUR EST;→ UNCHECKED ←

DESIG=13;OUR EST;→ UNCHECKED ←

DESIG=22

DESIG=23;OUR EST;→ UNCHECKED ←

DESIG=18;OUR EST;→ UNCHECKED ←

DESIG=14;OUR EST;→ UNCHECKED ←

DESIG=4;OUR EST;→ UNCHECKED ←

$f_2(1270)$

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

T-Matrix Pole $\sqrt{s} = (1260-1283) - i(90-110)$ MeV

Mass (Breit-Wigner) = 1275.4 ± 0.8 MeV ($S = 1.1$)

Full width (Breit-Wigner) = $186.6^{+2.8}_{-2.2}$ MeV ($S = 1.5$)

NODE=M005

NODE=M005PP;DTYPE=p;OUR EST;

→ UNCHECKED ←

NODE=M005M;DTYPE=M

NODE=M005W;DTYPE=G

$f_2(1270)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
$\pi\pi$	($84.3^{+2.8}_{-1.0}$) %	S=1.2	623
$\pi^+\pi^-2\pi^0$	($7.7^{+1.2}_{-3.1}$) %	S=1.2	563
$K\bar{K}$	(4.6 ± 0.4) %	S=2.7	404
$2\pi^+2\pi^-$	(2.8 ± 0.4) %	S=1.2	559
$\eta\eta$	(4.0 ± 0.8) $\times 10^{-3}$	S=2.1	326
$4\pi^0$	(3.0 ± 1.0) $\times 10^{-3}$		565
$\gamma\gamma$	(1.42 ± 0.24) $\times 10^{-5}$	S=1.4	638
$\eta\pi\pi$	< 8 $\times 10^{-3}$	CL=95%	478
$K^0 K^- \pi^+ + \text{c.c.}$	< 3.4 $\times 10^{-3}$	CL=95%	293
e^+e^-	< 6 $\times 10^{-10}$	CL=90%	638

NODE=M005215;DESIG=1

DESIG=3

DESIG=4

DESIG=2

DESIG=7

DESIG=9

DESIG=8

DESIG=6

DESIG=5

DESIG=10

$f_1(1285)$

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

Mass $m = 1281.8 \pm 0.5$ MeV ($S = 1.7$)

Full width $\Gamma = 23.0 \pm 1.1$ MeV ($S = 1.6$)

NODE=M008

NODE=M008M;DTYPE=M

NODE=M008W;DTYPE=G

$f_1(1285)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)	
4π	$(32.7 \pm 1.8) \%$	S=1.2	568	NODE=M008215;DESIG=21
$\pi^0 \pi^0 \pi^+ \pi^-$	$(21.8 \pm 1.2) \%$	S=1.2	566	DESIG=22
$2\pi^+ 2\pi^-$	$(10.9 \pm 0.6) \%$	S=1.2	563	DESIG=20
$\rho^0 \pi^+ \pi^-$	$(10.9 \pm 0.6) \%$	S=1.2	336	DESIG=191
$\rho^0 \rho^0$	seen		†	DESIG=23
$4\pi^0$	$< 7 \times 10^{-4}$	CL=90%	568	DESIG=7
$\eta \pi^+ \pi^-$	$(35 \pm 15) \%$		479	DESIG=198
$\eta \pi \pi$	$(52.2 \pm 1.9) \%$	S=1.2	482	DESIG=3
$a_0(980) \pi$ [ignoring $a_0(980) \rightarrow K \bar{K}$]	$(38 \pm 4) \%$		238	DESIG=4
$\eta \pi \pi$ [excluding $a_0(980) \pi$]	$(14 \pm 4) \%$		482	DESIG=5
$K \bar{K} \pi$	$(9.0 \pm 0.4) \%$	S=1.1	308	DESIG=1
$K \bar{K}^*(892)$	not seen		†	DESIG=6
$\pi^+ \pi^- \pi^0$	$(3.0 \pm 0.9) \times 10^{-3}$		603	DESIG=197
$\rho^\pm \pi^\mp$	$< 3.1 \times 10^{-3}$	CL=95%	390	DESIG=199
$\gamma \rho^0$	$(6.1 \pm 1.0) \%$	S=1.7	407	DESIG=13
$\phi \gamma$	seen		235	DESIG=10
$e^+ e^-$	$< 9.4 \times 10^{-9}$	CL=90%	641	DESIG=200

 $\eta(1295)$

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

NODE=M037

See the review on "Spectroscopy of Light Meson Resonances."

Mass $m = 1294 \pm 4$ MeV (S = 1.6)Full width $\Gamma = 55 \pm 5$ MeV

NODE=M037M;DTYPE=M

NODE=M037W;DTYPE=G

$\eta(1295)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\eta \pi^+ \pi^-$	seen	487
$a_0(980) \pi$	seen	248
$\eta \pi^0 \pi^0$	seen	490
$\eta(\pi\pi)_S\text{-wave}$	seen	—
$\sigma \eta$	seen	—
$K \bar{K} \pi$	seen	320

NODE=M037215;DESIG=2;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=1;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=4;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=5;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=6;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=7;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$

 $\pi(1300)$

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

Mass $m = 1300 \pm 100$ MeV [e]Full width $\Gamma = 200$ to 600 MeV [e]

NODE=M058

NODE=M058M;DTYPE=M;OUR EST;

 $\rightarrow$ UNCHECKED $\leftarrow$

NODE=M058W;DTYPE=G;OUR EST;

 $\rightarrow$ UNCHECKED $\leftarrow$

$\pi(1300)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\rho \pi$	seen	404
$\pi(\pi\pi)_S\text{-wave}$	seen	—

NODE=M058215;DESIG=1;OUR EST;

 $\rightarrow$ UNCHECKED $\leftarrow$ DESIG=3;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$ **$a_2(1320)$**

$$I^G(J^{PC}) = 1^-(2^++)$$

T-Matrix Pole $\sqrt{s} = (1305-1321) - i(52-58)$ MeVMass (Breit-Wigner) = 1318.2 ± 0.6 MeV (S = 1.2)Full width $\Gamma = 107 \pm 5$ MeV

NODE=M012

NODE=M012PP;DTYPE=p;OUR EST;

 $\rightarrow$ UNCHECKED $\leftarrow$

NODE=M012M0;DTYPE=M

NODE=M012W;DTYPE=G;OUR EST;

 $\rightarrow$ UNCHECKED $\leftarrow$

$a_2(1320)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
3π	(70.1 $\pm$ 2.7) %	S=1.2	624
$\eta\pi$	(14.5 $\pm$ 1.2) %		535
$\omega\pi\pi$	(10.6 $\pm$ 3.2) %	S=1.3	366
$K\bar{K}$	(4.9 $\pm$ 0.8) %		437
$\eta'(958)\pi$	(5.5 $\pm$ 0.9) $\times 10^{-3}$		288
$\pi^\pm\gamma$	(2.91 $\pm$ 0.27) $\times 10^{-3}$		652
$\gamma\gamma$	(9.4 $\pm$ 0.7) $\times 10^{-6}$		659
e^+e^-	< 5 $\times 10^{-9}$	CL=90%	659

NODE=M012215;DESIG=1
DESIG=3
DESIG=4
DESIG=2
DESIG=8
DESIG=7
DESIG=9
DESIG=10

 $f_0(1370)$

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

NODE=M147

See the review on "Spectroscopy of Light Meson Resonances."

T-Matrix Pole $\sqrt{s} = (1250-1440) - i(60-300)$ MeV

Mass (Breit-Wigner) = 1200 to 1500 MeV

Full width (Breit-Wigner) = 200 to 500 MeV

NODE=M147PP;DTYPE=p;OUR EST;
→ UNCHECKED ←
NODE=M147M;DTYPE=M;OUR EST;
→ UNCHECKED ←
NODE=M147W;DTYPE=G;OUR EST;
→ UNCHECKED ←

$f_0(1370)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\pi\pi$	seen	672
4π	seen	617
$4\pi^0$	seen	617
$2\pi^+2\pi^-$	seen	612
$\pi^+\pi^-2\pi^0$	seen	615
$\rho\rho$	seen	†
$2(\pi\pi)_S\text{-wave}$	seen	—
$\pi(1300)\pi$	seen	†
$a_1(1260)\pi$	seen	35
$\eta\eta$	seen	411
$K\bar{K}$	seen	475
$K\bar{K}n\pi$	not seen	†
6π	not seen	508
$\omega\omega$	not seen	†
$\gamma\gamma$	seen	685
e^+e^-	not seen	685

NODE=M147215;DESIG=1;OUR EST;
→ UNCHECKED ←
DESIG=10;OUR EST;→ UNCHECKED ←
DESIG=4;OUR EST;→ UNCHECKED ←
DESIG=5;OUR EST;→ UNCHECKED ←
DESIG=6;OUR EST;→ UNCHECKED ←
DESIG=14;OUR EST;→ UNCHECKED ←
DESIG=15;OUR EST;→ UNCHECKED ←
DESIG=16;OUR EVAL;→ UNCHECKED ←
DESIG=17;OUR EVAL;→ UNCHECKED ←
DESIG=2;OUR EST;→ UNCHECKED ←
DESIG=11;OUR EST;→ UNCHECKED ←
DESIG=18;OUR EVAL;→ UNCHECKED ←
DESIG=19;OUR EVAL;→ UNCHECKED ←
DESIG=20;OUR EVAL;→ UNCHECKED ←
DESIG=12;OUR EST;→ UNCHECKED ←
DESIG=13;OUR EST;→ UNCHECKED ←

 $\eta(1405)$

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

NODE=M027

See the review on "Spectroscopy of Light Meson Resonances." See also $\eta(1475)$.

Mass $m = 1408.0^{+1.8}_{-1.2}$ MeV (S = 2.1)

Full width $\Gamma = 49.8^{+2.3}_{-2.0}$ MeV (S = 1.6)

NODE=M027MX;DTYPE=M
NODE=M027WX;DTYPE=G

$\eta(1405)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$K\bar{K}\pi$	seen		423
$\eta\pi\pi$	seen		562
$a_0(980)\pi$	seen		344
$\eta(\pi\pi)_S\text{-wave}$	seen		—
$f_0(980)\eta$	seen		†
4π	seen		638
$\rho^0\rho$	<58 %	99.85%	†
$\rho^0\gamma$	seen		491
$\phi\gamma$	seen		335
$K^*(892)K$	seen		121

NODE=M027215;DESIG=2;OUR EST;
→ UNCHECKED ←
DESIG=5;OUR EST;→ UNCHECKED ←
DESIG=4;OUR EST;→ UNCHECKED ←
DESIG=9;OUR EST;→ UNCHECKED ←
DESIG=10;OUR EST;→ UNCHECKED ←
DESIG=6;OUR EVAL;→ UNCHECKED ←
DESIG=12
DESIG=8;OUR EST;→ UNCHECKED ←
DESIG=13
DESIG=11;OUR EST;→ UNCHECKED ←

 $h_1(1415)$

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

NODE=M109

Mass $m = 1409^{+9}_{-8}$ MeV (S = 1.9)

Full width $\Gamma = 78 \pm 11$ MeV

NODE=M109M;DTYPE=M
NODE=M109W;DTYPE=G

$f_1(1420)$

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

See the review on "Spectroscopy of Light Meson Resonances."

Mass $m = 1427.7^{+1.7}_{-1.4}$ MeV ($S = 2.1$)

Full width $\Gamma = 55.4 \pm 3.2$ MeV ($S = 1.3$)

NODE=M006

NODE=M006M2;DTYPE=M
NODE=M006W;DTYPE=G

$f_1(1420)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K\bar{K}\pi$	seen	439
$K\bar{K}^*(892) + \text{c.c.}$	seen	166
$\eta\pi\pi$	possibly seen	574
$\phi\gamma$	seen	350

NODE=M006215;DESIG=2;OUR EST;
→ UNCHECKED ←
DESIG=1;OUR EST;→ UNCHECKED ←
DESIG=5;OUR EST;→ UNCHECKED ←
DESIG=9;OUR EST;→ UNCHECKED ← **$\omega(1420)$ [g]**

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

Mass $m = 1410 \pm 60$ MeV [e]

Full width $\Gamma = 290 \pm 190$ MeV [e]

NODE=M125

NODE=M125M;DTYPE=M;OUR EST;
→ UNCHECKED ←
NODE=M125W;DTYPE=G;OUR EST;
→ UNCHECKED ←

$\omega(1420)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\rho\pi$	seen	480
$\rho(1450)\pi$	possibly seen	†
$\omega\pi\pi$	seen	437
$\omega\eta$	possibly seen	230
$b_1(1235)\pi$	seen	112
e^+e^-	seen	705

NODE=M125215;DESIG=1
DESIG=8
DESIG=4;OUR EST;→ UNCHECKED ←
DESIG=7;OUR EVAL;→ UNCHECKED ←
DESIG=5;OUR EST;→ UNCHECKED ←
DESIG=3;OUR EST;→ UNCHECKED ← **$a_0(1450)$**

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

See the review on "Spectroscopy of Light Meson Resonances."

T-Matrix Pole $\sqrt{s} = (1290-1500) - i(30-140)$ MeV

Mass (Breit-Wigner) = 1439 ± 34 MeV ($S = 1.8$)

Full width (Breit-Wigner) = 258 ± 14 MeV

Branching fractions are given relative to the one **DEFINED AS 1**.

NODE=M149

NODE=M149PP;DTYPE=p;OUR EST;
→ UNCHECKED ←
NODE=M149M;DTYPE=M
NODE=M149W;DTYPE=G
NODE=M149215;NODE=M149

$a_0(1450)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\pi\eta$	0.093 ± 0.020	607
$\pi\eta'(958)$	0.033 ± 0.017	384
$K\bar{K}$	0.082 ± 0.028	523
$\omega\pi\pi$	DEFINED AS 1	458
$a_0(980)\pi\pi$	seen	310
$\gamma\gamma$	seen	719

DESIG=1
DESIG=2
DESIG=3
DESIG=4
DESIG=5
DESIG=6 **$\rho(1450)$**

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

See the review on "Spectroscopy of Light Meson Resonances."

Mass $m = 1465 \pm 25$ MeV [e]

Full width $\Gamma = 400 \pm 60$ MeV [e]

NODE=M105

NODE=M105M0;DTYPE=M;OUR EST;
→ UNCHECKED ←
NODE=M105W0;DTYPE=G;OUR EST;
→ UNCHECKED ←

$\rho(1450)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\pi\pi$	seen	720
$\pi^+\pi^-$	seen	719
4π	seen	669
e^+e^-	seen	732
$\eta\rho$	seen	311
$a_2(1320)\pi$	not seen	55
$K\bar{K}$	seen	541
K^+K^-	seen	541
$K\bar{K}^*(892) + \text{c.c.}$	possibly seen	229
$\pi^0\gamma$	seen	726
$\eta\gamma$	seen	630
$f_0(500)\gamma$	not seen	—
$f_0(980)\gamma$	not seen	398
$f_0(1370)\gamma$	not seen	92
$f_2(1270)\gamma$	not seen	177

 $\eta(1475)$

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

See the review on "Spectroscopy of Light Meson Resonances." See also $\eta(1405)$.

$$\text{Mass } m = 1476 \pm 4 \text{ MeV } (S = 1.4)$$

$$\text{Full width } \Gamma = 96 \pm 9 \text{ MeV } (S = 1.7)$$

NODE=M105215;DESIG=1;OUR EST;
 UNCHECKED
 DESIG=20;OUR EVAL;→ UNCHECKED ←
 DESIG=2;OUR EST;→ UNCHECKED ←
 DESIG=4;OUR EST;→ UNCHECKED ←
 DESIG=3
 DESIG=8;OUR EST;→ UNCHECKED ←
 DESIG=7;OUR EVAL;→ UNCHECKED ←
 DESIG=21;OUR EVAL;→ UNCHECKED ←
 DESIG=15;OUR EST;→ UNCHECKED ←
 DESIG=23;OUR EST;→ UNCHECKED ←
 DESIG=9
 DESIG=16;OUR EST;→ UNCHECKED ←
 DESIG=17;OUR EST;→ UNCHECKED ←
 DESIG=18;OUR EST;→ UNCHECKED ←
 DESIG=19;OUR EST;→ UNCHECKED ←

NODE=M175

NODE=M175M5;DTYPE=M
 NODE=M175W5;DTYPE=G

$\eta(1475)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K\bar{K}\pi$	seen	477
$K\bar{K}^*(892) + \text{c.c.}$	seen	245
$a_0(980)\pi$	seen	396
$\gamma\gamma$	seen	738
$K_S^0 K_S^0 \eta$	possibly seen	†
$\gamma\phi(1020)$	possibly seen	386

NODE=M175215;DESIG=2;OUR EST;
 UNCHECKED
 DESIG=1;OUR EST;→ UNCHECKED ←
 DESIG=4;OUR EST;→ UNCHECKED ←
 DESIG=7;OUR EST;→ UNCHECKED ←
 DESIG=8;OUR EVAL;→ UNCHECKED ←
 DESIG=9

 $f_0(1500)$

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

See the review on "Spectroscopy of Light Meson Resonances."
 T-Matrix Pole $\sqrt{s} = (1430-1530) - i(40-90) \text{ MeV}$
 Mass (Breit-Wigner) = $1522 \pm 25 \text{ MeV}$
 Full width (Breit-Wigner) = $108 \pm 33 \text{ MeV}$

NODE=M152

NODE=M152PP;DTYPE=p;OUR EST;
 UNCHECKED
 NODE=M152M;DTYPE=M
 NODE=M152W;DTYPE=G

$f_0(1500)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor	p (MeV/c)
$\pi\pi$	$(34.5 \pm 2.2) \%$	1.2	749
$\pi^+\pi^-$	seen		748
$2\pi^0$	seen		749
4π	$(48.9 \pm 3.3) \%$	1.2	700
$4\pi^0$	seen		700
$2\pi^+2\pi^-$	seen		696
$2(\pi\pi)S\text{-wave}$	seen		—
$\rho\rho$	seen		†
$\pi(1300)\pi$	seen		163
$a_1(1260)\pi$	seen		234
$\eta\eta$	$(6.0 \pm 0.9) \%$	1.1	528
$\eta\eta'(958)$	$(2.2 \pm 0.8) \%$	1.4	107
$K\bar{K}$	$(8.5 \pm 1.0) \%$	1.1	579
$\gamma\gamma$	not seen		761

NODE=M152215;DESIG=8
 DESIG=9
 DESIG=3;OUR EST;→ UNCHECKED ←
 DESIG=7
 DESIG=5;OUR EST;→ UNCHECKED ←
 DESIG=6;OUR EST;→ UNCHECKED ←
 DESIG=11;OUR EST;→ UNCHECKED ←
 DESIG=12;OUR EST;→ UNCHECKED ←
 DESIG=13;OUR EST;→ UNCHECKED ←
 DESIG=14;OUR EST;→ UNCHECKED ←
 DESIG=1
 DESIG=2
 DESIG=4
 DESIG=10;OUR EST;→ UNCHECKED ←

 $f_2'(1525)$

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

$$\text{Mass } m = 1517.3 \pm 2.4 \text{ MeV } (S = 2.8)$$

$$\text{Full width } \Gamma = 72_{-6}^{+7} \text{ MeV}$$

NODE=M013

NODE=M013MX;DTYPE=M
 NODE=M013WX;DTYPE=G

$f_2'(1525)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K\bar{K}$	(88.8 $\pm$ 2.2) %	576
$\eta\eta$	(10.3 $\pm$ 2.2) %	525
$\pi\pi$	(8.2 $\pm$ 1.5) $\times 10^{-3}$	747
$\gamma\phi$	seen	416
$\gamma\gamma$	(1.12 $\pm$ 0.15) $\times 10^{-6}$	759

NODE=M013215;DESIG=2
DESIG=4
DESIG=1
DESIG=9
DESIG=8

 $f_2(1565)$

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

NODE=M123

See the review on "Spectroscopy of Light Meson Resonances."

T-Matrix Pole $\sqrt{s} = (1495-1560) - i(40-110)$ MeV

Mass (Breit-Wigner) = 1571 $\pm$ 13 MeV

Full width (Breit-Wigner) = 132 $\pm$ 23 MeV (S = 1.1)

NODE=M123PP;DTYPE=p;OUR EST;
→ UNCHECKED ←
NODE=M123M;DTYPE=M
NODE=M123W;DTYPE=G

$f_2(1565)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\pi\pi$	seen	774
$\pi^+\pi^-$	seen	773
$\pi^0\pi^0$	seen	774
$\rho^0\rho^0$	seen	126
$2\pi^+2\pi^-$	seen	722
$\eta\eta$	seen	563
$\omega\omega$	seen	64
$K\bar{K}$	seen	611
$\gamma\gamma$	seen	785

NODE=M123215;DESIG=6;OUR EST;
→ UNCHECKED ←
DESIG=1;OUR EST;→ UNCHECKED ←
DESIG=3;OUR EST;→ UNCHECKED ←
DESIG=2;OUR EST;→ UNCHECKED ←
DESIG=5;OUR EST;→ UNCHECKED ←
DESIG=4;OUR EST;→ UNCHECKED ←
DESIG=7;OUR EST;→ UNCHECKED ←
DESIG=9;OUR EST;→ UNCHECKED ←
DESIG=10;OUR EST;→ UNCHECKED ←

 $\pi_1(1600)$

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

NODE=M164

See the review on "Spectroscopy of Light Meson Resonances."

Mass (T-Matrix Pole $\sqrt{s}$) = (1480-1680) - i (150-300) MeV

Mass (Breit-Wigner, $\eta\pi$ mode) = 1354 $\pm$ 25 MeV (S = 1.8)

Mass (Breit-Wigner, non- $\eta\pi$ mode) = 1645 $^{+40}_{-17}$ MeV (S = 1.3)

Full width (Breit-Wigner, $\eta\pi$ mode) = 330 $\pm$ 35 MeV

Full width (Breit-Wigner, non- $\eta\pi$ mode) = 370 $^{+50}_{-60}$ MeV

NODE=M164TMP;DTYPE=M;OUR EST;
→ UNCHECKED ←
NODE=M164MEP;DTYPE=M
NODE=M164M;DTYPE=M
NODE=M164WEP;DTYPE=G
NODE=M164W;DTYPE=G

$\pi_1(1600)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\pi\pi\pi$	seen	795
$\rho^0\pi^-$	seen	631
$f_2(1270)\pi^-$	not seen	304
$b_1(1235)\pi$	seen	343
$\eta'(958)\pi^-$	seen	532
$\eta\pi$	seen	725
$f_1(1285)\pi$	seen	300

NODE=M164215;DESIG=1;OUR EST;
→ UNCHECKED ←
DESIG=2
DESIG=4
DESIG=5
DESIG=3
DESIG=7;OUR EST;→ UNCHECKED ←
DESIG=6;OUR EST;→ UNCHECKED ←

 $a_1(1640)$

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

NODE=M161

Mass $m = 1655 \pm 16$ MeV (S = 1.2)

Full width $\Gamma = 250 \pm 40$ MeV (S = 1.8)

NODE=M161M;DTYPE=M
NODE=M161W;DTYPE=G

$a_1(1640)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\pi\pi\pi$	seen	800
$f_2(1270)\pi$	seen	314
$\sigma\pi$	seen	—
$\rho\pi$ S -wave	seen	638
$\rho\pi$ D -wave	seen	638
$\omega\pi\pi$	seen	607
$f_1(1285)\pi$	seen	309
$a_1(1260)\eta$	not seen	†

NODE=M161215;DESIG=3;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=1;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=2;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=7;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=4;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=5;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=6;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=8

 $\eta_2(1645)$

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

Mass $m = 1617 \pm 5$ MeVFull width $\Gamma = 181 \pm 11$ MeV

NODE=M154
NODE=M154M;DTYPE=M
NODE=M154W;DTYPE=G

$\eta_2(1645)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$a_2(1320)\pi$	seen	242
$K\bar{K}\pi$	seen	580
$K^*\bar{K}$	seen	404
$\eta\pi^+\pi^-$	seen	685
$a_0(980)\pi$	seen	499
$f_2(1270)\eta$	not seen	†

NODE=M154215;DESIG=1;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=2;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=3;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=4;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=5;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=6;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$

 $\omega(1650)$ ^[h]

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

Mass $m = 1670 \pm 30$ MeV ^[e]Full width $\Gamma = 150 \pm 50$ MeV ^[e]

NODE=M126

NODE=M126M;DTYPE=M;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$
NODE=M126W;DTYPE=G;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$

$\omega(1650)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\rho\pi$	seen	647
$\rho(1450)\pi$	seen	145
$\omega\pi\pi$	seen	617
$\omega\eta$	seen	500
e^+e^-	seen	835
$\pi^0\gamma$	not seen	830

NODE=M126215;DESIG=1;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=6
DESIG=2;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=4;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=3;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=5

 $\omega_3(1670)$

$$I^G(J^{PC}) = 0^-(3^{--})$$

Mass $m = 1667 \pm 4$ MeVFull width $\Gamma = 168 \pm 10$ MeV

NODE=M045

NODE=M045M;DTYPE=M
NODE=M045W;DTYPE=G

$\omega_3(1670)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\rho\pi$	seen	645
$\omega\pi\pi$	seen	615
$b_1(1235)\pi$	possibly seen	361

NODE=M045215;DESIG=1;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=2;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=3;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$

 $\pi_2(1670)$

$$I^G(J^{PC}) = 1^-(2^-+)$$

Mass $m = 1670.6^{+2.9}_{-1.2}$ MeV ($S = 1.3$)Full width $\Gamma = 258^{+8}_{-9}$ MeV ($S = 1.2$)

NODE=M034

NODE=M034M;DTYPE=M
NODE=M034W;DTYPE=G

$\pi_2(1670)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
3π	$(95.8 \pm 1.4) \%$		808
$f_2(1270)\pi$	$(56.3 \pm 3.2) \%$		327
$\rho\pi$	$(31 \pm 4) \%$		647
$\sigma\pi$	$(10 \pm 4) \%$		—
$\pi(\pi\pi)_{S\text{-wave}}$	$(8.7 \pm 3.4) \%$		—
$\pi^\pm\pi^+\pi^-$	$(53 \pm 4) \%$		806
$K\bar{K}^*(892) + \text{c.c.}$	$(4.2 \pm 1.4) \%$		453
$\omega\rho$	$(2.7 \pm 1.1) \%$		302
$\pi^\pm\gamma$	$(7.0 \pm 1.2) \times 10^{-4}$		829
$\gamma\gamma$	$< 2.8 \times 10^{-7}$	90%	835
$\eta\pi$	$< 5 \%$		739
$\pi^\pm 2\pi^+ 2\pi^-$	$< 5 \%$		735
$\rho(1450)\pi$	$< 3.6 \times 10^{-3}$	97.7%	145
$b_1(1235)\pi$	$< 1.9 \times 10^{-3}$	97.7%	364
$f_1(1285)\pi$	possibly seen		322
$a_2(1320)\pi$	not seen		291

 $\phi(1680)$

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

Mass $m = 1680 \pm 20$ MeV [e]Full width $\Gamma = 150 \pm 50$ MeV [e]

NODE=M067

NODE=M067M1; DTYPE=M; OUR EST;

→ UNCHECKED ←

NODE=M067W1; DTYPE=G; OUR EST;

→ UNCHECKED ←

$\phi(1680)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K\bar{K}^*(892) + \text{c.c.}$	seen	462
$K_S^0 K\pi$	seen	621
$K\bar{K}$	seen	680
e^+e^-	seen	840
$\omega\pi\pi$	not seen	623
$K^+K^-\pi^+\pi^-$	seen	544
$\eta\phi$	seen	290
$\eta\gamma$	seen	751
$\rho(770)\pi$	not seen	653
$f_2'(1525)\gamma$	not seen	155

NODE=M067215; DESIG=4; OUR EST;

→ UNCHECKED ←

DESIG=5; OUR EST; → UNCHECKED ←

DESIG=3; OUR EST; → UNCHECKED ←

DESIG=6; OUR EST; → UNCHECKED ←

DESIG=1; OUR EST; → UNCHECKED ←

DESIG=12; OUR EVAL; → UNCHECKED ←

DESIG=10

DESIG=13

DESIG=17

DESIG=15

 $\rho_3(1690)$

$$I^G(J^{PC}) = 1^+(3^{--})$$

Mass $m = 1688.8 \pm 2.1$ MeVFull width $\Gamma = 161 \pm 10$ MeV (S = 1.5)

NODE=M015

NODE=M015M; DTYPE=M

NODE=M015W; DTYPE=G

$\rho_3(1690)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor	p (MeV/c)
4π	$(71.1 \pm 1.9) \%$		790
$\pi^\pm\pi^+\pi^-\pi^0$	$(67 \pm 22) \%$		787
$\omega\pi$	$(16 \pm 6) \%$		655
$\pi\pi$	$(23.6 \pm 1.3) \%$		834
$K\bar{K}\pi$	$(3.8 \pm 1.2) \%$		629
$K\bar{K}$	$(1.58 \pm 0.26) \%$	1.2	685
$\eta\pi^+\pi^-$	seen		727
$\rho(770)\eta$	seen		520
$\pi\pi\rho$	seen		633
$a_2(1320)\pi$	seen		307
$\rho\rho$	seen		335

NODE=M015215; DESIG=2

DESIG=11

DESIG=7

DESIG=1

DESIG=3

DESIG=4

DESIG=13

DESIG=14; OUR EST; → UNCHECKED ←

DESIG=5; OUR EST; → UNCHECKED ←

DESIG=6; OUR EST; → UNCHECKED ←

DESIG=8; OUR EST; → UNCHECKED ←

 $\rho(1700)$

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

See the review on "Spectroscopy of Light Meson Resonances."

Mass $m = 1720 \pm 20$ MeV [e] ($\eta\rho^0$ and $\pi^+\pi^-$ modes)Full width $\Gamma = 250 \pm 100$ MeV [e] ($\eta\rho^0$ and $\pi^+\pi^-$ modes)

NODE=M065

NODE=M065M0; DTYPE=M; OUR EST;

→ UNCHECKED ←

NODE=M065W0; DTYPE=G; OUR EST;

→ UNCHECKED ←

$\rho(1700)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$2(\pi^+\pi^-)$	seen	803
$\rho\pi\pi$	seen	653
$\rho^0\pi^+\pi^-$	seen	651
$\rho^\pm\pi^\mp\pi^0$	seen	652
$a_1(1260)\pi$	seen	404
$h_1(1170)\pi$	seen	450
$\pi(1300)\pi$	seen	349
$\rho\rho$	seen	373
$\pi^+\pi^-$	seen	849
$\pi\pi$	seen	849
$K\bar{K}^*(892) + \text{c.c.}$	seen	496
$\eta\rho$	seen	545
$a_2(1320)\pi$	not seen	334
$K\bar{K}$	seen	704
e^+e^-	seen	860
$\pi^0\omega$	seen	674
$\pi^0\gamma$	not seen	855
$f_0(1500)\gamma$	not seen	187

NODE=M065215;DESIG=2;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=12;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=1;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=9;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=15;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=16;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=17;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=18;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=4;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=13;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=10;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=11;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=14;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=5;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=8;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=6;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=194
DESIG=195

 $a_2(1700)$

$$I^G(J^{PC}) = 1^-(2^{++})$$

T-Matrix Pole $\sqrt{s} = (1630-1780) - i(60-250)$ MeV

Mass $m = 1706 \pm 14$ MeV ($S = 1.2$)

Full width $\Gamma = 380^{+60}_{-50}$ MeV ($S = 3.9$)

NODE=M162

NODE=M162PP;DTYPE=p;OUR EST;

 $\rightarrow$ UNCHECKED $\leftarrow$

NODE=M162M;DTYPE=M

NODE=M162W;DTYPE=G

$a_2(1700)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\eta\pi$	$(2.5 \pm 0.6) \%$	758
$\eta'\pi$	seen	574
$\gamma\gamma$	$(7.9 \pm 1.7) \times 10^{-7}$	853
$\rho\pi$	seen	669
$f_2(1270)\pi$	seen	357
$K\bar{K}$	$(1.3 \pm 0.8) \%$	695
$\omega\pi^-\pi^0$	seen	639
$\omega\rho$	seen	347

NODE=M162215;DESIG=4

DESIG=8;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$

DESIG=1

DESIG=2;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$ DESIG=3;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$

DESIG=5

DESIG=6;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$ DESIG=7;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$ **$f_0(1710)$**

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

See the review on "Spectroscopy of Light Meson Resonances."

T-matrix pole $\sqrt{s} = (1680-1820) - i(50-180)$ MeV

Mass (Breit-Wigner) = 1733^{+8}_{-7} MeV ($S = 1.5$)

Full width (Breit-Wigner) = 150^{+12}_{-10} MeV ($S = 1.3$)

NODE=M068

NODE=M068PP;DTYPE=p;OUR EST;

 $\rightarrow$ UNCHECKED $\leftarrow$

NODE=M068M;DTYPE=M

NODE=M068W;DTYPE=G

$f_0(1710)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K\bar{K}$	seen	712
$\eta\eta$	seen	671
$\eta\eta'$	not seen	417
$\pi\pi$	seen	856
$\gamma\gamma$	seen	866
$\omega\omega$	seen	372

NODE=M068215;DESIG=2;OUR EST;

 $\rightarrow$ UNCHECKED $\leftarrow$ DESIG=1;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$ DESIG=7;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$ DESIG=5;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$ DESIG=6;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$

DESIG=4

 $\pi(1800)$

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

See the review on "Spectroscopy of Light Meson Resonances."

Mass $m = 1810^{+9}_{-11}$ MeV ($S = 2.2$)

Full width $\Gamma = 215^{+7}_{-8}$ MeV

NODE=M075

NODE=M075M;DTYPE=M

NODE=M075W;DTYPE=G

$\pi(1800)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\pi^+\pi^-\pi^-$	seen	878
$f_0(500)\pi^-$	seen	—
$f_0(980)\pi^-$	seen	624
$f_0(1370)\pi^-$	seen	366
$f_0(1500)\pi^-$	not seen	232
$\rho\pi^-$	not seen	731
$\eta\eta\pi^-$	seen	660
$a_0(980)\eta$	seen	471
$a_2(1320)\eta$	not seen	†
$f_2(1270)\pi$	not seen	441
$f_0(1370)\pi^-$	not seen	366
$f_0(1500)\pi^-$	seen	232
$\eta\eta'(958)\pi^-$	seen	373
$K_0^*(1430)K^-$	seen	†
$K^*(892)K^-$	not seen	568

NODE=M075215;DESIG=10;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=11;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=3;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=1
DESIG=12
DESIG=2
DESIG=7;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=5;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=13
DESIG=14
DESIG=15
DESIG=6;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=8;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=4
DESIG=9

 $\phi_3(1850)$

$$I^G(J^{PC}) = 0^-(3^{--})$$

Mass $m = 1854 \pm 7$ MeVFull width $\Gamma = 87^{+28}_{-23}$ MeV ($S = 1.2$)

NODE=M054
NODE=M054M;DTYPE=M
NODE=M054W;DTYPE=G

$\phi_3(1850)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K\bar{K}$	seen	785
$K\bar{K}^*(892) + \text{c.c.}$	seen	602

NODE=M054215;DESIG=1;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=2;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$

 $\eta_2(1870)$

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

Mass $m = 1842 \pm 8$ MeVFull width $\Gamma = 225 \pm 14$ MeV

NODE=M101
NODE=M101M;DTYPE=M
NODE=M101W;DTYPE=G

$\eta_2(1870)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\eta\pi\pi$	seen	816
$a_2(1320)\pi$	seen	434
$f_2(1270)\eta$	seen	119
$a_0(980)\pi$	seen	651
$\gamma\gamma$	seen	921

NODE=M101225;DESIG=1;OUR EVAL;
 $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=4;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=8;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=2;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=9

 $\pi_2(1880)$

$$I^G(J^{PC}) = 1^-(2^{-+})$$

Mass $m = 1874^{+26}_{-5}$ MeV ($S = 1.6$)Full width $\Gamma = 237^{+33}_{-30}$ MeV ($S = 1.2$)

NODE=M185
NODE=M185M;DTYPE=M
NODE=M185W;DTYPE=G

$\pi_2(1880)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\eta\eta\pi^-$	seen	702
$a_0(980)\eta$	seen	528
$a_2(1320)\eta$	seen	76
$f_0(1500)\pi$	seen	294
$f_1(1285)\pi$	seen	485
$\omega\pi^-\pi^0$	seen	744

NODE=M185215;DESIG=1;OUR EVAL;
 $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=2;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=3;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=4;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=5;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=6;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$

 $f_2(1950)$

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

T-Matrix Pole $\sqrt{s} = (1830-2020) - i(110-220)$ MeVMass (Breit-Wigner) = 1936 ± 12 MeV ($S = 1.3$)Full width (Breit-Wigner) = 464 ± 24 MeV

NODE=M135
NODE=M135PP;DTYPE=p;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$
NODE=M135M;DTYPE=M
NODE=M135W;DTYPE=G

$f_2(1950)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K^*(892)\bar{K}^*(892)$	seen	377
$\pi^+\pi^-$	seen	958
$\pi^0\pi^0$	seen	959
4π	seen	921
$\eta\eta$	seen	798
$K\bar{K}$	seen	833
$\gamma\gamma$	seen	968
$\gamma\phi$	seen	700
$p\bar{p}$	seen	238

NODE=M135215;DESIG=1
 DESIG=2;OUR EST;→ UNCHECKED ←
 DESIG=10;OUR EST;→ UNCHECKED ←
 DESIG=7;OUR EST;→ UNCHECKED ←
 DESIG=6;OUR EST;→ UNCHECKED ←
 DESIG=8;OUR EST;→ UNCHECKED ←
 DESIG=9;OUR EST;→ UNCHECKED ←
 DESIG=13
 DESIG=12

 $a_4(1970)$

$$I^G(J^{PC}) = 1^-(4^{++})$$

Mass $m = 1967 \pm 16$ MeV ($S = 2.1$)Full width $\Gamma = 324^{+15}_{-18}$ MeV

NODE=M017
 NODE=M017M;DTYPE=M
 NODE=M017W;DTYPE=G

$a_4(1970)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K\bar{K}$	seen	851
$\pi^+\pi^-\pi^0$	seen	959
$\rho\pi$	seen	825
$f_2(1270)\pi$	seen	559
$\omega\pi^-\pi^0$	seen	801
$\omega\rho$	seen	601
$\eta\pi$	seen	902
$\eta'(958)\pi$	seen	743

NODE=M017215;DESIG=1
 DESIG=2
 DESIG=5;OUR EST;→ UNCHECKED ←
 DESIG=6;OUR EST;→ UNCHECKED ←
 DESIG=7;OUR EST;→ UNCHECKED ←
 DESIG=8
 DESIG=3
 DESIG=4;OUR EST;→ UNCHECKED ←

 $f_2(2010)$

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

Mass $m = 2010^{+60}_{-80}$ MeVFull width $\Gamma = 200 \pm 60$ MeV

NODE=M106
 NODE=M106M;DTYPE=M
 NODE=M106W;DTYPE=G

$f_2(2010)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\phi\phi$	seen	†
$K\bar{K}$	seen	876
$\gamma\phi$	seen	747

NODE=M106215;DESIG=1;OUR EST;
 → UNCHECKED ←
 DESIG=2
 DESIG=4

 $f_0(2020)$

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

T-Matrix Pole $\sqrt{s} = (1870-2080) - i(120-240)$ MeVMass (Breit-Wigner) = $1982^{+54.1}_{-3.0}$ MeVFull width (Breit-Wigner) = 440 ± 50 MeV

NODE=M156
 NODE=M156PP;DTYPE=p;OUR EST;
 → UNCHECKED ←
 NODE=M156M;DTYPE=M
 NODE=M156W;DTYPE=G

$f_0(2020)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\rho\pi\pi$	seen	814
$\pi^0\pi^0$	seen	982
$\rho\rho$	seen	617
$\omega\omega$	seen	608
$\eta\eta$	seen	826
$\eta'\eta'$	seen	254

NODE=M156215;DESIG=1;OUR EST;
 → UNCHECKED ←
 DESIG=2;OUR EST;→ UNCHECKED ←
 DESIG=3;OUR EST;→ UNCHECKED ←
 DESIG=4;OUR EST;→ UNCHECKED ←
 DESIG=5
 DESIG=6

 $f_4(2050)$

$$I^G(J^{PC}) = 0^+(4^{++})$$

Mass $m = 2018 \pm 11$ MeV ($S = 2.1$)Full width $\Gamma = 237 \pm 18$ MeV ($S = 1.9$)

NODE=M016
 NODE=M016M;DTYPE=M
 NODE=M016W;DTYPE=G

$f_4(2050)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\omega\omega$	seen	637
$\pi\pi$	$(17.0 \pm 1.5) \%$	1000
$K\bar{K}$	$(6.8^{+3.4}_{-1.8}) \times 10^{-3}$	880
$\eta\eta$	$(2.1 \pm 0.8) \times 10^{-3}$	848
$4\pi^0$	$< 1.2 \%$	964
$\gamma\gamma$	seen	1009
$a_2(1320)\pi$	seen	567

NODE=M016215;DESIG=6

DESIG=1

DESIG=2

DESIG=3

DESIG=5

DESIG=4;OUR EVAL;→ UNCHECKED ←

DESIG=7

 $f_2(2150)$

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

Mass $m = 2157 \pm 12$ MeVFull width $\Gamma = 152 \pm 30$ MeV (S = 1.4)

NODE=M042

NODE=M042M;DTYPE=M

NODE=M042W;DTYPE=G

$f_2(2150)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\eta\eta$	seen	929
$K\bar{K}$	seen	959
$f_2(1270)\eta$	seen	542
$a_2(1320)\pi$	seen	666
$\rho\bar{\rho}$	seen	532

NODE=M042215;DESIG=2;OUR EST;

→ UNCHECKED ←

DESIG=3;OUR EST;→ UNCHECKED ←

DESIG=4;OUR EST;→ UNCHECKED ←

DESIG=5;OUR EST;→ UNCHECKED ←

DESIG=6

 $\phi(2170)$

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

Mass $m = 2164 \pm 5$ MeVFull width $\Gamma = 88^{+26}_{-21}$ MeV (S = 2.5)

NODE=M103

NODE=M103M;DTYPE=M

NODE=M103W;DTYPE=G

$\phi(2170)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
e^+e^-	seen	1082
$\phi\eta$	seen	728
$\phi\eta'$	seen	439
$\phi\pi\pi$	seen	815
$\phi f_0(980)$	seen	401
$K^+K^-f_0(980) \rightarrow$	seen	—
$K^+K^-\pi^+\pi^-$		
$K^+K^-f_0(980) \rightarrow K^+K^-\pi^0\pi^0$	seen	—
$K^{*0}K^\pm\pi^\mp$	not seen	762
$K^*(892)^0\bar{K}^*(892)^0$	not seen	613

NODE=M103215;DESIG=1;OUR EVAL;

→ UNCHECKED ←

DESIG=5;OUR EVAL;→ UNCHECKED ←

DESIG=11;OUR EVAL;→ UNCHECKED ←

DESIG=9

DESIG=2;OUR EVAL;→ UNCHECKED ←

DESIG=6

DESIG=7

DESIG=8

DESIG=10

 $f_2(2300)$

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

Mass $m = 2297 \pm 28$ MeVFull width $\Gamma = 150 \pm 40$ MeV

NODE=M107

NODE=M107M;DTYPE=M

NODE=M107W;DTYPE=G

$f_2(2300)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\phi\phi$	seen	529
$K\bar{K}$	seen	1037
$\gamma\gamma$	seen	1149
$\Lambda\bar{\Lambda}$	seen	273

NODE=M107215;DESIG=1

DESIG=2

DESIG=3

DESIG=4

 $f_2(2340)$

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

Mass $m = 2346^{+21}_{-10}$ MeVFull width $\Gamma = 331^{+27}_{-18}$ MeV

NODE=M108

NODE=M108M;DTYPE=M

NODE=M108W;DTYPE=G

$f_2(2340)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\phi\phi$	seen	580
$\eta\eta$	seen	1037
$\eta'\eta'$	seen	677

NODE=M108215;DESIG=1;OUR EST;
→ UNCHECKED ←
DESIG=2
DESIG=3

STRANGE MESONS ($S = \pm 1$, $C = B = 0$)

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

NODE=MXXX020

$K_0^*(700)$

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

also known as κ ; was $K_0^*(800)$

See the review on "Scalar Mesons below 1 GeV."

Mass (T-Matrix Pole $\sqrt{s}$) = $(630-730) - i(260-340)$ MeV

Mass (Breit-Wigner) = 838 ± 11 MeV

Full width (Breit-Wigner) = 463 ± 27 MeV

NODE=M174

NODE=M174TMP;DTYPE=M;OUR EST;
→ UNCHECKED ←
NODE=M174M;DTYPE=M
NODE=M174W;DTYPE=G

$K_0^*(700)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K\pi$	100 %	250

NODE=M174215;DESIG=1;OUR EVAL;
→ UNCHECKED ←

$K^*(892)$

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

Mass (T-Matrix Pole $\sqrt{s}$) = $(890 \pm 14) - i(26 \pm 6)$ MeV

$K^*(892)^\pm$ hadroproduced mass $m = 891.67 \pm 0.26$ MeV

$K^*(892)^\pm$ in τ decays mass $m = 895.5 \pm 0.8$ MeV

$K^*(892)^0$ mass $m = 895.55 \pm 0.20$ MeV ($S = 1.7$)

$K^*(892)^\pm$ hadroproduced full width $\Gamma = 51.4 \pm 0.8$ MeV

$K^*(892)^\pm$ in τ decays full width $\Gamma = 46.2 \pm 1.3$ MeV

$K^*(892)^0$ full width $\Gamma = 47.3 \pm 0.5$ MeV ($S = 2.0$)

NODE=M018

NODE=M018TMP;DTYPE=M;OUR EST;
→ UNCHECKED ←
NODE=M018M1;DTYPE=M
NODE=M018MCT;DTYPE=M
NODE=M018M2;DTYPE=M
NODE=M018W1;DTYPE=G
NODE=M018W5;DTYPE=G
NODE=M018W2;DTYPE=G

$K^*(892)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$K\pi$	~ 100 %		289
$K^0\gamma$	$(2.46 \pm 0.21) \times 10^{-3}$		307
$K^\pm\gamma$	$(9.8 \pm 0.9) \times 10^{-4}$		309
$K\pi\pi$	$< 7 \times 10^{-4}$	95%	223

NODE=M018220;DESIG=1;OUR EVAL;
→ UNCHECKED ←
DESIG=4
DESIG=3
DESIG=2

$K_1(1270)$

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

Mass $m = 1256 \pm 6$ MeV ($S = 2.2$)

Full width $\Gamma = 90 \pm 20$ MeV [e]

NODE=M028

NODE=M028MX;DTYPE=M
NODE=M028WX;DTYPE=G;OUR EST;
→ UNCHECKED ←

$K_1(1270)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor	p (MeV/c)
$K\rho$	$(43 \pm 6) \%$		†
$K_0^*(1430)\pi$	$(28 \pm 4) \%$		†
$K^*(892)\pi$	$(14 \pm 4) \%$	1.4	289
$K\omega$	$(11.0 \pm 2.0) \%$		†
$Kf_0(1370)$	$(3.0 \pm 2.0) \%$		†
γK^0	seen		529

NODE=M028215;DESIG=2

DESIG=7

DESIG=1

DESIG=5

DESIG=8

DESIG=9;OUR EST;→ UNCHECKED ←

$K_1(1400)$

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

Mass $m = 1403 \pm 7$ MeV

Full width $\Gamma = 174 \pm 13$ MeV ($S = 1.6$)

NODE=M064

NODE=M064M;DTYPE=M

NODE=M064W;DTYPE=G

$K_1(1400)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K^*(892)\pi$	(94 $\pm$ 6) %	402
$K\rho$	(3.0 $\pm$ 3.0) %	293
$Kf_0(1370)$	(2.0 $\pm$ 2.0) %	†
$K\omega$	(1.0 $\pm$ 1.0) %	284
$K_0^*(1430)\pi$	not seen	†
γK^0	seen	613
$K\phi$	seen	†

NODE=M064215;DESIG=1

DESIG=2

DESIG=8

DESIG=5

DESIG=7;OUR EST;→ UNCHECKED ←

DESIG=9;OUR EST;→ UNCHECKED ←

DESIG=10

 $K^*(1410)$

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

T-matrix pole $\sqrt{s} = (1368 \pm 38) - i(106^{+48}_{-59})$ MeVMass $m = 1414 \pm 15$ MeV ($S = 1.3$)Full width $\Gamma = 232 \pm 21$ MeV ($S = 1.1$)

NODE=M094

NODE=M094PP;DTYPE=p;OUR EST;

→ UNCHECKED ←
NODE=M094M;DTYPE=M

NODE=M094W;DTYPE=G

$K^*(1410)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$K^*(892)\pi$	> 40 %	95%	410
$K\pi$	(6.6 $\pm$ 1.3) %		612
$K\rho$	< 7 %	95%	306
γK^0	< 2.3 $\times 10^{-4}$	90%	619
$K\phi$	seen		†

NODE=M094215;DESIG=2

DESIG=1

DESIG=3;OUR EST;→ UNCHECKED ←

DESIG=4

DESIG=5

 $K_0^*(1430)$

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

T-matrix pole $\sqrt{s} = (1431 \pm 6) - i(110 \pm 19)$ MeVMass $m = 1425 \pm 50$ MeV [e]Full width $\Gamma = 270 \pm 80$ MeV [e]

NODE=M019

NODE=M019PP;DTYPE=p;OUR EST;

→ UNCHECKED ←
NODE=M019M;DTYPE=M;OUR EST;→ UNCHECKED ←
NODE=M019W;DTYPE=G;OUR EST;

→ UNCHECKED ←

$K_0^*(1430)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K\pi$	(93 $\pm$ 10) %	619
$K\eta$	(8.6 $^{+2.7}_{-3.4}$) %	486
$K\eta'(958)$	seen	†

NODE=M019215;DESIG=1

DESIG=2

DESIG=3

 $K_2^*(1430)$

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

T-matrix pole $\sqrt{s} = (1424 \pm 4) - i(66 \pm 2)$ MeV $K_2^*(1430)^\pm$ mass $m = 1427.3 \pm 1.5$ MeV ($S = 1.3$) $K_2^*(1430)^0$ mass $m = 1432.4 \pm 1.3$ MeV $K_2^*(1430)^\pm$ full width $\Gamma = 100.0 \pm 2.2$ MeV ($S = 1.1$) $K_2^*(1430)^0$ full width $\Gamma = 109 \pm 5$ MeV ($S = 1.9$)

NODE=M022

NODE=M022PP;DTYPE=p;OUR EST;

→ UNCHECKED ←
NODE=M022M1;DTYPE=M

NODE=M022M4;DTYPE=M

NODE=M022W1;DTYPE=G

NODE=M022W4;DTYPE=G

$K_2^*(1430)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
$K\pi$	(49.9 $\pm$ 1.2) %		620
$K^*(892)\pi$	(24.7 $\pm$ 1.5) %		420
$K^*(892)\pi\pi$	(13.4 $\pm$ 2.2) %		373
$K\rho$	(8.7 $\pm$ 0.8) %	$S=1.2$	320
$K\omega$	(2.9 $\pm$ 0.8) %		313
$K^+\gamma$	(2.4 $\pm$ 0.5) $\times 10^{-3}$	$S=1.1$	628
$K\eta$	(1.5 $^{+3.4}_{-1.0}$) $\times 10^{-3}$	$S=1.3$	488
$K\omega\pi$	< 7.2 $\times 10^{-4}$	CL=95%	106
$K^0\gamma$	< 9 $\times 10^{-4}$	CL=90%	627

NODE=M022215;DESIG=1

DESIG=2

DESIG=6

DESIG=3

DESIG=4

DESIG=8

DESIG=5

DESIG=7

DESIG=10;OUR EVAL;→ UNCHECKED ←

 $K(1460)$

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

NODE=M021

$K(1460)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K^*(892)\pi$	seen	—
$K\rho$	seen	—
$K_0^*(1430)\pi$	seen	—
$K\phi$	seen	—

NODE=M021215;DESIG=1;OUR EST;
 $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=2;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=3;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
DESIG=4

 $K_1(1650)$

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

Mass $m = 1650 \pm 50$ MeV
Full width $\Gamma = 150 \pm 50$ MeV

NODE=M099

NODE=M099M;DTYPE=M
NODE=M099W;DTYPE=G

 $K^*(1680)$

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

Mass $m = 1718 \pm 18$ MeV
Full width $\Gamma = 320 \pm 110$ MeV ($S = 4.2$)

NODE=M095

NODE=M095M;DTYPE=M
NODE=M095W;DTYPE=G

$K^*(1680)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K\pi$	$(38.7 \pm 2.5) \%$	782
$K\rho$	$(31.4^{+5.0}_{-2.1}) \%$	571
$K^*(892)\pi$	$(29.9^{+2.2}_{-5.0}) \%$	618
$K\phi$	seen	387
$K\eta$	$(1.4^{+1.0}_{-0.8}) \%$	683

NODE=M095215;DESIG=1

DESIG=3

DESIG=2

DESIG=4

DESIG=6

 $K_2(1770)$ ^[i]

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

Mass $m = 1773 \pm 8$ MeV
Full width $\Gamma = 186 \pm 14$ MeV

NODE=M023

NODE=M023M;DTYPE=M

NODE=M023W;DTYPE=G

$K_2(1770)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K\pi\pi$		794
$K_2^*(1430)\pi$	seen	287
$K^*(892)\pi$	seen	654
$Kf_2(1270)$	seen	53
$Kf_0(980)$	possibly seen	466
$K\phi$	seen	441
$K\omega$	seen	607

NODE=M023215;DESIG=1;OUR EST;

 $\rightarrow$ UNCHECKED $\leftarrow$ DESIG=2;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$ DESIG=4;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$ DESIG=9;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$ DESIG=11;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$

DESIG=10

DESIG=8

 $K_3^*(1780)$

$$I(J^P) = \frac{1}{2}(3^-)$$

T-matrix pole $\sqrt{s} = (1754 \pm 13) - i(119 \pm 14)$ MeV
Mass $m = 1779 \pm 8$ MeV ($S = 1.2$)
Full width $\Gamma = 161 \pm 17$ MeV ($S = 1.1$)

NODE=M060

NODE=M060PP;DTYPE=p;OUR EVAL;

 $\rightarrow$ UNCHECKED $\leftarrow$

NODE=M060M;DTYPE=M

NODE=M060W;DTYPE=G

$K_3^*(1780)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$K\rho$	$(31 \pm 9) \%$		616
$K^*(892)\pi$	$(20 \pm 5) \%$		657
$K\pi$	$(18.8 \pm 1.0) \%$		815
$K\eta$	$(30 \pm 13) \%$		721
$K_2^*(1430)\pi$	$< 16 \%$	95%	292

NODE=M060215;DESIG=3

DESIG=2

DESIG=1

DESIG=6

DESIG=4

 $K_2(1820)$ ^[i]

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

Mass $m = 1819 \pm 12$ MeV
Full width $\Gamma = 264 \pm 34$ MeV

NODE=M146

NODE=M146M;DTYPE=M

NODE=M146W;DTYPE=G

$K_2(1820)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K \pi \pi$	seen	819
$K_2^*(1430) \pi$	seen	328
$K^*(892) \pi$	seen	683
$K f_2(1270)$	seen	191
$K \omega$	seen	640
$K \phi$	seen	483

NODE=M146215;DESIG=5;OUR EVAL;
DESIG=1;OUR EVAL;
DESIG=2;OUR EVAL;
DESIG=3;OUR EVAL;
DESIG=6;OUR EVAL;
DESIG=7

$K_0^*(1950)$	$I(J^P) = \frac{1}{2}(0^+)$
Mass $m = 1957 \pm 14$ MeV	
Full width $\Gamma = 170 \pm 50$ MeV (S = 2.2)	

NODE=M134
NODE=M134M;DTYPE=M
NODE=M134W;DTYPE=G

$K_0^*(1950)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K^- \pi^+$	(52±14) %	911

NODE=M134215;DESIG=1

$K_2^*(1980)$	$I(J^P) = \frac{1}{2}(2^+)$
Mass $m = 1990^{+60}_{-50}$ MeV (S = 2.8)	
Full width $\Gamma = 348^{+50}_{-30}$ MeV (S = 1.3)	

NODE=M104
NODE=M104M;DTYPE=M
NODE=M104W;DTYPE=G

$K_2^*(1980)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K^*(892) \pi$	possibly seen	791
$K \rho$	possibly seen	762
$K f_2(1270)$	possibly seen	424
$K \phi$	seen	627
$K \eta$	seen	850

NODE=M104215;DESIG=2
DESIG=3
DESIG=4
DESIG=5
DESIG=6

$K_4^*(2045)$	$I(J^P) = \frac{1}{2}(4^+)$
Mass $m = 2048^{+8}_{-9}$ MeV (S = 1.1)	
Full width $\Gamma = 199^{+27}_{-19}$ MeV	

NODE=M035
NODE=M035M;DTYPE=M
NODE=M035W;DTYPE=G

$K_4^*(2045)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K \pi$	(9.9±1.2) %	960
$K^*(892) \pi \pi$	(9 ±5) %	804
$K^*(892) \pi \pi \pi$	(7 ±5) %	770
$\rho K \pi$	(5.7±3.2) %	744
$\omega K \pi$	(5.0±3.0) %	740
$\phi K \pi$	(2.8±1.4) %	597
$\phi K^*(892)$	(1.4±0.7) %	368

NODE=M035215;DESIG=1
DESIG=2
DESIG=5
DESIG=3
DESIG=4
DESIG=6
DESIG=7

CHARMED MESONS (C = ±1)
$D^+ = c \bar{d}, D^0 = c \bar{u}, \bar{D}^0 = \bar{c} u, D^- = \bar{c} d,$ similarly for D^{*} 's

NODE=MXXX035

$D^*(2007)^0$	$I(J^P) = \frac{1}{2}(1^-)$
Mass $m = 2006.86 \pm 0.05$ MeV (S = 1.1)	
$m_{D^{*0}} - m_{D^0} = 142.014 \pm 0.030$ MeV (S = 1.5)	
Full width $\Gamma < 2.1$ MeV, CL = 90%	

NODE=M061
NODE=M061M;DTYPE=M
NODE=M061DM;DTYPE=D
NODE=M061W;DTYPE=G

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

NODE=M061220;NODE=M061

$D^*(2007)^0$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$D^0 \pi^0$	(64.7 $\pm$ 0.9) %		43
$D^0 \gamma$	(35.3 $\pm$ 0.9) %		137
$D^0 e^+ e^-$	(3.91 $\pm$ 0.33) $\times 10^{-3}$		137
$\mu^+ \mu^-$	< 2.5 $\times 10^{-8}$	90%	998
$e^+ e^-$	< 1.7 $\times 10^{-6}$	90%	1003

DESIG=1
DESIG=2
DESIG=3
DESIG=4
DESIG=5

$D^*(2010)^\pm$

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

Mass $m = 2010.27 \pm 0.04$ MeV

$m_{D^*(2010)^+} - m_{D^+} = 140.603 \pm 0.015$ MeV

$m_{D^*(2010)^+} - m_{D^0} = 145.4257 \pm 0.0017$ MeV

Full width $\Gamma = 83.4 \pm 1.8$ keV

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

NODE=M062

NODE=M062M;DTYPE=M

NODE=M062MD;DTYPE=D

NODE=M062DM;DTYPE=D
NODE=M062W;DTYPE=G

NODE=M062225;NODE=M062

$D^*(2010)^\pm$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$D^0 \pi^+$	(67.7 $\pm$ 0.5) %		39
$D^+ \pi^0$	(30.7 $\pm$ 0.5) %		38
$D^+ \gamma$	(1.6 $\pm$ 0.4) %		136
$e^+ \nu_e$	< 1.1 $\times 10^{-5}$	90%	1005
$\mu^+ \nu_\mu$	< 4.3 $\times 10^{-6}$	90%	1002

DESIG=1
DESIG=3
DESIG=2
DESIG=5
DESIG=6

$D_0^*(2300)$

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

was $D_0^*(2400)$

Mass $m = 2343 \pm 10$ MeV ($S = 1.5$)

Full width $\Gamma = 229 \pm 16$ MeV

NODE=M252

NODE=M252M;DTYPE=M

NODE=M252W;DTYPE=G

$D_0^*(2300)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D \pi^\pm$	seen	411

NODE=M252215;DESIG=1

$D_1(2420)$

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

Mass $m = 2422.1 \pm 0.6$ MeV ($S = 1.7$)

$m_{D_1(2420)^0} - m_{D^{*+}} = 411.8 \pm 0.6$ MeV ($S = 1.7$)

$m_{D_1(2420)^\pm} - m_{D_1(2420)^0} = 4 \pm 4$ MeV

Full width $\Gamma = 31.3 \pm 1.9$ MeV ($S = 2.8$)

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

NODE=M253

NODE=M253M;DTYPE=M

NODE=M253DM;DTYPE=D

NODE=M253DMC;DTYPE=D

NODE=M253W;DTYPE=G

NODE=M253215;NODE=M253

$D_1(2420)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^*(2007)^0 \pi$	seen	359

DESIG=1

$D_1(2430)^0$

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

Mass $m = 2412 \pm 9$ MeV

Full width $\Gamma = 314 \pm 29$ MeV

NODE=M180

NODE=M180M;DTYPE=M

NODE=M180W;DTYPE=G

$D_1(2430)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^*(2010)^+ \pi^-$	seen	345

NODE=M180215;DESIG=1;OUR EVAL;
→ UNCHECKED ←

$D_2^*(2460)$

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

Mass $m = 2461.1 \pm 0.8$ MeV ($S = 6.3$)
 $m_{D_2^*(2460)^0} - m_{D^+} = 591.5 \pm 0.8$ MeV ($S = 6.0$)
 $m_{D_2^*(2460)^0} - m_{D^{*+}} = 450.9 \pm 0.8$ MeV ($S = 6.0$)
 $m_{D_2^*(2460)^\pm} - m_{D_2^*(2460)^0} = 2.4 \pm 1.7$ MeV
 Full width $\Gamma = 47.3 \pm 0.8$ MeV ($S = 1.5$)

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

NODE=M254
 NODE=M254M;DTYPE=M
 NODE=M254DM;DTYPE=D
 NODE=M254DM2;DTYPE=D
 NODE=M254DMC;DTYPE=D
 NODE=M254W;DTYPE=G
 NODE=M254215;NODE=M254

$D_2^*(2460)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D \pi^-$	seen	509
$D^*(2010) \pi^-$	seen	389

DESIG=1
 DESIG=2

$D_3^*(2750)$

$$I(J^P) = \frac{1}{2}(3^-)$$

Mass $m = 2763.1 \pm 3.2$ MeV ($S = 2.1$)
 Full width $\Gamma = 66 \pm 5$ MeV

NODE=M203
 NODE=M203M;DTYPE=M
 NODE=M203W;DTYPE=G

$D_3^*(2750)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D \pi$	seen	743
$D^+ \pi^-$	seen	739
$D^0 \pi^\pm$	seen	743
$D^* \pi$	seen	639
$D^{*+} \pi^-$	seen	639

NODE=M203215;DESIG=1;OUR EVAL;
 → UNCHECKED ←
 DESIG=2;OUR EVAL;→ UNCHECKED ←
 DESIG=3;OUR EVAL;→ UNCHECKED ←
 DESIG=4;OUR EVAL;→ UNCHECKED ←
 DESIG=5;OUR EVAL;→ UNCHECKED ←

CHARMED, STRANGE MESONS ($C = \pm 1, S = \pm 1$) (including possibly non- $q\bar{q}$ states)

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

NODE=MXXX040

$D_s^{*\pm}$

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

Mass $m = 2112.2 \pm 0.4$ MeV
 $m_{D_s^{*\pm}} - m_{D_s^\pm} = 143.8 \pm 0.4$ MeV
 Full width $\Gamma < 1.9$ MeV, CL = 90%

NODE=S074
 NODE=S074M;DTYPE=M
 NODE=S074DM;DTYPE=D
 NODE=S074W;DTYPE=G

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

NODE=S074215;NODE=S074

D_s^{*+} DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D_s^+ \gamma$	(93.6 $\pm$ 0.4) %	139
$D_s^+ \pi^0$	(5.77 $\pm$ 0.35) %	48
$D_s^+ e^+ e^-$	(6.7 $\pm$ 1.6) $\times 10^{-3}$	139
$e^+ \nu_e$	(2.1 $^{+1.2}_{-0.9}$) $\times 10^{-5}$	1056

DESIG=1

DESIG=2

DESIG=3

DESIG=4

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

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

J, P need confirmation.

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

NODE=M172

See the review on "Heavy Non- $q\bar{q}$ Mesons."

Mass $m = 2317.8 \pm 0.5$ MeV

$m_{D_{s0}^*(2317)^\pm} - m_{D_s^\pm} = 349.4 \pm 0.5$ MeV

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

NODE=M172M;DTYPE=M

NODE=M172DM;DTYPE=D
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 (Γ_i/Γ)	Confidence level	p (MeV/c)
$D_s^+ \pi^0$	(100 $^{+0}_{-20}$) %		298
$D_s^+ \gamma$	< 5 %	90%	323
$D_s^*(2112)^+ \gamma$	< 6 %	90%	—
$D_s^+ \gamma \gamma$	< 18 %	95%	323
$D_s^*(2112)^+ \pi^0$	< 11 %	90%	—
$D_s^+ \pi^+ \pi^-$	< 4 $\times 10^{-3}$	90%	194
$D_s^+ \pi^0 \pi^0$	not seen		205

DESIG=1

DESIG=2

DESIG=3

DESIG=4

DESIG=5

DESIG=6

DESIG=7;OUR EVAL;→ UNCHECKED ←

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

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

NODE=M173

See the review on "Heavy Non- $q\bar{q}$ Mesons."

Mass $m = 2459.5 \pm 0.6$ MeV ($S = 1.1$)

$m_{D_{s1}(2460)^\pm} - m_{D_s^\pm} = 347.3 \pm 0.7$ MeV ($S = 1.2$)

$m_{D_{s1}(2460)^\pm} - m_{D_s^\pm} = 491.1 \pm 0.6$ MeV ($S = 1.1$)

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

NODE=M173M;DTYPE=M

NODE=M173MD;DTYPE=D

NODE=M173DM;DTYPE=D
NODE=M173W;DTYPE=G

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

NODE=M173215;NODE=M173

$D_{s1}(2460)^+$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
$D_s^{*+} \pi^0$	(48 $\pm$ 11) %		297
$D_s^+ \gamma$	(18 $\pm$ 4) %		442
$D_s^+ \pi^+ \pi^-$	(4.3 $\pm$ 1.3) %	$S=1.1$	363
$D_s^{*+} \gamma$	< 8 %	CL=90%	323
$D_{s0}^*(2317)^+ \gamma$	(3.7 $^{+5.0}_{-2.4}$) %		138

DESIG=1

DESIG=2

DESIG=3

DESIG=4

DESIG=5

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

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

J, P need confirmation.

NODE=M121

Mass $m = 2535.12 \pm 0.06$ MeV

NODE=M121M;DTYPE=M

$m_{D_{s1}(2536)^\pm} - m_{D_s^*(2111)} = 422.9 \pm 0.4$ MeV

NODE=M121DM;DTYPE=D

$m_{D_{s1}(2536)^\pm} - m_{D_s^*(2010)^\pm} = 524.85 \pm 0.04$ MeV

NODE=M121DN;DTYPE=D

$m_{D_{s1}(2536)^\pm} - m_{D_s^*(2007)^0} = 528.26 \pm 0.05$ MeV ($S = 1.1$)

NODE=M121DP;DTYPE=D
NODE=M121W;DTYPE=G

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

Branching fractions are given relative to the one **DEFINED AS 1**.
 $D_{s1}(2536)^-$ modes are charge conjugates of the modes below.

NODE=M121215;NODE=M121

$D_{s1}(2536)^+$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$D^*(2010)^+ K^0$	(31 $\pm$ 7) %		149
$(D^*(2010)^+ K^0)_{S-wave}$	(22 $\pm$ 5) %		149
$K_S^0 D^*(2010)^+$	(17 $\pm$ 4) %		149
$D^+ \pi^- K^+$	$(10.0 \pm 2.5) \times 10^{-3}$		176
$D^*(2007)^0 K^+$	(36 $\pm$ 6) %		167
$D^+ K^0$	< 12 %	90%	381
$D^0 K^+$	< 4 %	90%	391
$D_s^{*+} \gamma$	possibly seen		388
$D_s^+ \pi^+ \pi^-$	seen		437

DESIG=1
 DESIG=7
 DESIG=10
 DESIG=8
 DESIG=4
 DESIG=2
 DESIG=5
 DESIG=3
 DESIG=6

$D_{s2}^*(2573)$

$$I(J^P) = 0(2^+)$$

Mass $m = 2569.1 \pm 0.8$ MeV ($S = 2.4$)

$m_{D_{s2}^*(2573)} - m_{D^0} = 704 \pm 3.2$ MeV

Full width $\Gamma = 16.9 \pm 0.7$ MeV

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

NODE=M148

NODE=M148M;DTYPE=M

NODE=M148DM;DTYPE=D
 NODE=M148W;DTYPE=G

NODE=M148215;NODE=M148

$D_{s2}^*(2573)^+$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^0 K^+$	(37 $\pm$ 6) %	431
$D^*(2007)^0 K^+$	not seen	238
$D^+ K_S^0$	seen	422
$D^{*+} K_S^0$	seen	225

DESIG=1
 DESIG=2;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=4;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=5;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$

$D_{s1}^*(2700)^\pm$

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

Mass $m = 2714 \pm 5$ MeV ($S = 1.5$)

Full width $\Gamma = 122 \pm 10$ MeV

NODE=M182

NODE=M182M;DTYPE=M

NODE=M182W;DTYPE=G

$D_{s1}^*(2700)^\pm$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^0 K^+$	seen	579
$D^+ K_S^0$	seen	573
$D^{*0} K^+$	seen	438
$D^{*+} K_S^0$	seen	431

NODE=M182215;DESIG=1;OUR EVAL;
 $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=3;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=5;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=6;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$

$D_{s3}^*(2860)^\pm$

$$I(J^P) = 0(3^-)$$

Mass $m = 2860 \pm 7$ MeV

Full width $\Gamma = 53 \pm 10$ MeV

NODE=M226

NODE=M226M;DTYPE=M

NODE=M226W;DTYPE=G

$D_{s3}^*(2860)^\pm$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^0 K^+$	seen	710
$D^+ K_S^0$	seen	704
$D^{*0} K^+$	seen	589
$D^{*+} K_S^0$	seen	584

NODE=M226215;DESIG=2;OUR EVAL;
 $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=3;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=5;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=6;OUR EVAL; $\rightarrow$ UNCHECKED $\leftarrow$

BOTTOM MESONS

($B = \pm 1$)

$B^+ = u\bar{b}$, $B^0 = d\bar{b}$, $\bar{B}^0 = \bar{d}b$, $B^- = \bar{u}b$, similarly for B^{*} 's

NODE=MXXX045

$B_1(5721)$

$I(J^P) = \frac{1}{2}(1^+)$
 I, J, P need confirmation.

$B_1(5721)^+$ mass = $5726.0^{+2.5}_{-2.7}$ MeV
 $m_{B_1^+} - m_{B^{*0}} = 401.2^{+2.4}_{-2.7}$ MeV
 $B_1(5721)^0$ mass = 5726.1 ± 1.2 MeV ($S = 1.2$)
 $m_{B_1^0} - m_{B^+} = 446.7 \pm 1.2$ MeV ($S = 1.2$)
 $m_{B_1^0} - m_{B^{*+}} = 401.4 \pm 1.2$ MeV ($S = 1.2$)
Full width $\Gamma(B_1(5721)^+) = 31 \pm 6$ MeV ($S = 1.1$)
Full width $\Gamma(B_1(5721)^0) = 27.5 \pm 3.4$ MeV ($S = 1.1$)

NODE=M244

NODE=M244M+;DTYPE=M

NODE=M244DM+;DTYPE=D

NODE=M244M0;DTYPE=M

NODE=M244DM0;DTYPE=D

NODE=M244DM1;DTYPE=D

NODE=M244W+;DTYPE=G

NODE=M244W0;DTYPE=G

$B_1(5721)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$B^* \pi$	seen	365

NODE=M244215;DESIG=1

$B_2^*(5747)$

$I(J^P) = \frac{1}{2}(2^+)$
 I, J, P need confirmation.

$B_2^*(5747)^+$ mass = 5737.3 ± 0.7 MeV
 $m_{B_2^{*+}} - m_{B^0} = 457.5 \pm 0.7$ MeV
 $B_2^*(5747)^0$ mass = 5739.6 ± 0.7 MeV ($S = 1.4$)
 $m_{B_2^{*0}} - m_{B_1^0} = 13.5 \pm 1.4$ MeV ($S = 1.3$)
 $m_{B_2^{*0}} - m_{B^+} = 460.2 \pm 0.6$ MeV ($S = 1.4$)
Full width $\Gamma(B_2^*(5747)^+) = 20 \pm 5$ MeV ($S = 2.2$)
Full width $\Gamma(B_2^*(5747)^0) = 24.2 \pm 1.7$ MeV

NODE=M245

NODE=M245M+;DTYPE=M

NODE=M245DM+;DTYPE=D

NODE=M245M0;DTYPE=M

NODE=M245DM0;DTYPE=D

NODE=M245DM2;DTYPE=D

NODE=M245W+;DTYPE=G

NODE=M245W0;DTYPE=G

$B_2^*(5747)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$B \pi$	seen	420
$B^* \pi$	seen	376

NODE=M245215;DESIG=1

DESIG=2

$B_J(5970)$

$I(J^P) = \frac{1}{2}(??)$
 I, J, P need confirmation.

$B_J(5970)^+$ mass $m = 5965 \pm 5$ MeV
 $m_{B_J(5970)^+} - m_{B^0} = 685 \pm 5$ MeV
 $B_J(5970)^0$ mass $m = 5971 \pm 5$ MeV
 $m_{B_J(5970)^0} - m_{B^+} = 691 \pm 5$ MeV
 $B_J(5970)^+$ full width $\Gamma = 62 \pm 20$ MeV
 $B_J(5970)^0$ full width $\Gamma = 81 \pm 12$ MeV

NODE=M248

NODE=M248M+;DTYPE=M

NODE=M248DM+;DTYPE=D

NODE=M248M0;DTYPE=M

NODE=M248DM0;DTYPE=D

NODE=M248W+;DTYPE=G

NODE=M248W0;DTYPE=G

$B_J(5970)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$B \pi$	possibly seen	633
$B^* \pi$	seen	592

NODE=M248215;DESIG=1

DESIG=2

BOTTOM, STRANGE MESONS

($B = \pm 1, S = \mp 1$)

$$B_s^0 = s\bar{b}, \bar{B}_s^0 = \bar{s}b, \text{ similarly for } B_s^{*'}s$$

$B_{s1}(5830)^0$

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

I, J, P need confirmation.

$$\text{Mass } m = 5828.73 \pm 0.20 \text{ MeV}$$

$$m_{B_s^0} - m_{B^{*+}} = 503.98 \pm 0.17 \text{ MeV}$$

$$\text{Full width } \Gamma = 0.5 \pm 0.4 \text{ MeV}$$

$B_{s1}(5830)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$B^{*+} K^-$	seen	97

NODE=M187

NODE=M187M;DTYPE=M

NODE=M187DM;DTYPE=D
NODE=M187W;DTYPE=G

NODE=M187215;DESIG=1

$B_{s2}^{*}(5840)^0$

$$I(J^P) = 0(2^+)$$

I, J, P need confirmation.

$$\text{Mass } m = 5839.88 \pm 0.12 \text{ MeV}$$

$$m_{B_s^{*0}} - m_{B^{*+}} = 560.48 \pm 0.12 \text{ MeV}$$

$$\text{Full width } \Gamma = 1.49 \pm 0.27 \text{ MeV}$$

Branching fractions are given relative to the one **DEFINED AS 1**.

$B_{s2}^{*}(5840)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$B^+ K^-$	DEFINED AS 1	252
$B^{*+} K^-$	0.093 ± 0.018	141
$B^0 K_S^0$	0.43 ± 0.11	245
$B^{*0} K_S^0$	0.04 ± 0.04	—

NODE=M186

NODE=M186M;DTYPE=M

NODE=M186DM2;DTYPE=D
NODE=M186W;DTYPE=G

NODE=M186215;NODE=M186

DESIG=1

DESIG=2

DESIG=4

DESIG=3

BOTTOM, CHARMED MESONS

($B = C = \pm 1$)

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

$B_c(2S)^\pm$

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

$$\text{Mass } m = 6871.2 \pm 1.0 \text{ MeV}$$

The following quantities are not pure branching ratios; rather the fractions $\Gamma_i/\Gamma \times B(\bar{b} \rightarrow B_c(2S))$.

$B_c(2S)^\pm$ DECAY MODES $\times B(\bar{b} \rightarrow B_c(2S))$	Fraction (Γ_i/Γ)	p (MeV/c)
$B_c^+ \pi^+ \pi^-$	seen	504

NODE=M217

NODE=M217M;DTYPE=M

NODE=M217215;NODE=M217

DESIG=1

$c\bar{c}$ MESONS

(including possibly non- $q\bar{q}$ states)

$\eta_c(1S)$

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

$$\text{Mass } m = 2984.10 \pm 0.24 \text{ MeV}$$

$$\text{Full width } \Gamma = 30.0 \pm 0.5 \text{ MeV } (S = 1.2)$$

NODE=MXXX025

NODE=M026

NODE=M026M;DTYPE=M

NODE=M026W;DTYPE=G

$\eta_c(1S)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)	
Decays involving hadronic resonances				NODE=M026215;NODE=M026;CLUMP=A
$\eta'(958)\pi\pi$	(1.59 $\pm$ 0.34) %	S=1.7	1323	DESIG=24
$\eta'(958)K\bar{K}$	(1.37 $\pm$ 0.31) %		1131	DESIG=85
$\eta'(958)\eta\eta$	(2.7 $\pm$ 0.5) $\times 10^{-3}$		1081	DESIG=93
$\rho\rho$	(1.41 $\pm$ 0.34) %		1275	DESIG=19
$K^*(892)^0 K^- \pi^+ + \text{c.c.}$	(1.43 $\pm$ 0.35) %		1278	DESIG=26
$K^*(892)\bar{K}^*(892)$	(5.5 $\pm$ 1.1) $\times 10^{-3}$	S=1.2	1196	DESIG=18
$K^*(892)^0 \bar{K}^*(892)^0 \pi^+ \pi^-$	(1.1 $\pm$ 0.4) %		1074	DESIG=57
$\phi K^+ K^-$	(3.0 $^{+1.2}_{-1.0}$) $\times 10^{-3}$		1104	DESIG=28
$\phi\phi$	(1.4 $\pm$ 0.4) $\times 10^{-3}$	S=2.9	1089	DESIG=17
$\phi 2(\pi^+ \pi^-)$	< 3.3 $\times 10^{-3}$	CL=90%	1251	DESIG=58
$a_0(980)\pi$	seen		1327	DESIG=21
$a_2(1320)\pi$	seen		1196	DESIG=22
$K^*(892)\bar{K} + \text{c.c.}$	< 1.28 %	CL=90%	1310	DESIG=40
$f_2(1270)\eta$	seen		1146	DESIG=23
$f_2(1270)\eta'$	seen		984	DESIG=92
$\omega\omega$	(2.1 $\pm$ 0.8) $\times 10^{-3}$	S=2.4	1270	DESIG=20
$\omega\phi$	(3.0 $\pm$ 0.8) $\times 10^{-5}$		1185	DESIG=47
$f_2(1270)f_2(1270)$	(8.4 $\pm$ 2.4) $\times 10^{-3}$	S=1.2	774	DESIG=46
$f_2(1270)f_2'(1525)$	(7.7 $\pm$ 2.5) $\times 10^{-3}$		524	DESIG=59
$f_0(500)\eta$	seen		—	DESIG=86
$f_0(500)\eta'$	seen		—	DESIG=87
$f_0(980)\eta$	seen		1265	DESIG=70
$f_0(980)\eta'$	seen		1130	DESIG=88
$f_0(1500)\eta$	seen		1016	DESIG=71
$f_0(1710)\eta'$	seen		623	DESIG=90
$f_0(2100)\eta'$	seen		†	DESIG=91
$f_0(2200)\eta$	seen		499	DESIG=72
$a_0(1320)\pi$	seen		—	DESIG=74
$a_0(1450)\pi$	seen		1140	DESIG=75
$a_2(1700)\pi$	seen		999	DESIG=94
$a_0(1710)\pi$	seen		994	DESIG=97
$a_0(1950)\pi$	seen		860	DESIG=79
$K_0^*(1430)\bar{K} + \text{c.c.}$	seen		1086	DESIG=76
$K_2^*(1430)\bar{K} + \text{c.c.}$	seen		1084	DESIG=77
$K_0^*(1950)\bar{K} + \text{c.c.}$	seen		742	DESIG=78
$K_0^*(2600)\bar{K} + \text{c.c.}$	seen		—	DESIG=95
Decays into stable hadrons				NODE=M026;CLUMP=B
$K\bar{K}\pi$	(5.9 $\pm$ 0.5) %	S=1.8	1381	DESIG=14
$K\bar{K}\eta$	(1.11 $\pm$ 0.15) %	S=1.3	1265	DESIG=25
$\eta\pi^+ \pi^-$	(1.5 $\pm$ 0.4) %		1428	DESIG=16
$\eta 2(\pi^+ \pi^-)$	(4.0 $\pm$ 1.2) %		1386	DESIG=61
$K^+ K^- \pi^+ \pi^-$	(6.7 $\pm$ 1.8) $\times 10^{-3}$	S=2.4	1345	DESIG=15
$K^+ K^- \pi^+ \pi^- \pi^0$	(2.8 $\pm$ 0.5) %		1305	DESIG=60
$K^0 K^- \pi^+ \pi^- \pi^+ + \text{c.c.}$	(5.1 $\pm$ 1.4) %		1302	DESIG=62
$K^+ K^- 2(\pi^+ \pi^-)$	(6.9 $\pm$ 2.0) $\times 10^{-3}$		1254	DESIG=55
$2(K^+ K^-)$	(1.2 $\pm$ 0.4) $\times 10^{-3}$	S=1.6	1056	DESIG=27
$\pi^+ \pi^- \pi^0$	< 4 $\times 10^{-4}$	CL=90%	1476	DESIG=81
$\pi^+ \pi^- \pi^0 \pi^0$	(4.3 $\pm$ 1.0) %		1461	DESIG=63
$2(\pi^+ \pi^-)$	(7.5 $\pm$ 1.3) $\times 10^{-3}$	S=1.6	1459	DESIG=11
$2\pi^+ 2\pi^- \eta$	(5.6 $\pm$ 2.0) $\times 10^{-3}$		1386	DESIG=99
$2(\pi^+ \pi^- \pi^0)$	(15.5 $\pm$ 2.0) %		1409	DESIG=64
$3(\pi^+ \pi^-)$	(1.55 $\pm$ 0.28) %		1407	DESIG=56
$p\bar{p}$	(1.11 $\pm$ 0.12) $\times 10^{-3}$	S=1.4	1160	DESIG=12
$p\bar{p}\pi^0$	(3.2 $\pm$ 1.2) $\times 10^{-3}$		1101	DESIG=65
$p\bar{p}\pi^+ \pi^-$	(3.4 $\pm$ 0.5) $\times 10^{-3}$	S=1.2	1027	DESIG=13
$\Lambda\bar{\Lambda}$	(9.4 $\pm$ 1.8) $\times 10^{-4}$	S=1.2	991	DESIG=45
$K^+ \bar{p}\Lambda + \text{c.c.}$	(2.26 $\pm$ 0.34) $\times 10^{-3}$		773	DESIG=82
$\Lambda(1520)\Lambda + \text{c.c.}$	(2.8 $\pm$ 1.2) $\times 10^{-3}$		694	DESIG=83
$\Sigma^+ \Sigma^-$	(1.98 $\pm$ 0.35) $\times 10^{-3}$		901	DESIG=66
$\Xi^- \Xi^+$	(8.3 $\pm$ 1.8) $\times 10^{-4}$		692	DESIG=67

Radiative decays

$\gamma\gamma$	$(2.13 \pm 0.15) \times 10^{-4}$	S=1.5	1492
$\gamma\phi$	$(1.15^{+0.33}_{-0.40}) \times 10^{-5}$		1318

NODE=M026;CLUMP=C

DESIG=31

DESIG=100

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

$\pi^+\pi^-$	$P, CP < 1.0$	$\times 10^{-4}$	CL=90%	1486
$\pi^0\pi^0$	$P, CP < 3.3$	$\times 10^{-5}$	CL=90%	1486
K^+K^-	$P, CP < 5$	$\times 10^{-4}$	CL=90%	1408
$K_S^0 K_S^0$	$P, CP < 2.9$	$\times 10^{-4}$	CL=90%	1407

NODE=M026;CLUMP=D

DESIG=51

DESIG=52

DESIG=53

DESIG=54

 $J/\psi(1S)$

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

Mass $m = 3096.900 \pm 0.006$ MeVFull width $\Gamma = 92.6 \pm 1.7$ keV (S = 1.1)

NODE=M070

NODE=M070M;DTYPE=M

NODE=M070W;DTYPE=G

$J/\psi(1S)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level (MeV/c)	p
hadrons	$(87.7 \pm 0.5) \%$	—	—
virtual $\gamma \rightarrow$ hadrons	$(13.46 \pm 0.07) \%$	—	—
ggg	$(64.1 \pm 1.0) \%$	—	—
$\gamma g g$	$(8.8 \pm 1.1) \%$	—	—
e^+e^-	$(5.971 \pm 0.032) \%$	1548	DESIG=1
$e^+e^-\gamma$	[j] $(8.8 \pm 1.4) \times 10^{-3}$	1548	DESIG=5
$\mu^+\mu^-$	$(5.961 \pm 0.033) \%$	1545	DESIG=2
$e^+e^-e^+e^-$	$(5.5 \pm 0.5) \times 10^{-5}$	1548	DESIG=472
$e^+e^-\mu^+\mu^-$	$(3.53 \pm 0.26) \times 10^{-5}$	1545	DESIG=473
$\mu^+\mu^-\mu^+\mu^-$	$(1.11 \pm 0.11) \times 10^{-6}$	1530	DESIG=471

NODE=M070215;DESIG=3

DESIG=4

DESIG=249

DESIG=250

NODE=M070;CLUMP=A

DESIG=20

DESIG=21

DESIG=442

DESIG=443

DESIG=43

DESIG=239

DESIG=22

DESIG=420

DESIG=422

DESIG=287

DESIG=253

DESIG=455

DESIG=230

DESIG=252

DESIG=23

DESIG=415

DESIG=416

DESIG=444

DESIG=342

DESIG=310;OUR EST;→ UNCHECKED ←

DESIG=328

DESIG=329

DESIG=312

DESIG=345

DESIG=325;OUR EST;→ UNCHECKED ←

Decays involving hadronic resonances

$\rho\pi$	$(1.88 \pm 0.12) \%$	S=2.6	1448
$\rho^0\pi^0$	$(6.2 \pm 0.6) \times 10^{-3}$		1448
$a_2(1320)^0\pi^+\pi^- \rightarrow$	$(2.8 \pm 0.6) \times 10^{-3}$		—
$2(\pi^+\pi^-)\pi^0$			
$a_2(1320)^+\pi^-\pi^0 + \text{c.c.} \rightarrow$	$(3.7 \pm 0.7) \times 10^{-3}$		—
$2(\pi^+\pi^-)\pi^0$			
$a_2(1320)\rho$	$(1.09 \pm 0.22) \%$		1123
$\eta\pi^+\pi^-$	$(3.8 \pm 0.7) \times 10^{-4}$		1487
$\eta\rho$	$(1.93 \pm 0.23) \times 10^{-4}$		1396
$\eta\pi^+\pi^-\pi^0$	$(1.17 \pm 0.20) \%$		1470
$\eta\pi^+\pi^-3\pi^0$	$(4.9 \pm 1.0) \times 10^{-3}$		1419
$\eta\phi(2170) \rightarrow \eta\phi f_0(980) \rightarrow$	$(1.2 \pm 0.4) \times 10^{-4}$		628
$\eta\phi\pi^+\pi^-$			
$\eta\phi(2170) \rightarrow$	$< 2.52 \times 10^{-4}$	CL=90%	—
$\eta K^*(892)^0 \bar{K}^*(892)^0$			
ηK^+K^-	$(8.6 \pm 3.0) \times 10^{-4}$		1331
$\eta K^\pm K_S^0 \pi^\mp$	[k] $(2.2 \pm 0.4) \times 10^{-3}$		1278
$\eta K^*(892)^0 \bar{K}^*(892)^0$	$(1.15 \pm 0.26) \times 10^{-3}$		1003
$\rho\eta'(958)$	$(8.1 \pm 0.8) \times 10^{-5}$	S=1.6	1281
$\rho^\pm\pi^\mp\pi^+\pi^-2\pi^0$	$(2.8 \pm 0.8) \%$		1364
$\rho^+\rho^-\pi^+\pi^-\pi^0$	$(6 \pm 4) \times 10^{-3}$		1186
$\rho^+K^+K^-\pi^-\pi^0 + \text{c.c.} \rightarrow$	$(3.5 \pm 0.8) \times 10^{-3}$		—
$K^+K^-\pi^+\pi^-\pi^0$			
$\rho^\mp K^\pm K_S^0$	$(1.9 \pm 0.4) \times 10^{-3}$		1269
$\rho(1450)\pi$	seen		1197
$\rho(1450)\pi \rightarrow \pi^+\pi^-\pi^0$	$(2.2 \pm 1.1) \times 10^{-4}$		—
$\rho(1450)^\pm\pi^\mp \rightarrow K_S^0 K^\pm\pi^\mp$	$(3.3 \pm 0.6) \times 10^{-4}$		—
$\rho(1450)^0\pi^0 \rightarrow K^+K^-\pi^0$	$(2.7 \pm 0.6) \times 10^{-4}$		—
$\rho(1450)\eta'(958) \rightarrow$	$(3.3 \pm 0.7) \times 10^{-6}$		—
$\pi^+\pi^-\eta'(958)$			
$\rho(1700)\pi$	seen		1065

$\rho(1700)\pi \rightarrow \pi^+\pi^-\pi^0$	$(1.6 \pm 1.1) \times 10^{-4}$	—	DESIG=313
$\rho(2150)\pi$	seen	790	DESIG=326;OUR EST;→ UNCHECKED ←
$\rho(2150)\pi \rightarrow \pi^+\pi^-\pi^0$	$(10 \pm 40) \times 10^{-6}$	—	DESIG=314
$\omega\pi^0$	$(4.5 \pm 0.5) \times 10^{-4}$	S=1.4 1446	DESIG=32
$\omega\pi^0 \rightarrow \pi^+\pi^-\pi^0$	$(1.6 \pm 0.7) \times 10^{-5}$	—	DESIG=327
$\omega\pi^+\pi^-$	$(8.5 \pm 1.0) \times 10^{-3}$	S=1.3 1435	DESIG=24
$\omega\pi^0\pi^0$	$(3.4 \pm 0.8) \times 10^{-3}$	1436	DESIG=140
$\omega 3\pi^0$	$(1.9 \pm 0.6) \times 10^{-3}$	1419	DESIG=421
$\omega f_2(1270)$	$(4.3 \pm 0.6) \times 10^{-3}$	1142	DESIG=28
$\omega\eta$	$(1.74 \pm 0.20) \times 10^{-3}$	S=1.6 1394	DESIG=30
$\omega\pi^+\pi^-\pi^0$	$(4.0 \pm 0.7) \times 10^{-3}$	1418	DESIG=211
$\omega\pi^0\eta$	$(3.4 \pm 1.7) \times 10^{-4}$	1363	DESIG=360
$\omega\pi^+\pi^+\pi^-\pi^-$	$(8.5 \pm 3.4) \times 10^{-3}$	1392	DESIG=26
$\omega\pi^+\pi^-\pi^0$	$(3.3 \pm 0.5) \%$	1394	DESIG=412
$\omega\eta'\pi^+\pi^-$	$(1.12 \pm 0.13) \times 10^{-3}$	1173	DESIG=385
$\omega\eta'(958)$	$(1.89 \pm 0.18) \times 10^{-4}$	1279	DESIG=31
$\omega f_0(980)$	$(1.4 \pm 0.5) \times 10^{-4}$	1267	DESIG=150
$\omega f_0(1710) \rightarrow \omega K \bar{K}$	$(4.8 \pm 1.1) \times 10^{-4}$	878	DESIG=130
$\omega f_1(1420)$	$(6.8 \pm 2.4) \times 10^{-4}$	1061	DESIG=105
$\omega f_2'(1525)$	$< 2.2 \times 10^{-4}$	CL=90% 1007	DESIG=29
$\omega X(1835) \rightarrow \omega p \bar{p}$	$< 3.9 \times 10^{-6}$	CL=95% —	DESIG=263
$\omega K^+ K^- \eta$	$(3.33 \pm 0.12) \times 10^{-4}$	996	DESIG=478
$\omega X(1835), X \rightarrow \eta' \pi^+ \pi^-$	$< 6.2 \times 10^{-5}$	—	DESIG=386
$\omega K^+ K^-$	$(1.52 \pm 0.31) \times 10^{-3}$	1268	DESIG=441
$\omega K^\pm K_S^0 \pi^\mp$	[k] $(3.4 \pm 0.5) \times 10^{-3}$	1210	DESIG=101
$\omega K \bar{K}$	$(1.9 \pm 0.4) \times 10^{-3}$	1268	DESIG=27
$\omega K^*(892) \bar{K} + \text{c.c.}$	$(6.1 \pm 0.9) \times 10^{-3}$	1097	DESIG=102
$\eta' K^{*\pm} K^\mp$	$(1.48 \pm 0.13) \times 10^{-3}$	—	DESIG=355
$\eta' K^{*0} \bar{K}^0 + \text{c.c.}$	$(1.66 \pm 0.21) \times 10^{-3}$	1000	DESIG=357
$\eta' h_1(1415) \rightarrow \eta' K^* \bar{K} + \text{c.c.}$	$(2.16 \pm 0.31) \times 10^{-4}$	—	DESIG=353
$\eta' h_1(1415) \rightarrow \eta' K^{*\pm} K^\mp$	$(1.51 \pm 0.23) \times 10^{-4}$	—	DESIG=354
$\eta' h_1(1415) \rightarrow \gamma \eta' \eta'$	$(4.7 \pm \frac{1.1}{2.0}) \times 10^{-7}$	—	DESIG=430
$\bar{K} K^*(892) + \text{c.c.}$	seen	1373	DESIG=331;OUR EST;→ UNCHECKED ←
$\bar{K} K^*(892) + \text{c.c.} \rightarrow K_S^0 K^\pm \pi^\mp$	$(4.8 \pm 0.5) \times 10^{-3}$	—	DESIG=332
$K^+ K^*(892)^- + \text{c.c.}$	$(6.0 \pm \frac{0.8}{1.0}) \times 10^{-3}$	S=2.9 1373	DESIG=121
$K^+ K^*(892)^- + \text{c.c.} \rightarrow K^+ K^- \pi^0$	$(2.69 \pm \frac{0.13}{0.20}) \times 10^{-3}$	—	DESIG=231
$K^+ K^*(892)^- + \text{c.c.} \rightarrow K^0 K^\pm \pi^\mp + \text{c.c.}$	$(3.0 \pm 0.4) \times 10^{-3}$	—	DESIG=232
$K^0 \bar{K}^*(892)^0 + \text{c.c.}$	$(4.2 \pm 0.4) \times 10^{-3}$	1373	DESIG=122
$K^0 \bar{K}^*(892)^0 + \text{c.c.} \rightarrow K^0 K^\pm \pi^\mp + \text{c.c.}$	$(3.2 \pm 0.4) \times 10^{-3}$	—	DESIG=233
$\bar{K}^*(892)^0 K^+ \pi^- + \text{c.c.}$	$(5.7 \pm 0.8) \times 10^{-3}$	1343	DESIG=214
$K^*(892)^\pm K^\mp \pi^0$	$(4.1 \pm 1.3) \times 10^{-3}$	1344	DESIG=343
$K^*(892)^+ K_S^0 \pi^- + \text{c.c.}$	$(2.0 \pm 0.5) \times 10^{-3}$	1342	DESIG=299
$K^*(892)^+ K_S^0 \pi^- + \text{c.c.} \rightarrow K_S^0 K_S^0 \pi^+ \pi^-$	$(6.7 \pm 2.2) \times 10^{-4}$	—	DESIG=300
$K^*(892)^0 K^- \pi^+ + \text{c.c.} \rightarrow K^+ K^- \pi^+ \pi^-$	$(3.8 \pm 0.5) \times 10^{-3}$	—	DESIG=445
$K^*(892)^0 K_S^0 \rightarrow \gamma K_S^0 K_S^0$	$(6.3 \pm \frac{0.6}{0.5}) \times 10^{-6}$	—	DESIG=376
$K^*(892)^0 K_S^0 \pi^0$	$(7 \pm 4) \times 10^{-4}$	1343	DESIG=344
$K^*(892)^\pm K^*(700)^\mp$	$(1.1 \pm \frac{1.0}{0.6}) \times 10^{-3}$	—	DESIG=257
$K^*(892)^0 \bar{K}^*(892)^0$	$(2.3 \pm 0.6) \times 10^{-4}$	1266	DESIG=46
$K^*(892)^\pm K^*(892)^\mp$	$(1.00 \pm \frac{0.22}{0.40}) \times 10^{-3}$	1266	DESIG=256
$K_1(1400)^\pm K^\mp$	$(3.8 \pm 1.4) \times 10^{-3}$	1170	DESIG=132

$K^*(1410)\bar{K} + \text{c.c.}$	seen	1165	DESIG=317;OUR EST;→ UNCHECKED ←
$K^*(1410)\bar{K} + \text{c.c.} \rightarrow K^\pm K^\mp \pi^0$	$(7 \pm 4) \times 10^{-5}$	—	DESIG=330
$K^*(1410)\bar{K} + \text{c.c.} \rightarrow K_S^0 K^\pm \pi^\mp$	$(8 \pm 5) \times 10^{-5}$	—	DESIG=318
$K_2^*(1430)\bar{K} + \text{c.c.}$	seen	1158	DESIG=319;OUR EST;→ UNCHECKED ←
$K_2^*(1430)\bar{K} + \text{c.c.} \rightarrow K^\pm K^\mp \pi^0$	$(1.0 \pm 0.5) \times 10^{-4}$	—	DESIG=321
$K_2^*(1430)\bar{K} + \text{c.c.} \rightarrow K_S^0 K^\pm \pi^\mp$	$(3.8 \pm 1.0) \times 10^{-4}$	—	DESIG=320
$\bar{K}_2^*(1430)K + \text{c.c.}$	$< 4.0 \times 10^{-3}$	CL=90% 1158	DESIG=45
$K_2^*(1430)^+ K^- + \text{c.c.} \rightarrow K^+ K^- \pi^0$	$(2.69 \pm 0.25_{-0.19}) \times 10^{-4}$	—	DESIG=381
$K_2^*(1430)^0 K^- \pi^+ + \text{c.c.} \rightarrow K^+ K^- \pi^+ \pi^-$	$(2.6 \pm 0.9) \times 10^{-3}$	—	DESIG=446
$K_2^*(1430)^+ K_S^0 \pi^- + \text{c.c.}$	$(3.6 \pm 1.8) \times 10^{-3}$	1116	DESIG=301
$\bar{K}_2^*(1430)^0 K^*(892)^0 + \text{c.c.}$	$(4.67 \pm 0.29) \times 10^{-3}$	1011	DESIG=48
$K_2^*(1430)^- K^*(892)^+ + \text{c.c.}$	$(3.4 \pm 2.9) \times 10^{-3}$	1011	DESIG=303
$K_2^*(1430)^- K^*(892)^+ + \text{c.c.} \rightarrow K^*(892)^+ K_S^0 \pi^- + \text{c.c.}$	$(4 \pm 4) \times 10^{-4}$	—	DESIG=304
$K_2^*(1430)^0 \bar{K}_2^*(1430)^0$	$< 2.9 \times 10^{-3}$	CL=90% 601	DESIG=47
$\bar{K}_2(1770)^0 K^*(892)^0 + \text{c.c.} \rightarrow K^*(892)^0 K^- \pi^+ + \text{c.c.}$	$(6.9 \pm 0.9) \times 10^{-4}$	—	DESIG=235
$K_2^*(1980)^+ K^- + \text{c.c.} \rightarrow K^+ K^- \pi^0$	$(1.10 \pm 0.60_{-0.14}) \times 10^{-5}$	—	DESIG=382
$K_4^*(2045)^+ K^- + \text{c.c.} \rightarrow K^+ K^- \pi^0$	$(6.2 \pm 2.9_{-1.6}) \times 10^{-6}$	—	DESIG=383
$K_1(1270)^\pm K^\mp$	$< 3.0 \times 10^{-3}$	CL=90% 1238	DESIG=131
$K_1(1270)K_S^0 \rightarrow \gamma K_S^0 K_S^0$	$(8.5 \pm 2.5) \times 10^{-7}$	—	DESIG=377
$a_2(1320)^\pm \pi^\mp$	$[k] < 4.3 \times 10^{-3}$	CL=90% 1263	DESIG=42
$\phi \pi^0$	$3 \times 10^{-6} \text{ or } 1 \times 10^{-7}$	1377	DESIG=33;OUR EVAL;→ UNCHECKED ←
$\phi \pi^+ \pi^-$	$(9.4 \pm 1.5) \times 10^{-4}$	S=1.7 1365	DESIG=34
$\phi \pi^0 \pi^0$	$(4.9 \pm 1.0) \times 10^{-4}$	1366	DESIG=76
$\phi 2(\pi^+ \pi^-)$	$(1.60 \pm 0.32) \times 10^{-3}$	1318	DESIG=35
$\phi \eta$	$(7.4 \pm 0.6) \times 10^{-4}$	S=1.2 1320	DESIG=37
$\phi \eta'(958)$	$(4.6 \pm 0.5) \times 10^{-4}$	S=2.2 1192	DESIG=38
$\phi \eta \eta'$	$(2.32 \pm 0.17) \times 10^{-4}$	885	DESIG=387
$\phi f_0(980)$	$(3.2 \pm 0.9) \times 10^{-4}$	S=1.9 1178	DESIG=41
$\phi f_0(980) \rightarrow \phi \pi^+ \pi^-$	$(2.57 \pm 0.34) \times 10^{-4}$	—	DESIG=236
$\phi f_0(980) \rightarrow \phi \pi^0 \pi^0$	$(1.7 \pm 0.5) \times 10^{-4}$	—	DESIG=237
$\phi \pi^0 f_0(980) \rightarrow \phi \pi^0 \pi^+ \pi^-$	$(4.5 \pm 1.0) \times 10^{-6}$	—	DESIG=278
$\phi \pi^0 f_0(980) \rightarrow \phi \pi^0 \rho^0 \pi^0$	$(1.7 \pm 0.6) \times 10^{-6}$	1045	DESIG=279
$\phi f_0(980) \eta \rightarrow \eta \phi \pi^+ \pi^-$	$(3.2 \pm 1.0) \times 10^{-4}$	—	DESIG=229
$\phi(1680)^0 \pi^0 \rightarrow \phi \eta \pi^0$	$(6.7 \pm 1.1) \times 10^{-6}$	—	DESIG=480
$X(2000)^0 \pi^0 \rightarrow \phi \eta \pi^0$	$(1.70 \pm 0.50_{-0.23}) \times 10^{-6}$	—	DESIG=481
$h_1(1900)^0 \pi^0 \rightarrow \phi \eta \pi^0$	$(8.4 \pm 1.4_{-1.3}) \times 10^{-6}$	—	DESIG=482
$\phi f_2(1270)$	$(3.2 \pm 0.6) \times 10^{-4}$	1036	DESIG=39
$\phi f_1(1285)$	$(2.6 \pm 0.5) \times 10^{-4}$	1033	DESIG=106
$\phi f_1(1285) \rightarrow \phi \pi^0 f_0(980) \rightarrow \phi \pi^0 \pi^+ \pi^-$	$(9.4 \pm 2.8) \times 10^{-7}$	952	DESIG=280
$\phi f_1(1285) \rightarrow \phi \pi^0 f_0(980) \rightarrow \phi 3\pi^0$	$(2.1 \pm 2.2) \times 10^{-7}$	955	DESIG=281
$\phi \eta(1405) \rightarrow \phi \eta \pi^+ \pi^-$	$(2.0 \pm 1.0) \times 10^{-5}$	946	DESIG=128
$\phi f_2'(1525)$	$(8 \pm 4) \times 10^{-4}$	S=2.7 877	DESIG=40

$\phi X(1835) \rightarrow \phi p \bar{p}$	< 2.1	$\times 10^{-7}$	CL=90%	—	DESIG=291
$\phi X(1835) \rightarrow \phi \eta \pi^+ \pi^-$	< 2.8	$\times 10^{-4}$	CL=90%	578	DESIG=288
$\phi X(1870) \rightarrow \phi \eta \pi^+ \pi^-$	< 6.13	$\times 10^{-5}$	CL=90%	—	DESIG=289
$\phi K \bar{K}$	(1.77 ± 0.16)	$\times 10^{-3}$	S=1.3	1179	DESIG=36
$\phi f_0(1710) \rightarrow \phi K \bar{K}$	(3.6 ± 0.6)	$\times 10^{-4}$		875	DESIG=129
$\phi K^+ K^-$	(8.2 ± 1.1)	$\times 10^{-4}$		1179	DESIG=295
$\phi K_S^0 K_S^0$	(5.8 ± 1.5)	$\times 10^{-4}$		1176	DESIG=305
$\phi K^\pm K_S^0 \pi^\mp$	[k] (7.2 ± 0.8)	$\times 10^{-4}$		1114	DESIG=103
$\phi K^*(892) \bar{K} + \text{c.c.}$	(2.18 ± 0.23)	$\times 10^{-3}$		969	DESIG=104
$b_1(1235)^\pm \pi^\mp$	[k] (3.0 ± 0.5)	$\times 10^{-3}$		1300	DESIG=49
$b_1(1235)^0 \pi^0$	(2.3 ± 0.6)	$\times 10^{-3}$		1300	DESIG=160
$f_2'(1525) K^+ K^-$	(1.04 ± 0.35)	$\times 10^{-3}$		897	DESIG=308
$\Delta(1232)^+ \bar{p}$	< 1	$\times 10^{-4}$	CL=90%	1100	DESIG=112
$\Delta(1232)^{++} \bar{p} \pi^-$	(1.6 ± 0.5)	$\times 10^{-3}$		1030	DESIG=70
$\Delta(1232)^{++} \bar{\Delta}(1232)^{--}$	(1.10 ± 0.29)	$\times 10^{-3}$		938	DESIG=66
$\Sigma(1385)^0 p K^-$	(5.1 ± 3.2)	$\times 10^{-4}$		646	DESIG=74
$\Sigma(1385)^0 \bar{\Lambda} + \text{c.c.}$	< 8.2	$\times 10^{-6}$	CL=90%	911	DESIG=111
$\Sigma(1385)^- \bar{\Sigma}^+ + \text{c.c.}$	[k] (3.0 ± 0.7)	$\times 10^{-4}$		855	DESIG=68
$\Sigma(1385)^+ \bar{\Sigma}^- + \text{c.c.}$	(3.3 ± 0.8)	$\times 10^{-4}$		861	DESIG=450
$\Sigma(1385)^- \bar{\Sigma}(1385)^+ + \text{c.c.}$	[k] (1.08 ± 0.06)	$\times 10^{-3}$		697	DESIG=67
$\Sigma(1385)^+ \bar{\Sigma}(1385)^- + \text{c.c.}$	(1.25 ± 0.07)	$\times 10^{-3}$		697	DESIG=451
$\Sigma(1385)^0 \bar{\Sigma}(1385)^0$	(1.07 ± 0.08)	$\times 10^{-3}$		697	DESIG=309
$\Lambda(1520) \bar{\Lambda} + \text{c.c.} \rightarrow \gamma \Lambda \bar{\Lambda}$	< 4.1	$\times 10^{-6}$	CL=90%	—	DESIG=260
$\bar{\Lambda}(1520) \Lambda + \text{c.c.}$	< 1.80	$\times 10^{-3}$	CL=90%	807	DESIG=364
$\Xi^0 \Xi^0$	(1.17 ± 0.04)	$\times 10^{-3}$		818	DESIG=248
$\Xi(1530)^- \Xi^+ + \text{c.c.}$	(3.18 ± 0.08)	$\times 10^{-4}$		600	DESIG=107
$\Xi(1530)^0 \Xi^0$	(3.2 ± 1.4)	$\times 10^{-4}$		608	DESIG=108
$\Theta(1540) \bar{\Theta}(1540) \rightarrow K_S^0 p K^- \bar{n} + \text{c.c.}$	[l] < 1.1	$\times 10^{-5}$	CL=90%	—	DESIG=205
$\Theta(1540) K^- \bar{n} \rightarrow K_S^0 p K^- \bar{n}$	[l] < 2.1	$\times 10^{-5}$	CL=90%	—	DESIG=206
$\Theta(1540) K_S^0 \bar{p} \rightarrow K_S^0 \bar{p} K^+ n$	[l] < 1.6	$\times 10^{-5}$	CL=90%	—	DESIG=207
$\bar{\Theta}(1540) K^+ n \rightarrow K_S^0 \bar{p} K^+ n$	[l] < 5.6	$\times 10^{-5}$	CL=90%	—	DESIG=208
$\bar{\Theta}(1540) K_S^0 p \rightarrow K_S^0 p K^- \bar{n}$	[l] < 1.1	$\times 10^{-5}$	CL=90%	—	DESIG=209

Decays into stable hadrons

$2(\pi^+ \pi^-) \pi^0$	$(4.2 \pm 0.4) \%$	S=2.1	1496	DESIG=9
$3(\pi^+ \pi^-) \pi^0$	$(2.9 \pm 0.6) \%$		1433	DESIG=11
$\pi^+ \pi^- 3\pi^0$	$(1.9 \pm 0.9) \%$		1497	DESIG=358
$\rho^\pm \pi^\mp \pi^0 \pi^0$	$(1.41 \pm 0.22) \%$		1421	DESIG=362
$\rho^+ \rho^- \pi^0$	$(6.0 \pm 1.1) \times 10^{-3}$		1298	DESIG=363
$\pi^+ \pi^- 4\pi^0$	$(6.5 \pm 1.3) \times 10^{-3}$		1470	DESIG=419
$\pi^+ \pi^- \pi^0$	$(2.00 \pm 0.07) \%$	S=2.0	1533	DESIG=7
$2(\pi^+ \pi^- \pi^0)$	$(1.61 \pm 0.20) \%$		1468	DESIG=210
$\pi^+ \pi^- \pi^0 K^+ K^-$	$(1.52 \pm 0.27) \%$	S=1.4	1368	DESIG=18
$\pi^+ \pi^-$	$(1.47 \pm 0.14) \times 10^{-4}$		1542	DESIG=6
$2(\pi^+ \pi^-)$	$(3.20 \pm 0.25) \times 10^{-3}$	S=1.2	1517	DESIG=8
$3(\pi^+ \pi^-)$	$(4.3 \pm 0.4) \times 10^{-3}$		1466	DESIG=10
$2(\pi^+ \pi^-) 3\pi^0$	$(6.2 \pm 0.9) \%$		1435	DESIG=411
$4(\pi^+ \pi^-) \pi^0$	$(9.0 \pm 3.0) \times 10^{-3}$		1345	DESIG=12
$2(\pi^+ \pi^-) \eta$	$(2.29 \pm 0.28) \times 10^{-3}$		1446	DESIG=201
$3(\pi^+ \pi^-) \eta$	$(7.2 \pm 1.5) \times 10^{-4}$		1379	DESIG=202
$2(\pi^+ \pi^- \pi^0) \eta$	$(1.6 \pm 0.5) \times 10^{-3}$		1381	DESIG=418
$\pi^+ \pi^- \pi^0 \pi^0 \eta$	$(2.4 \pm 0.5) \times 10^{-3}$		1448	DESIG=359
$\rho^\pm \pi^\mp \pi^0 \eta$	$(1.9 \pm 0.8) \times 10^{-3}$		1326	DESIG=361
$K^+ K^-$	$(3.06 \pm 0.05) \times 10^{-4}$		1468	DESIG=13
$K_S^0 K_L^0$	$(1.95 \pm 0.11) \times 10^{-4}$	S=2.4	1466	DESIG=75
$K_S^0 K_S^0$	< 1.4	CL=95%	1466	DESIG=14
$K \bar{K} \pi$	$(6.1 \pm 1.0) \times 10^{-3}$		1442	DESIG=15
$K^+ K^- \pi^0$	$(2.88 \pm 0.12) \times 10^{-3}$		1442	DESIG=334
$K_S^0 K^\pm \pi^\mp$	$(5.3 \pm 0.5) \times 10^{-3}$		1440	DESIG=335

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$K_S^0 K_L^0 \pi^0$	$(2.06 \pm 0.26) \times 10^{-3}$	1440	DESIG=336
$K^*(892)^0 \bar{K}^0 + \text{c.c.} \rightarrow$	$(1.21 \pm 0.18) \times 10^{-3}$	—	DESIG=339
$K_S^0 K_L^0 \pi^0$			
$K_2^*(1430)^0 \bar{K}^0 + \text{c.c.} \rightarrow$	$(4.3 \pm 1.3) \times 10^{-4}$	—	DESIG=338
$K_S^0 K_L^0 \pi^0$			
$K^+ K^- \pi^+ \pi^-$	$(7.0 \pm 1.0) \times 10^{-3}$	1407	DESIG=16
$K^+ K^- \pi^0 \pi^0$	$(2.13 \pm 0.22) \times 10^{-3}$	1410	DESIG=234
$K^+ K^- \pi^0 \pi^0 \pi^0$	$(1.61 \pm 0.29) \times 10^{-3}$	1371	DESIG=452
$K_S^0 K^\pm \pi^\mp \pi^0 \pi^0$	$(5.3 \pm 0.7) \times 10^{-3}$	1369	DESIG=453
$K_S^0 K^\pm \pi^\mp \pi^+ \pi^-$	$(6.3 \pm 0.4) \times 10^{-3}$	1366	DESIG=454
$K_S^0 K^\pm \rho(770)^\pm \pi^0$	$(2.9 \pm 0.8) \times 10^{-3}$	—	DESIG=463
$K_S^0 K_L^0 \pi^+ \pi^-$	$(3.8 \pm 0.6) \times 10^{-3}$	1406	DESIG=296
$K_S^0 K_L^0 \pi^0 \pi^0$	$(1.9 \pm 0.4) \times 10^{-3}$	1408	DESIG=337
$K_S^0 K_L^0 \eta$	$(1.45 \pm 0.33) \times 10^{-3}$	1328	DESIG=340
$K_S^0 K_S^0 \pi^+ \pi^-$	$(1.68 \pm 0.19) \times 10^{-3}$	1406	DESIG=297
$K^\mp K_S^0 \pi^\pm \pi^0$	$(5.7 \pm 0.5) \times 10^{-3}$	1408	DESIG=341
$K_S^0 K^\pm \pi^\mp \rho(770)^0$	$(3.1 \pm 0.5) \times 10^{-3}$	—	DESIG=456
$K^+ K^- 2(\pi^+ \pi^-)$	$(3.1 \pm 1.3) \times 10^{-3}$	1320	DESIG=17
$K^+ K^- \pi^+ \pi^- \eta$	$(4.7 \pm 0.7) \times 10^{-3}$	1221	DESIG=238
$2(K^+ K^-)$	$(7.2 \pm 0.8) \times 10^{-4}$	1131	DESIG=19
$K^+ K^- K_S^0 K_S^0$	$(4.2 \pm 0.7) \times 10^{-4}$	1127	DESIG=298
$K_S^0 K^*(892)^0 \pi^+ \pi^-$	$(1.7 \pm 0.6) \times 10^{-3}$	1304	DESIG=457
$K_S^0 K^*(892)^0 \pi^0 \pi^0$	$(1.01 \pm 0.18) \times 10^{-3}$	1306	DESIG=462
$K^\mp K^*(892)^\pm \pi^+ \pi^-$	$(3.4 \pm 1.2) \times 10^{-3}$	1305	DESIG=458
$K^*(892)^\pm K^*(892)^0 \pi^\mp$	$(4.8 \pm 1.0) \times 10^{-3}$	1213	DESIG=459
$K^\mp K^*(892)^\pm \pi^0 \pi^0$	$(1.57 \pm 0.32) \times 10^{-3}$	1308	DESIG=461
$K^*(892)^+ K^*(892)^- \pi^0$	$(1.12 \pm 0.23) \%$	1214	DESIG=460
$p\bar{p}$	$(2.121 \pm 0.029) \times 10^{-3}$	1232	DESIG=50
$p\bar{p}\pi^0$	$(1.19 \pm 0.08) \times 10^{-3}$	S=1.1 1176	DESIG=52
$p\bar{p}\pi^+ \pi^-$	$(6.0 \pm 0.5) \times 10^{-3}$	S=1.3 1107	DESIG=54
$p\bar{p}\pi^+ \pi^- \pi^0$	[n] $(2.3 \pm 0.9) \times 10^{-3}$	S=1.9 1033	DESIG=55
$p\bar{p}\eta$	$(1.513 \pm 0.023) \times 10^{-3}$	948	DESIG=56
$p\bar{p}\rho$	< 3.1 $\times 10^{-4}$	CL=90% 774	DESIG=57
$p\bar{p}\omega$	$(9.8 \pm 1.0) \times 10^{-4}$	S=1.3 768	DESIG=58
$p\bar{p}\eta'(958)$	$(1.29 \pm 0.14) \times 10^{-4}$	S=2.0 596	DESIG=59
$p\bar{p}a_0(980) \rightarrow p\bar{p}\pi^0 \eta$	$(6.8 \pm 1.8) \times 10^{-5}$	—	DESIG=276
$p\bar{p}\phi$	$(5.19 \pm 0.33) \times 10^{-5}$	527	DESIG=127
$p\bar{n}\pi^-$	$(2.12 \pm 0.09) \times 10^{-3}$	1174	DESIG=53
$n\bar{n}$	$(2.09 \pm 0.16) \times 10^{-3}$	1231	DESIG=64
$n\bar{n}\pi^+ \pi^-$	$(4 \pm 4) \times 10^{-3}$	1106	DESIG=65
$nN(1440)$	seen	978	DESIG=215;OUR EST;→ UNCHECKED ←
$nN(1520)$	seen	928	DESIG=216;OUR EST;→ UNCHECKED ←
$nN(1535)$	seen	917	DESIG=217;OUR EST;→ UNCHECKED ←
$\Lambda \bar{\Lambda}$	$(1.88 \pm 0.08) \times 10^{-3}$	S=2.6 1074	DESIG=60
$\Lambda \bar{\Lambda} \pi^0$	$(3.8 \pm 0.4) \times 10^{-5}$	998	DESIG=109
$\Lambda \bar{\Lambda} \pi^+ \pi^-$	$(4.3 \pm 1.0) \times 10^{-3}$	903	DESIG=261
$\Lambda \bar{\Lambda} \eta$	$(1.62 \pm 0.17) \times 10^{-4}$	672	DESIG=228
$\Lambda \bar{\Sigma}^- \pi^+ + \text{c.c.}$	[k] $(1.26 \pm 0.05) \times 10^{-3}$	S=1.2 950	DESIG=71
$\Lambda \bar{\Sigma}^+ \pi^- + \text{c.c.}$	$(1.21 \pm 0.07) \times 10^{-3}$	S=1.8 945	DESIG=449
$pK^- \bar{\Lambda} + \text{c.c.}$	$(8.6 \pm 1.1) \times 10^{-4}$	876	DESIG=72
$pK^- \bar{\Sigma}^0$	$(2.9 \pm 0.8) \times 10^{-4}$	819	DESIG=73
$pK_S^0 \bar{\Sigma}^- + \text{c.c.}$	$(2.73 \pm 0.05) \times 10^{-4}$	819	DESIG=474
$\bar{\Lambda} n K_S^0 + \text{c.c.}$	$(6.5 \pm 1.1) \times 10^{-4}$	872	DESIG=225
$\Lambda \bar{\Sigma} + \text{c.c.}$	$(2.83 \pm 0.23) \times 10^{-5}$	1034	DESIG=61
$\Sigma^+ \bar{\Sigma}^-$	$(1.07 \pm 0.04) \times 10^{-3}$	992	DESIG=247
$\Sigma^0 \bar{\Sigma}^0$	$(1.172 \pm 0.032) \times 10^{-3}$	S=1.4 988	DESIG=63
$\Sigma^+ \bar{\Sigma}^- \eta$	$(6.3 \pm 0.4) \times 10^{-5}$	498	DESIG=448
$\Xi^- \bar{\Xi}^+$	$(9.7 \pm 0.8) \times 10^{-4}$	S=1.4 807	DESIG=62

Radiative decays

$\gamma\eta_c(1S)$	(1.82 $\pm$ 0.15) %	S=1.6	111	NODE=M070;CLUMP=C
$\gamma\eta_c(1S) \rightarrow 3\gamma$	seen		—	DESIG=85
$\gamma\eta_c(1S) \rightarrow \gamma\eta\eta\eta'$	seen		—	DESIG=246;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
3γ	(1.16 $\pm$ 0.22) $\times 10^{-5}$		1548	DESIG=81
4γ	< 9 $\times 10^{-6}$	CL=90%	1548	DESIG=244
5γ	< 1.5 $\times 10^{-5}$	CL=90%	1548	DESIG=245
$\gamma\pi^0$	(3.39 $\pm$ 0.08) $\times 10^{-5}$		1546	DESIG=82
$\gamma\pi^0\pi^0$	(1.15 $\pm$ 0.05) $\times 10^{-3}$		1543	DESIG=283
$\gamma 2\pi^+ 2\pi^-$	(2.8 $\pm$ 0.5) $\times 10^{-3}$	S=1.9	1517	DESIG=95
$\gamma f_2(1270) f_2(1270)$	(9.5 $\pm$ 1.7) $\times 10^{-4}$		878	DESIG=203
$\gamma f_2(1270) f_2(1270)$ (non resonant)	(8.2 $\pm$ 1.9) $\times 10^{-4}$		—	DESIG=204
$\gamma\pi^+\pi^-2\pi^0$	(8.3 $\pm$ 3.1) $\times 10^{-3}$		1518	DESIG=99
$\gamma K_S^0 K_S^0$	(8.1 $\pm$ 0.4) $\times 10^{-4}$		1466	DESIG=378
$\gamma(K\bar{K}\pi) [J^{PC} = 0^{-+}]$	(7 $\pm$ 4) $\times 10^{-4}$	S=2.1	1442	DESIG=176
$\gamma K^+ K^- \pi^+ \pi^-$	(2.1 $\pm$ 0.6) $\times 10^{-3}$		1407	DESIG=143
$\gamma K^*(892) \bar{K}^*(892)$	(4.0 $\pm$ 1.3) $\times 10^{-3}$		1266	DESIG=145
$\gamma\eta$	(1.090 $\pm$ 0.013) $\times 10^{-3}$		1500	DESIG=83
$\gamma\eta\pi^0$	(2.14 $\pm$ 0.31) $\times 10^{-5}$		1497	DESIG=292
$\gamma a_0(980)^0 \rightarrow \gamma\eta\pi^0$	< 2.5 $\times 10^{-6}$	CL=95%	—	DESIG=293
$\gamma a_2(1320)^0 \rightarrow \gamma\eta\pi^0$	< 6.6 $\times 10^{-6}$	CL=95%	—	DESIG=294
$\gamma\eta\pi\pi$	(6.1 $\pm$ 1.0) $\times 10^{-3}$		1487	DESIG=96
$\gamma\eta_2(1870) \rightarrow \gamma\eta\pi^+\pi^-$	(6.2 $\pm$ 2.4) $\times 10^{-4}$		—	DESIG=142
$\gamma\eta'(958)$	(5.28 $\pm$ 0.06) $\times 10^{-3}$	S=1.3	1400	DESIG=84
$\gamma\rho\rho$	(4.5 $\pm$ 0.8) $\times 10^{-3}$		1340	DESIG=94
$\gamma\rho\omega$	< 5.4 $\times 10^{-4}$	CL=90%	1338	DESIG=226
$\gamma\rho\phi$	< 8.8 $\times 10^{-5}$	CL=90%	1258	DESIG=227
$\gamma\omega\omega$	(1.61 $\pm$ 0.33) $\times 10^{-3}$		1336	DESIG=97
$\gamma\phi\phi$	(4.0 $\pm$ 1.2) $\times 10^{-4}$	S=2.1	1166	DESIG=98
$\gamma\eta(1405/1475) \rightarrow \gamma K\bar{K}\pi$	(2.8 $\pm$ 0.6) $\times 10^{-3}$	S=1.6	1223	DESIG=89
$\gamma\eta(1405/1475) \rightarrow \gamma\gamma\rho^0$	(7.8 $\pm$ 2.0) $\times 10^{-5}$	S=1.8	1223	DESIG=171
$\gamma\eta(1405/1475) \rightarrow \gamma\eta\pi^+\pi^-$	(3.0 $\pm$ 0.5) $\times 10^{-4}$		—	DESIG=170
$\gamma\eta(1405/1475) \rightarrow \gamma\rho^0\rho^0$	(1.7 $\pm$ 0.4) $\times 10^{-3}$	S=1.3	1223	DESIG=124
$\gamma\eta(1405/1475) \rightarrow \gamma\gamma\phi$	(3.6 $\pm$ 0.6) $\times 10^{-6}$		—	DESIG=212
$\gamma\eta(1405) \rightarrow \gamma f_0(980)\pi^0 \rightarrow \gamma\pi^+\pi^-\pi^0$	(1.50 $\pm$ 0.16) $\times 10^{-5}$		—	DESIG=476
$\gamma\eta(1405) \rightarrow \gamma f_0(980)\pi^0 \rightarrow \gamma\pi^0\pi^0\pi^0$	(6.64 $\pm$ 1.10 / 0.23) $\times 10^{-6}$		—	DESIG=477
$\gamma\eta(1405) \rightarrow \gamma\gamma\gamma$	< 2.63 $\times 10^{-6}$	CL=90%	—	DESIG=348
$\gamma\eta(1475) \rightarrow \gamma\gamma\gamma$	< 1.86 $\times 10^{-6}$	CL=90%	—	DESIG=349
$\gamma\eta(1760) \rightarrow \gamma\rho^0\rho^0$	(1.3 $\pm$ 0.9) $\times 10^{-4}$		1048	DESIG=125
$\gamma\eta(1760) \rightarrow \gamma\omega\omega$	(1.98 $\pm$ 0.33) $\times 10^{-3}$		—	DESIG=224
$\gamma\eta(1760) \rightarrow \gamma\gamma\gamma$	< 4.80 $\times 10^{-6}$	CL=90%	—	DESIG=347
$\gamma\eta(2225)$	(3.14 $\pm$ 0.50 / 0.19) $\times 10^{-4}$		752	DESIG=126
$\gamma f_2(1270)$	(1.63 $\pm$ 0.12) $\times 10^{-3}$	S=1.3	1286	DESIG=86
$\gamma f_2(1270) \rightarrow \gamma K_S^0 K_S^0$	(2.58 $\pm$ 0.60 / 0.22) $\times 10^{-5}$		—	DESIG=373
$\gamma f_1(1285)$	(6.1 $\pm$ 0.8) $\times 10^{-4}$		1283	DESIG=88
$\gamma f_1(1285) \rightarrow \gamma\gamma\phi$	(2.9 $\pm$ 1.1 / 0.9) $\times 10^{-7}$		—	DESIG=486
$\gamma f_1(1285) \rightarrow \gamma\pi^0 f_0(980) \rightarrow \gamma\pi^0\pi^0\pi^0$	(5.6 $\pm$ 0.9 / 3.1) $\times 10^{-7}$		—	DESIG=494
$\gamma f_0(1370) \rightarrow \gamma K\bar{K}$	(4.2 $\pm$ 1.5) $\times 10^{-4}$		—	DESIG=284
$\gamma f_0(1370) \rightarrow \gamma K_S^0 K_S^0$	(1.1 $\pm$ 0.4) $\times 10^{-5}$		—	DESIG=368
$\gamma f_1(1420) \rightarrow \gamma K\bar{K}\pi$	(7.9 $\pm$ 1.3) $\times 10^{-4}$		1220	DESIG=175
$\gamma f_1(1420) \rightarrow \gamma\gamma\phi$	(5.5 $\pm$ 1.9) $\times 10^{-7}$		—	DESIG=487
$\gamma f_1(1420) \rightarrow \gamma\pi^0 f_0(980) \rightarrow \gamma\pi^0\pi^0\pi^0$	(2.23 $\pm$ 0.26 / 1.20) $\times 10^{-6}$		—	DESIG=496
$\gamma f_0(1500) \rightarrow \gamma\pi\pi$	(1.09 $\pm$ 0.24) $\times 10^{-4}$		1183	DESIG=172

$\gamma f_0(1500) \rightarrow \gamma \eta \eta$	$(1.7 \pm_{-1.4}^{+0.6}) \times 10^{-5}$	—	DESIG=265
$\gamma f_0(1500) \rightarrow \gamma K_S^0 K_S^0$	$(1.59 \pm_{-0.60}^{+0.24}) \times 10^{-5}$	—	DESIG=369
$\gamma f_1(1510) \rightarrow \gamma \eta \pi^+ \pi^-$	$(4.5 \pm 1.2) \times 10^{-4}$	—	DESIG=141
$\gamma f_1(1510) \rightarrow \gamma \gamma \phi$	$(7.8 \pm_{-3.1}^{+3.5}) \times 10^{-7}$	—	DESIG=488
$\gamma f_2'(1525)$	$(5.7 \pm_{-0.5}^{+0.8}) \times 10^{-4}$	S=1.5 1177	DESIG=87
$\gamma f_2'(1525) \rightarrow \gamma K_S^0 K_S^0$	$(8.0 \pm_{-0.5}^{+0.7}) \times 10^{-5}$	—	DESIG=374
$\gamma f_2'(1525) \rightarrow \gamma \eta \eta$	$(3.4 \pm 1.4) \times 10^{-5}$	—	DESIG=268
$\gamma f_2'(1525) \rightarrow \gamma \gamma \phi$	$(2.8 \pm_{-0.6}^{+0.9}) \times 10^{-6}$	—	DESIG=489
$\gamma f_2(1640) \rightarrow \gamma \omega \omega$	$(2.8 \pm 1.8) \times 10^{-4}$	—	DESIG=222
$\gamma f_0(1710) \rightarrow \gamma \pi \pi$	$(3.8 \pm 0.5) \times 10^{-4}$	—	DESIG=135
$\gamma f_0(1710) \rightarrow \gamma K \bar{K}$	$(9.5 \pm_{-0.5}^{+1.0}) \times 10^{-4}$	S=1.5 1075	DESIG=91
$\gamma f_0(1710) \rightarrow \gamma \omega \omega$	$(3.1 \pm 1.0) \times 10^{-4}$	—	DESIG=221
$\gamma f_0(1710) \rightarrow \gamma \eta \eta$	$(2.4 \pm_{-0.7}^{+1.2}) \times 10^{-4}$	—	DESIG=266
$\gamma f_0(1710) \rightarrow \gamma \omega \phi$	$(2.5 \pm 0.6) \times 10^{-4}$	—	DESIG=262
$\gamma f_0(1770) \rightarrow \gamma K_S^0 K_S^0$	$(1.11 \pm_{-0.33}^{+0.20}) \times 10^{-5}$	—	DESIG=370
$\gamma f_2(1810) \rightarrow \gamma \eta \eta$	$(5.4 \pm_{-2.4}^{+3.5}) \times 10^{-5}$	—	DESIG=269
$\gamma \eta_1(1855) \rightarrow \gamma \eta \eta'$	$(2.7 \pm_{-0.5}^{+0.4}) \times 10^{-6}$	—	DESIG=447
$\gamma f_2(1910) \rightarrow \gamma \omega \omega$	$(2.0 \pm 1.4) \times 10^{-4}$	—	DESIG=223
$\gamma f_2(1950) \rightarrow \gamma K^*(892) \bar{K}^*(892)$	$(7.0 \pm 2.2) \times 10^{-4}$	—	DESIG=144
$\gamma f_2(1950) \rightarrow \gamma \gamma \phi$	$(10.0 \pm_{-2.2}^{+3.5}) \times 10^{-6}$	—	DESIG=490
$\gamma f_2(2010) \rightarrow \gamma \gamma \phi$	$(4.6 \pm 1.5) \times 10^{-6}$	—	DESIG=491
$\gamma f_0(2020) \rightarrow \gamma \eta' \eta'$	$(2.63 \pm_{-0.50}^{+0.32}) \times 10^{-4}$	—	DESIG=426
$\gamma f_4(2050)$	$(2.7 \pm 0.7) \times 10^{-3}$	891	DESIG=100
$\gamma f_0(2100) \rightarrow \gamma \eta \eta$	$(1.13 \pm_{-0.30}^{+0.60}) \times 10^{-4}$	—	DESIG=267
$\gamma f_0(2100) \rightarrow \gamma \pi \pi$	$(6.2 \pm 1.0) \times 10^{-4}$	—	DESIG=286
$\gamma f_0(2200)$	seen	776	DESIG=123;OUR EST;→ UNCHECKED ←
$\gamma f_0(2200) \rightarrow \gamma K \bar{K}$	$(5.9 \pm 1.3) \times 10^{-4}$	—	DESIG=285
$\gamma f_0(2200) \rightarrow \gamma K_S^0 K_S^0$	$(2.72 \pm_{-0.50}^{+0.19}) \times 10^{-4}$	—	DESIG=371
$\gamma f_0(2200) \rightarrow \gamma \gamma \phi$	$(2.0 \pm_{-0.8}^{+0.6}) \times 10^{-7}$	—	DESIG=492
$\gamma f_J(2220)$	seen	745	DESIG=92;OUR EST;→ UNCHECKED ←
$\gamma f_J(2220) \rightarrow \gamma \pi \pi$	$< 3.9 \times 10^{-5}$	CL=90%	DESIG=136
$\gamma f_J(2220) \rightarrow \gamma K \bar{K}$	$< 4.1 \times 10^{-5}$	CL=90%	DESIG=137
$\gamma f_J(2220) \rightarrow \gamma p \bar{p}$	$(1.5 \pm 0.8) \times 10^{-5}$	—	DESIG=138
$\gamma f_0(2330) \rightarrow \gamma K_S^0 K_S^0$	$(4.9 \pm 0.7) \times 10^{-5}$	—	DESIG=372
$\gamma f_0(2330) \rightarrow \gamma \eta' \eta'$	$(6.1 \pm_{-1.8}^{+4.0}) \times 10^{-6}$	—	DESIG=427
$\gamma f_2(2340) \rightarrow \gamma \eta \eta$	$(5.6 \pm_{-2.2}^{+2.4}) \times 10^{-5}$	—	DESIG=270
$\gamma f_2(2340) \rightarrow \gamma K_S^0 K_S^0$	$(5.5 \pm_{-1.5}^{+4.0}) \times 10^{-5}$	—	DESIG=375
$\gamma f_2(2340) \rightarrow \gamma \eta' \eta'$	$(8.7 \pm_{-1.8}^{+0.9}) \times 10^{-6}$	—	DESIG=428
$\gamma f_0(2470) \rightarrow \gamma \eta' \eta'$	$(8.2 \pm_{-2.8}^{+4.0}) \times 10^{-7}$	—	DESIG=429
$\gamma X(1835) \rightarrow \gamma \pi^+ \pi^- \eta'$	$(2.7 \pm_{-0.8}^{+0.6}) \times 10^{-4}$	S=1.6 1006	DESIG=213
$\gamma X(1835) \rightarrow \gamma p \bar{p}$	$(7.7 \pm_{-0.9}^{+1.5}) \times 10^{-5}$	—	DESIG=254
$\gamma X(1835) \rightarrow \gamma K_S^0 K_S^0 \eta$	$(3.3 \pm_{-1.3}^{+2.0}) \times 10^{-5}$	—	DESIG=282
$\gamma X(1835) \rightarrow \gamma \gamma \phi(1020)$	$(3.4 \pm_{-1.1}^{+0.8}) \times 10^{-6}$	—	DESIG=346

$\gamma X(1835) \rightarrow \gamma\gamma\gamma$		< 3.56	$\times 10^{-6}$	CL=90%	—	DESIG=350
$\gamma X(1835) \rightarrow \gamma 3(\pi^+\pi^-)$		(2.4 ± 0.7)	$\times 10^{-5}$	—	—	DESIG=264
$\gamma\eta(2370) \rightarrow \gamma K^+ K^- \eta'$		(1.8 ± 0.7)	$\times 10^{-5}$	—	—	DESIG=388
$\gamma\eta(2370) \rightarrow \gamma K_S^0 K_S^0 \eta'$		(1.2 ± 0.5)	$\times 10^{-5}$	—	—	DESIG=389
$\gamma\eta(2370) \rightarrow \gamma\eta\eta\eta'$		< 9.2	$\times 10^{-6}$	CL=90%	—	DESIG=390
$\gamma D^0 + c.c.$		< 9.1	$\times 10^{-8}$	CL=90%	987	DESIG=479
$\gamma p\bar{p}$		(3.8 ± 1.0)	$\times 10^{-4}$	—	1232	DESIG=90
$\gamma p\bar{p}\pi^+\pi^-$		< 7.9	$\times 10^{-4}$	CL=90%	1107	DESIG=93
$\gamma\Lambda\bar{\Lambda}$		< 1.3	$\times 10^{-4}$	CL=90%	1074	DESIG=200
$\gamma A^0 \rightarrow \gamma \text{invisible}$	$[o]$	< 1.7	$\times 10^{-6}$	CL=90%	—	DESIG=251
$\gamma A^0 \rightarrow \gamma\gamma\gamma$		< 4.9	$\times 10^{-7}$	CL=95%	—	DESIG=469
$\gamma A^0 \rightarrow \gamma\mu^+\mu^-$	$[p]$	< 7.8	$\times 10^{-7}$	CL=90%	—	DESIG=259
Dalitz decays						
$\pi^0 e^+ e^-$		(8.1 ± 0.5)	$\times 10^{-7}$	—	1546	NODE=M070;CLUMP=G DESIG=271
$\eta e^+ e^-$		(1.42 ± 0.08)	$\times 10^{-5}$	—	1500	DESIG=272
$\eta'(958) e^+ e^-$		(6.59 ± 0.18)	$\times 10^{-5}$	—	1400	DESIG=273
$\eta(1405) e^+ e^- \rightarrow$		(2.04 ± 0.22)	$\times 10^{-7}$	—	—	DESIG=475
$f_0(980) \pi^0 e^+ e^- \rightarrow$						
$\pi^+\pi^-\pi^0 e^+ e^-$						
$X(1835) e^+ e^-, X \rightarrow$		(3.58 ± 0.25)	$\times 10^{-6}$	—	—	DESIG=423
$\pi^+\pi^-\eta'$						
$X(2120) e^+ e^-, X \rightarrow$		(8.2 ± 1.3)	$\times 10^{-7}$	—	—	DESIG=425
$\pi^+\pi^-\eta'$						
$\eta(2370) e^+ e^-, \eta \rightarrow \pi^+\pi^-\eta'$		(1.08 ± 0.17)	$\times 10^{-6}$	—	—	DESIG=424
$\eta U \rightarrow \eta e^+ e^-$	$[q]$	< 9.11	$\times 10^{-7}$	CL=90%	—	DESIG=352
$\eta'(958) U \rightarrow \eta'(958) e^+ e^-$	$[q]$	< 2.0	$\times 10^{-7}$	CL=90%	—	DESIG=366
$\phi e^+ e^-$		< 1.2	$\times 10^{-7}$	CL=90%	1381	DESIG=384
Weak decays						
$D^- e^+ \nu_e + c.c.$		< 7.1	$\times 10^{-8}$	CL=90%	984	NODE=M070;CLUMP=E DESIG=218
$D^- \mu^+ \nu_\mu + c.c.$		< 5.6	$\times 10^{-7}$	CL=90%	980	DESIG=468
$\bar{D}^0 e^+ e^- + c.c.$		< 8.5	$\times 10^{-8}$	CL=90%	987	DESIG=219
$D^0 \mu^+ \mu^- + c.c.$		< 1.1	$\times 10^{-7}$	CL=90%	971	DESIG=485
$D_s^- e^+ \nu_e + c.c.$		< 1.3	$\times 10^{-6}$	CL=90%	923	DESIG=220
$D_s^{*-} e^+ \nu_e + c.c.$		< 1.8	$\times 10^{-6}$	CL=90%	828	DESIG=290
$D^- \pi^+ + c.c.$		< 7.0	$\times 10^{-8}$	CL=90%	977	DESIG=241
$D^- \rho^+ + c.c.$		< 6.0	$\times 10^{-7}$	CL=90%	—	DESIG=464
$\bar{D}^0 \pi^0 + c.c.$		< 4.7	$\times 10^{-7}$	CL=90%	—	DESIG=465
$\bar{D}^0 \bar{K}^0 + c.c.$		< 1.7	$\times 10^{-4}$	CL=90%	898	DESIG=242
$\bar{D}^0 \bar{K}^{*0} + c.c.$		< 2.5	$\times 10^{-6}$	CL=90%	670	DESIG=275
$\bar{D}^0 \eta + c.c.$		< 6.8	$\times 10^{-7}$	CL=90%	—	DESIG=466
$\bar{D}^0 \rho^0 + c.c.$		< 5.2	$\times 10^{-7}$	CL=90%	—	DESIG=467
$D_s^- \pi^+ + c.c.$		< 1.3	$\times 10^{-4}$	CL=90%	915	DESIG=243
$D_s^- \rho^+ + c.c.$		< 1.3	$\times 10^{-5}$	CL=90%	663	DESIG=274
Charge conjugation (C), Parity (P), Lepton Family number (LF) violating modes						
$\gamma\gamma$	C	< 2.7	$\times 10^{-7}$	CL=90%	1548	NODE=M070;CLUMP=D DESIG=80
$\gamma\phi$	C	< 1.4	$\times 10^{-6}$	CL=90%	1381	DESIG=277
$e^\pm \mu^\mp$	LF	< 1.6	$\times 10^{-7}$	CL=90%	1547	DESIG=177
$e^\pm \tau^\mp$	LF	< 7.5	$\times 10^{-8}$	CL=90%	1039	DESIG=178
$\mu^\pm \tau^\mp$	LF	< 2.0	$\times 10^{-6}$	CL=90%	1035	DESIG=179
$p e^- + c.c.$	L,B	< 3.1	$\times 10^{-8}$	CL=90%	1406	DESIG=484
$\Lambda_c^+ e^- + c.c.$		< 6.9	$\times 10^{-8}$	CL=90%	704	DESIG=379
Other decays						
invisible		< 7	$\times 10^{-4}$	CL=90%	—	NODE=M070;CLUMP=F DESIG=240

 $\chi_{c0}(1P)$

$$J^{PC} = 0^+(0^{++})$$

Mass $m = 3414.71 \pm 0.30$ MeVFull width $\Gamma = 11.1 \pm 0.7$ MeV ($S = 1.2$)

NODE=M056

NODE=M056M;DTYPE=M

NODE=M056W;DTYPE=G

$\chi_{c0}(1P)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)	
Hadronic decays				NODE=M056215;NODE=M056;CLUMP=A
$2(\pi^+\pi^-)$	$(2.14 \pm 0.11) \%$	S=1.2	1679	DESIG=3
$\rho^0\pi^+\pi^-$	$(8.4 \pm 2.7) \times 10^{-3}$		1607	DESIG=9
$f_0(980)f_0(980)$	$(6.6 \pm 2.1) \times 10^{-4}$		1391	DESIG=20
$\pi^+\pi^-\pi^0\pi^0$	$(3.3 \pm 0.4) \%$		1680	DESIG=61
$\rho^+\pi^-\pi^0 + \text{c.c.}$	$(2.8 \pm 0.4) \%$		1607	DESIG=62
$4\pi^0$	$(3.2 \pm 0.4) \times 10^{-3}$		1681	DESIG=70
$\pi^+\pi^-K^+K^-$	$(1.78 \pm 0.16) \%$	S=1.2	1580	DESIG=5
$K_0^*(1430)^0\bar{K}_0^*(1430)^0 \rightarrow \pi^+\pi^-K^+K^-$	$(9.7 \pm_{-2.8}^{+4.0}) \times 10^{-4}$		—	DESIG=31
$K_0^*(1430)^0\bar{K}_2^*(1430)^0 + \text{c.c.} \rightarrow \pi^+\pi^-K^+K^-$	$(7.9 \pm_{-2.4}^{+1.9}) \times 10^{-4}$		—	DESIG=32
$K_1(1270)^+K^- + \text{c.c.} \rightarrow \pi^+\pi^-K^+K^-$	$(6.2 \pm 1.9) \times 10^{-3}$		—	DESIG=33
$K_1(1400)^+K^- + \text{c.c.} \rightarrow \pi^+\pi^-K^+K^-$	$< 2.7 \times 10^{-3}$	CL=90%	—	DESIG=34
$f_0(980)f_0(980)$	$(1.6 \pm_{-0.9}^{+1.0}) \times 10^{-4}$		1391	DESIG=23
$f_0(980)f_0(2200)$	$(7.8 \pm_{-2.5}^{+2.0}) \times 10^{-4}$		586	DESIG=24
$f_0(1370)f_0(1370)$	$< 2.7 \times 10^{-4}$	CL=90%	1019	DESIG=25
$f_0(1370)f_0(1500)$	$< 1.7 \times 10^{-4}$	CL=90%	907	DESIG=26
$f_0(1370)f_0(1710)$	$(6.6 \pm_{-2.3}^{+3.5}) \times 10^{-4}$		709	DESIG=27
$f_0(1500)f_0(1370)$	$< 1.3 \times 10^{-4}$	CL=90%	907	DESIG=28
$f_0(1500)f_0(1500)$	$< 5 \times 10^{-5}$	CL=90%	774	DESIG=29
$f_0(1500)f_0(1710)$	$< 7 \times 10^{-5}$	CL=90%	515	DESIG=30
$K^+K^-\pi^+\pi^-\pi^0$	$(8.7 \pm 1.0) \times 10^{-3}$	S=1.2	1545	DESIG=75
$K_S^0K^\pm\pi^\mp\pi^+\pi^-$	$(4.1 \pm 0.4) \times 10^{-3}$		1543	DESIG=87
$K^+K^-\pi^0\pi^0$	$(5.5 \pm 0.9) \times 10^{-3}$		1582	DESIG=63
$K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$	$(2.46 \pm 0.33) \%$		1581	DESIG=65
$\rho^+K^-K^0 + \text{c.c.}$	$(1.19 \pm 0.21) \%$		1458	DESIG=66
$K^*(892)^-K^+\pi^0 \rightarrow K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$	$(4.6 \pm 1.2) \times 10^{-3}$		—	DESIG=67
$K_S^0K_S^0\pi^+\pi^-$	$(5.6 \pm 1.0) \times 10^{-3}$		1579	DESIG=41
$K^+K^-\eta\pi^0$	$(3.0 \pm 0.7) \times 10^{-3}$		1468	DESIG=68
$3(\pi^+\pi^-)$	$(1.99 \pm 0.22) \%$	S=3.0	1633	DESIG=4
$K^+\bar{K}^*(892)^0\pi^- + \text{c.c.}$	$(7.3 \pm 1.6) \times 10^{-3}$		1523	DESIG=10
$K^*(892)^0\bar{K}^*(892)^0$	$(1.7 \pm 0.6) \times 10^{-3}$		1456	DESIG=21
$\pi\pi$	$(8.4 \pm 0.4) \times 10^{-3}$	S=1.4	1702	DESIG=18
$\pi^0\eta$	$< 1.7 \times 10^{-4}$		1661	DESIG=35
$\pi^0\eta'$	$< 1.1 \times 10^{-3}$		1570	DESIG=36
$\pi^0\eta_c$	$< 1.6 \times 10^{-3}$	CL=90%	383	DESIG=86
$\eta\eta$	$(2.97 \pm 0.24) \times 10^{-3}$	S=1.3	1617	DESIG=13
$\eta\eta'$	$(9.0 \pm 1.1) \times 10^{-5}$		1521	DESIG=37
$\eta'\eta'$	$(2.14 \pm 0.12) \times 10^{-3}$		1413	DESIG=46
$\omega\omega$	$(1.03 \pm 0.05) \times 10^{-3}$		1517	DESIG=22
$\omega\phi$	$(1.22 \pm 0.10) \times 10^{-4}$	S=1.4	1447	DESIG=76
ωK^+K^-	$(1.89 \pm 0.20) \times 10^{-3}$		1457	DESIG=88
K^+K^-	$(5.97 \pm 0.34) \times 10^{-3}$	S=1.1	1634	DESIG=2
$K_S^0K_S^0$	$(3.12 \pm 0.19) \times 10^{-3}$	S=1.1	1633	DESIG=15
$\pi^+\pi^-\eta$	$< 2.0 \times 10^{-4}$	CL=90%	1651	DESIG=50
$2\pi^+2\pi^-\eta$	$(4.5 \pm 0.4) \times 10^{-3}$		1615	DESIG=110
$\pi^+\pi^-\eta'$	$< 3.5 \times 10^{-4}$	CL=90%	1560	DESIG=53
$\bar{K}^0K^+\pi^- + \text{c.c.}$	$< 9 \times 10^{-5}$	CL=90%	1610	DESIG=17
$K^+K^-\pi^0$	$< 6 \times 10^{-5}$	CL=90%	1611	DESIG=47
$K^+K^-\eta$	$< 2.2 \times 10^{-4}$	CL=90%	1512	DESIG=51
$K^+K^-K_S^0K_S^0$	$(1.4 \pm 0.5) \times 10^{-3}$		1331	DESIG=42
$K_S^0K_S^0K_S^0K_S^0$	$(5.7 \pm 0.5) \times 10^{-4}$		1327	DESIG=94

$K^+ K^- K^+ K^-$	$(2.8 \pm 0.4) \times 10^{-3}$	S=1.5	1333	DESIG=14
$K^+ K^- \phi$	$(9.6 \pm 2.4) \times 10^{-4}$		1381	DESIG=44
$\bar{K}^0 K^+ \pi^- \phi + \text{c.c.}$	$(3.7 \pm 0.6) \times 10^{-3}$		1326	DESIG=91
$K^+ K^- \pi^0 \phi$	$(1.90 \pm 0.35) \times 10^{-3}$		1329	DESIG=92
$K_S^0 K_S^0 K_S^0 K^\pm \pi^\mp$	$(7.8 \pm 0.8) \times 10^{-5}$		1261	DESIG=111
$3(K^+ K^-)$	$(1.06 \pm 0.21) \times 10^{-5}$		693	DESIG=106
$\phi \pi^+ \pi^- \pi^0$	$(1.18 \pm 0.15) \times 10^{-3}$		1525	DESIG=89
$\phi \phi$	$(8.4 \pm 0.4) \times 10^{-4}$	S=1.2	1370	DESIG=16
$\phi \phi \eta$	$(8.3 \pm 1.0) \times 10^{-4}$		1100	DESIG=96
$p \bar{p}$	$(2.38 \pm 0.13) \times 10^{-4}$	S=2.0	1426	DESIG=11
$p \bar{p} \pi^0$	$(6.9 \pm 0.7) \times 10^{-4}$	S=1.3	1379	DESIG=48
$p \bar{p} \eta$	$(3.5 \pm 0.4) \times 10^{-4}$		1187	DESIG=52
$p \bar{p} \omega$	$(5.2 \pm 0.6) \times 10^{-4}$		1043	DESIG=69
$p \bar{p} \pi^+ \pi^-$	$(2.1 \pm 0.7) \times 10^{-3}$	S=1.4	1320	DESIG=8
$p \bar{p} \pi^0 \pi^0$	$(1.02 \pm 0.28) \times 10^{-3}$		1324	DESIG=64
$p \bar{p} \eta \pi^0$	$(2.38 \pm 0.20) \times 10^{-4}$		1107	DESIG=112
$p \bar{p} K^+ K^-$	$(2.51 \pm 0.17) \times 10^{-4}$		890	DESIG=113
$p \bar{p} K^+ K^- (\text{non-resonant})$	$(1.20 \pm 0.26) \times 10^{-4}$		890	DESIG=71
$K^+ \bar{p} \Lambda(1520) + \text{c.c.}$	$(2.9 \pm 0.7) \times 10^{-4}$		859	DESIG=72
$\Lambda(1520) \bar{\Lambda}(1520)$	$(3.1 \pm 1.2) \times 10^{-4}$		780	DESIG=73
$p \bar{p} \phi$	$(5.9 \pm 1.4) \times 10^{-5}$		876	DESIG=74
$p \bar{p} K_S^0 K_S^0$	$< 8 \times 10^{-4}$	CL=90%	884	DESIG=40
$p \bar{p} K_S^0 K^- \pi^+ + \text{c.c.}$	$(2.6 \pm 0.4) \times 10^{-5}$		763	DESIG=107
$p \bar{n} \pi^-$	$(1.25 \pm 0.11) \times 10^{-3}$		1376	DESIG=43
$\bar{p} n \pi^+$	$(1.35 \pm 0.12) \times 10^{-3}$		1376	DESIG=82
$p \bar{n} \pi^- \pi^0$	$(2.31 \pm 0.21) \times 10^{-3}$		1321	DESIG=83
$\bar{p} n \pi^+ \pi^0$	$(2.18 \pm 0.19) \times 10^{-3}$		1321	DESIG=84
$\Lambda \bar{\Lambda}$	$(3.55 \pm 0.17) \times 10^{-4}$	S=1.1	1292	DESIG=19
$\Lambda \bar{\Lambda} \pi^+ \pi^-$	$(1.16 \pm 0.13) \times 10^{-3}$		1153	DESIG=38
$\Lambda \bar{\Lambda} \pi^+ \pi^- (\text{non-resonant})$	$< 5 \times 10^{-4}$	CL=90%	1153	DESIG=77
$\Sigma(1385)^+ \bar{\Lambda} \pi^- + \text{c.c.}$	$< 5 \times 10^{-4}$	CL=90%	1083	DESIG=78
$\Sigma(1385)^- \bar{\Lambda} \pi^+ + \text{c.c.}$	$< 5 \times 10^{-4}$	CL=90%	1083	DESIG=79
$\Lambda \bar{\Lambda} \eta$	$(2.3 \pm 0.4) \times 10^{-4}$		979	DESIG=102
$\Lambda \bar{\Lambda} \omega$	$(2.34 \pm 0.33) \times 10^{-4}$		781	DESIG=105
$\Lambda \bar{\Lambda} \phi$	$(2.9 \pm 1.2) \times 10^{-5}$		499	DESIG=104
$K^+ \bar{p} \Lambda + \text{c.c.}$	$(1.23 \pm 0.12) \times 10^{-3}$	S=1.3	1132	DESIG=49
$n K_S^0 \bar{\Lambda} + \text{c.c.}$	$(6.6 \pm 0.5) \times 10^{-4}$		1129	DESIG=101
$K^*(892)^+ \bar{p} \Lambda + \text{c.c.}$	$(4.7 \pm 0.9) \times 10^{-4}$		845	DESIG=98
$\bar{p} \Lambda(1520) K_S^0 \pi^+ + \text{c.c.}$	$(1.6 \pm 0.7) \times 10^{-5}$		722	DESIG=108
$\Sigma^0 \bar{\Sigma}^0$	$(4.62 \pm 0.32) \times 10^{-4}$		1222	DESIG=58
$\Sigma^+ \bar{p} K_S^0 + \text{c.c.}$	$(3.48 \pm 0.27) \times 10^{-4}$		1089	DESIG=97
$\Sigma^0 \bar{p} K^+ + \text{c.c.}$	$(3.00 \pm 0.20) \times 10^{-4}$		1090	DESIG=100
$\Sigma^+ \bar{\Sigma}^-$	$(4.6 \pm 0.8) \times 10^{-4}$	S=2.5	1225	DESIG=59
$\Sigma^+ \bar{\Sigma}^- \eta$	$(1.24 \pm 0.24) \times 10^{-4}$		868	DESIG=109
$\Sigma^- \bar{\Sigma}^+$	$(5.1 \pm 0.5) \times 10^{-4}$		1217	DESIG=99
$\Sigma(1385)^+ \bar{\Sigma}(1385)^-$	$(1.6 \pm 0.6) \times 10^{-4}$		1001	DESIG=80
$\Sigma(1385)^- \bar{\Sigma}(1385)^+$	$(2.3 \pm 0.6) \times 10^{-4}$		1001	DESIG=81
$K^- \Lambda \bar{\Xi}^+ + \text{c.c.}$	$(1.92 \pm 0.35) \times 10^{-4}$		873	DESIG=85
$\Xi^0 \bar{\Xi}^0$	$(4.4 \pm 0.5) \times 10^{-4}$	S=1.7	1089	DESIG=60
$\Xi^- \bar{\Xi}^+$	$(4.40 \pm 0.20) \times 10^{-4}$		1081	DESIG=39
$\Omega^- \bar{\Omega}^+$	$(3.5 \pm 0.6) \times 10^{-5}$		343	DESIG=103
$\eta_c \pi^+ \pi^-$	$< 7 \times 10^{-4}$	CL=90%	307	DESIG=90

Radiative decays

$\gamma J/\psi(1S)$	$(1.36 \pm 0.09) \%$	S=1.9	303
$\gamma \rho^0$	$< 9 \times 10^{-6}$	CL=90%	1619
$\gamma \omega$	$< 8 \times 10^{-6}$	CL=90%	1618
$\gamma \phi$	$< 6 \times 10^{-6}$	CL=90%	1555
$\gamma \gamma$	$(2.05 \pm 0.11) \times 10^{-4}$	S=1.3	1707
$e^+ e^- J/\psi(1S)$	$(1.29 \pm 0.29) \times 10^{-4}$		303
$\mu^+ \mu^- J/\psi(1S)$	$< 1.8 \times 10^{-5}$	CL=90%	226

NODE=M056;CLUMP=B

DESIG=6

DESIG=55

DESIG=56

DESIG=57

DESIG=7

DESIG=93

DESIG=95

 $\chi_{c1}(1P)$

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

NODE=M055

Mass $m = 3510.67 \pm 0.05$ MeV (S = 1.2)

NODE=M055M;DTYPE=M

Full width $\Gamma = 0.82 \pm 0.04$ MeV (S = 1.1)

NODE=M055W;DTYPE=G

$\chi_{c1}(1P)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
$e^+ e^-$	$(1.5^{+1.6}_{-1.0}) \times 10^{-7}$		1755

NODE=M055215;DESIG=110

Hadronic decays

$3(\pi^+ \pi^-)$	$(1.06 \pm 0.11) \%$	S=3.0	1683
$2(\pi^+ \pi^-)$	$(6.6 \pm 0.7) \times 10^{-3}$	S=2.3	1728
$\pi^+ \pi^- \pi^0 \pi^0$	$(1.18 \pm 0.15) \%$		1729
$\rho^+ \pi^- \pi^0 + \text{c.c.}$	$(1.44 \pm 0.24) \%$		1658
$\rho^0 \pi^+ \pi^-$	$(3.9 \pm 3.5) \times 10^{-3}$		1658
$4\pi^0$	$(5.3 \pm 0.8) \times 10^{-4}$		1729
$\pi^+ \pi^- K^+ K^-$	$(4.5 \pm 1.0) \times 10^{-3}$		1632
$K^+ K^- \pi^0 \pi^0$	$(1.10 \pm 0.27) \times 10^{-3}$		1634
$K^+ K^- \pi^+ \pi^- \pi^0$	$(1.15 \pm 0.13) \%$		1598
$K_S^0 K^\pm \pi^\mp \pi^\pm \pi^-$	$(7.5 \pm 0.8) \times 10^{-3}$		1596
$K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.}$	$(8.5 \pm 1.3) \times 10^{-3}$		1632
$\rho^- K^+ \bar{K}^0 + \text{c.c.}$	$(5.0 \pm 1.2) \times 10^{-3}$		1514
$K^*(892)^0 \bar{K}^0 \pi^0 \rightarrow$	$(2.3 \pm 0.6) \times 10^{-3}$		—
$K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.}$			
$K^+ K^- \eta \pi^0$	$(1.10 \pm 0.34) \times 10^{-3}$		1523
$\pi^+ \pi^- K_S^0 K_S^0$	$(6.8 \pm 2.9) \times 10^{-4}$		1630
$K^+ K^- \eta$	$(3.1 \pm 1.0) \times 10^{-4}$		1566
$\bar{K}^0 K^+ \pi^- + \text{c.c.}$	$(6.9 \pm 0.6) \times 10^{-3}$	S=1.1	1661
$K^*(892)^0 \bar{K}^0 + \text{c.c.}$	$(1.04 \pm 0.15) \times 10^{-3}$		1602
$K^*(892)^+ K^- + \text{c.c.}$	$(1.22 \pm 0.23) \times 10^{-3}$		1602
$K_J^*(1430)^0 \bar{K}^0 + \text{c.c.} \rightarrow$	$< 8 \times 10^{-4}$	CL=90%	—
$K_S^0 K^+ \pi^- + \text{c.c.}$			
$K_J^*(1430)^+ K^- + \text{c.c.} \rightarrow$	$< 2.1 \times 10^{-3}$	CL=90%	—
$K_S^0 K^+ \pi^- + \text{c.c.}$			
$K^+ K^- \pi^0$	$(1.80 \pm 0.24) \times 10^{-3}$		1662
$\eta \pi^+ \pi^-$	$(4.58 \pm 0.23) \times 10^{-3}$		1701
$a_0(980)^+ \pi^- + \text{c.c.} \rightarrow \eta \pi^+ \pi^-$	$(3.2 \pm 0.4) \times 10^{-3}$	S=2.1	—
$a_2(1320)^+ \pi^- + \text{c.c.} \rightarrow \eta \pi^+ \pi^-$	$(1.75 \pm 0.24) \times 10^{-4}$		—
$a_2(1700)^+ \pi^- + \text{c.c.} \rightarrow \eta \pi^+ \pi^-$	$(4.6 \pm 0.7) \times 10^{-5}$		—
$f_2(1270) \eta \rightarrow \eta \pi^+ \pi^-$	$(3.5 \pm 0.6) \times 10^{-4}$		—
$f_4(2050) \eta \rightarrow \eta \pi^+ \pi^-$	$(2.5 \pm 0.9) \times 10^{-5}$		—
$\pi_1(1400)^+ \pi^- + \text{c.c.} \rightarrow$	$< 4 \times 10^{-5}$	CL=90%	—
$\eta \pi^+ \pi^-$			
$\pi_1(1600)^+ \pi^- + \text{c.c.} \rightarrow$	$< 1.5 \times 10^{-5}$	CL=90%	—
$\eta \pi^+ \pi^-$			
$\pi_1(2015)^+ \pi^- + \text{c.c.} \rightarrow$	$< 8 \times 10^{-6}$	CL=90%	—
$\eta \pi^+ \pi^-$			
$2\pi^+ 2\pi^- \eta$	$(8.0 \pm 0.8) \times 10^{-3}$		1666
$f_2(1270) \eta$	$(6.6 \pm 1.1) \times 10^{-4}$		1467
$\pi^+ \pi^- \eta'$	$(2.2 \pm 0.4) \times 10^{-3}$		1612
$K^+ K^- \eta'(958)$	$(8.3 \pm 0.4) \times 10^{-4}$		1461

NODE=M055;CLUMP=A

DESIG=6

DESIG=5

DESIG=51

DESIG=52

DESIG=9

DESIG=60

DESIG=7

DESIG=53

DESIG=79

DESIG=84

DESIG=55

DESIG=56

DESIG=57

DESIG=58

DESIG=28

DESIG=42

DESIG=17

DESIG=32

DESIG=33

DESIG=34

DESIG=35

DESIG=38

DESIG=31

DESIG=36

DESIG=93

DESIG=96

DESIG=94

DESIG=95

DESIG=97

DESIG=98

DESIG=99

DESIG=123

DESIG=37

DESIG=44

DESIG=85

$K_0^*(1430)^+ K^- + \text{c.c.}$	$(6.4^{+2.2}_{-2.8}) \times 10^{-4}$	—	DESIG=86
$f_0(980)\eta'(958)$	$(1.6^{+1.4}_{-0.7}) \times 10^{-4}$	1460	DESIG=87
$f_0(1710)\eta'(958)$	$(7^{+7}_{-5}) \times 10^{-5}$	1100	DESIG=88
$f_2'(1525)\eta'(958)$	$(9 \pm 6) \times 10^{-5}$	1229	DESIG=89
$K_2^*(1430)^+ K^- + \text{c.c.}$	$(1.63 \pm 0.31) \times 10^{-3}$	1416	DESIG=115
$K_2^*(1430) \bar{K}^0 + \text{c.c.}$	$(1.18 \pm 0.20) \times 10^{-3}$	1416	DESIG=116
$\pi^0 f_0(980) \rightarrow \pi^0 \pi^+ \pi^-$	$(3.5 \pm 0.9) \times 10^{-7}$	—	DESIG=61
$K^+ \bar{K}^*(892)^0 \pi^- + \text{c.c.}$	$(3.2 \pm 2.1) \times 10^{-3}$	1577	DESIG=10
$K^*(892)^0 \bar{K}^*(892)^0$	$(1.4 \pm 0.4) \times 10^{-3}$	1512	DESIG=21
$K^+ K^- K_S^0 K_S^0$	$< 4 \times 10^{-4}$	CL=90% 1390	DESIG=29
$K_S^0 K_S^0 K_S^0 K_S^0$	$(3.5 \pm 1.0) \times 10^{-5}$	1387	DESIG=102
$K^+ K^- K^+ K^-$	$(5.3 \pm 1.1) \times 10^{-4}$	1393	DESIG=14
$K^+ K^- \phi$	$(4.1 \pm 1.5) \times 10^{-4}$	1440	DESIG=30
$\bar{K}^0 K^+ \pi^- \phi + \text{c.c.}$	$(3.3 \pm 0.5) \times 10^{-3}$	1387	DESIG=90
$K^+ K^- \pi^0 \phi$	$(1.62 \pm 0.30) \times 10^{-3}$	1390	DESIG=91
$K_S^0 K_S^0 K_S^0 K^\pm \pi^\mp$	$(2.60 \pm 0.22) \times 10^{-4}$	1322	DESIG=124
$3(K^+ K^-)$	$(4.2 \pm 1.1) \times 10^{-6}$	779	DESIG=119
$\phi \pi^+ \pi^- \pi^0$	$(7.5 \pm 1.0) \times 10^{-4}$	1578	DESIG=82
$\omega \omega$	$(6.26 \pm 0.30) \times 10^{-4}$	1571	DESIG=66
$\omega K^+ K^-$	$(7.8 \pm 0.9) \times 10^{-4}$	1513	DESIG=81
$\omega \phi$	$(2.13 \pm 0.30) \times 10^{-5}$	S=1.5 1503	DESIG=67
$\phi \phi$	$(4.22 \pm 0.20) \times 10^{-4}$	1429	DESIG=68
$\phi \phi \eta$	$(2.9 \pm 0.5) \times 10^{-4}$	1172	DESIG=104
$p \bar{p}$	$(7.97 \pm 0.29) \times 10^{-5}$	S=1.3 1484	DESIG=11
$p \bar{p} \pi^0$	$(1.54 \pm 0.18) \times 10^{-4}$	1438	DESIG=39
$p \bar{p} \eta$	$(1.44 \pm 0.24) \times 10^{-4}$	1254	DESIG=43
$p \bar{p} \omega$	$(2.10 \pm 0.30) \times 10^{-4}$	1117	DESIG=59
$p \bar{p} \pi^+ \pi^-$	$(5.0 \pm 1.9) \times 10^{-4}$	1381	DESIG=8
$p \bar{p} \pi^0 \pi^0$	$< 5 \times 10^{-4}$	CL=90% 1385	DESIG=54
$p \bar{p} \eta \pi^0$	$(1.93 \pm 0.13) \times 10^{-4}$	1179	DESIG=125
$p \bar{p} K^+ K^-$	$(1.86 \pm 0.12) \times 10^{-4}$	974	DESIG=126
$p \bar{p} K^+ K^- (\text{non-resonant})$	$(1.26 \pm 0.22) \times 10^{-4}$	974	DESIG=62
$K^+ \bar{p} \Lambda(1520) + \text{c.c.}$	$(1.7 \pm 0.4) \times 10^{-4}$	951	DESIG=63
$\Lambda(1520) \bar{\Lambda}(1520)$	$< 9 \times 10^{-5}$	CL=90% 880	DESIG=64
$p \bar{p} \phi$	$< 1.7 \times 10^{-5}$	CL=90% 962	DESIG=65
$p \bar{p} K_S^0 K_S^0$	$< 4.5 \times 10^{-4}$	CL=90% 968	DESIG=25
$p \bar{p} K_S^0 K^- \pi^+ + \text{c.c.}$	$(4.1 \pm 0.5) \times 10^{-5}$	857	DESIG=120
$p \bar{n} \pi^-$	$(3.8 \pm 0.5) \times 10^{-4}$	1435	DESIG=74
$\bar{p} n \pi^+$	$(3.9 \pm 0.5) \times 10^{-4}$	1435	DESIG=75
$p \bar{n} \pi^- \pi^0$	$(1.02 \pm 0.12) \times 10^{-3}$	1383	DESIG=76
$\bar{p} n \pi^+ \pi^0$	$(9.9 \pm 1.2) \times 10^{-4}$	1383	DESIG=77
$\Lambda \bar{\Lambda}$	$(1.26 \pm 0.09) \times 10^{-4}$	S=1.1 1355	DESIG=19
$\Lambda \bar{\Lambda} \pi^+ \pi^-$	$(2.9 \pm 0.5) \times 10^{-4}$	1223	DESIG=24
$\Lambda \bar{\Lambda} \pi^+ \pi^- (\text{non-resonant})$	$(2.4 \pm 0.6) \times 10^{-4}$	1223	DESIG=69
$\Sigma(1385)^+ \bar{\Lambda} \pi^- + \text{c.c.}$	$< 1.3 \times 10^{-4}$	CL=90% 1157	DESIG=70
$\Sigma(1385)^- \bar{\Lambda} \pi^+ + \text{c.c.}$	$< 1.3 \times 10^{-4}$	CL=90% 1157	DESIG=71
$\Lambda \bar{\Lambda} \eta$	$(5.8 \pm 1.5) \times 10^{-5}$	1059	DESIG=111
$\Lambda \bar{\Lambda} \omega$	$(9.9 \pm 1.5) \times 10^{-5}$	877	DESIG=118
$\Lambda \bar{\Lambda} \phi$	$(5.9 \pm 1.0) \times 10^{-5}$	634	DESIG=117
$K^+ \bar{p} \Lambda + \text{c.c.}$	$(4.1 \pm 0.4) \times 10^{-4}$	S=1.2 1203	DESIG=40
$n K_S^0 \bar{\Lambda} + \text{c.c.}$	$(1.64 \pm 0.17) \times 10^{-4}$	1200	DESIG=109
$\bar{p} \Lambda(1520) K_S^0 \pi^+ + \text{c.c.}$	$(4.0 \pm 0.9) \times 10^{-5}$	829	DESIG=121
$K^*(892)^+ \bar{p} \Lambda + \text{c.c.}$	$(4.9 \pm 0.7) \times 10^{-4}$	935	DESIG=106
$\Sigma^0 \bar{\Sigma}^0$	$(4.2 \pm 0.6) \times 10^{-5}$	1288	DESIG=48
$\Sigma^+ \bar{p} K_S^0 + \text{c.c.}$	$(1.51 \pm 0.12) \times 10^{-4}$	1163	DESIG=105

$\Sigma^0 \bar{p} K^+ + \text{c.c.}$	$(1.44 \pm 0.10) \times 10^{-4}$	1163	DESIG=108
$\Sigma^+ \bar{\Sigma}^-$	$(3.6 \pm 0.6) \times 10^{-5}$	1291	DESIG=49
$\Sigma^+ \bar{\Sigma}^- \eta$	$(5.0 \pm 1.4) \times 10^{-5}$	958	DESIG=122
$\Sigma^- \bar{\Sigma}^+$	$(5.6 \pm 1.5) \times 10^{-5}$	1283	DESIG=107
$\Sigma(1385)^+ \bar{\Sigma}(1385)^-$	$< 9 \times 10^{-5}$	CL=90% 1081	DESIG=72
$\Sigma(1385)^- \bar{\Sigma}(1385)^+$	$< 5 \times 10^{-5}$	CL=90% 1081	DESIG=73
$K^- \Lambda \Xi^+ + \text{c.c.}$	$(1.34 \pm 0.24) \times 10^{-4}$	963	DESIG=92
$\Xi^0 \Xi^0$	$(7.4 \pm 1.2) \times 10^{-5}$	1163	DESIG=50
$\Xi^- \Xi^+$	$(5.9 \pm 0.6) \times 10^{-5}$	1155	DESIG=26
$\Omega^- \bar{\Omega}^+$	$(1.49 \pm 0.25) \times 10^{-5}$	533	DESIG=113
$\pi^+ \pi^- + K^+ K^-$	$< 2.1 \times 10^{-3}$	—	DESIG=23
$K_S^0 K_S^0$	$< 6 \times 10^{-5}$	CL=90% 1683	DESIG=27
$\eta_c \pi^+ \pi^-$	$< 3.2 \times 10^{-3}$	CL=90% 413	DESIG=83

Radiative decays

$\gamma J/\psi(1S)$	$(33.8 \pm 1.2) \%$	S=1.3 389	NODE=M055;CLUMP=B DESIG=1
$\gamma \rho^0$	$(2.14 \pm 0.17) \times 10^{-4}$	1670	DESIG=45
$\gamma \omega$	$(6.7 \pm 0.8) \times 10^{-5}$	1668	DESIG=46
$\gamma \phi$	$(2.4 \pm 0.5) \times 10^{-5}$	1607	DESIG=47
$\gamma \gamma$	$< 6.3 \times 10^{-6}$	CL=90% 1755	DESIG=4
$e^+ e^- J/\psi(1S)$	$(3.42 \pm 0.23) \times 10^{-3}$	389	DESIG=100
$\mu^+ \mu^- J/\psi(1S)$	$(2.30 \pm 0.29) \times 10^{-4}$	335	DESIG=103

 $h_c(1P)$

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

Mass $m = 3525.37 \pm 0.14$ MeV (S = 1.2)Full width $\Gamma = 0.78 \pm 0.28$ MeV

NODE=M144

NODE=M144M;DTYPE=M

NODE=M144W;DTYPE=G

$h_c(1P)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)	
$J/\psi(1S) \pi^0$	$< 5 \times 10^{-4}$	CL=90%	382	NODE=M144215;DESIG=1
$J/\psi(1S) \pi \pi$	$< 9 \times 10^{-5}$	CL=90%	312	DESIG=2
$J/\psi(1S) \pi^+ \pi^-$	$< 9 \times 10^{-4}$	CL=90%	305	DESIG=10
$p \bar{p}$	$< 4 \times 10^{-5}$	CL=90%	1492	DESIG=3
$p \bar{p} \pi^0$	$< 8 \times 10^{-4}$	CL=90%	1447	DESIG=24
$p \bar{p} \pi^+ \pi^-$	$(3.3 \pm 0.6) \times 10^{-3}$		1390	DESIG=11
$p \bar{p} \pi^0 \pi^0$	$< 6 \times 10^{-4}$	CL=90%	1394	DESIG=13
$p \bar{p} \pi^+ \pi^- \pi^0$	$(4.4 \pm 1.3) \times 10^{-3}$		1331	DESIG=25
$p \bar{p} \eta$	$(7.4 \pm 2.2) \times 10^{-4}$		1264	DESIG=23
$\pi^+ \pi^- \pi^0$	$(1.57 \pm 0.13) \times 10^{-3}$		1749	DESIG=5
$\pi^+ \pi^- \eta$	$< 5 \times 10^{-4}$	CL=90%	1709	DESIG=31
$\pi^+ \pi^- \pi^0 \eta$	$(8.3 \pm 2.4) \times 10^{-3}$		1695	DESIG=14
$2\pi^+ 2\pi^- \pi^0 \eta$	$(7.2 \pm 1.7) \times 10^{-3}$		1648	DESIG=29
$2\pi^+ 2\pi^- \pi^0$	$(9.4 \pm 1.7) \times 10^{-3}$		1716	DESIG=6
$2\pi^+ 2\pi^- \eta$	$< 6 \times 10^{-4}$	CL=90%	1674	DESIG=30
$3\pi^+ 3\pi^- \pi^0$	$(9.1 \pm 1.5) \times 10^{-3}$		1661	DESIG=7
$2\pi^+ 2\pi^- \omega$	$(3.9 \pm 1.0) \times 10^{-3}$		1627	DESIG=28
$K^+ K^- \pi^+ \pi^-$	$< 7 \times 10^{-4}$	CL=90%	1640	DESIG=12
$K^+ K^- \pi^+ \pi^- \pi^0$	$(3.8 \pm 0.8) \times 10^{-3}$		1606	DESIG=15
$K^+ K^- \pi^+ \pi^- \eta$	$< 2.7 \times 10^{-3}$	CL=90%	1480	DESIG=16
$K^+ K^- \pi^0$	$(3.8 \pm 0.9) \times 10^{-4}$		1670	DESIG=17
$K^+ K^- \pi^0 \eta$	$< 2.4 \times 10^{-3}$	CL=90%	1532	DESIG=18
$K^+ K^- \eta$	$(3.6 \pm 1.2) \times 10^{-4}$		1574	DESIG=19
$2K^+ 2K^- \pi^0$	$< 2.8 \times 10^{-4}$	CL=90%	1339	DESIG=20
$K_S^0 K^\pm \pi^\mp$	$(7.1 \pm 1.9) \times 10^{-4}$		1668	DESIG=21
$K_S^0 K^\pm \pi^\mp \pi^+ \pi^-$	$(3.2 \pm 1.0) \times 10^{-3}$		1604	DESIG=22

Radiative decays

$\gamma\eta$	$(3.8 \pm 0.6) \times 10^{-4}$	1720	NODE=M144;CLUMP=R
$\gamma\eta'(958)$	$(1.41 \pm 0.15) \times 10^{-3}$	1633	DESIG=9
$\gamma\pi^0$	$< 5 \times 10^{-5}$	1760	DESIG=8
$\gamma\eta_c(1S)$	$(64 \pm 5) \%$	S=1.2 500	DESIG=32
$\gamma\pi^+\pi^-$	$(3.0 \pm 0.7) \times 10^{-4}$	1757	DESIG=4
$\gamma\pi^+\pi^-\eta$	$(3.5 \pm 0.6) \times 10^{-3}$	1709	DESIG=34
$\gamma 2\pi^+ 2\pi^-$	$(2.18 \pm 0.30) \times 10^{-3}$	1735	DESIG=35
$\gamma p\bar{p}$	$(3.3 \pm 0.7) \times 10^{-4}$	1492	DESIG=37
$e^+e^-\eta_c(1S)$	$(3.8 \pm 0.8) \times 10^{-3}$	500	DESIG=38
$\gamma f_2(1270) \rightarrow \gamma\pi^+\pi^-$	$(1.8 \pm 0.4) \times 10^{-4}$	—	DESIG=33
			DESIG=39

 $\chi_{c2}(1P)$

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

Mass $m = 3556.17 \pm 0.07$ MeVFull width $\Gamma = 1.92 \pm 0.09$ MeV (S = 1.1)

NODE=M057

NODE=M057M;DTYPE=M

NODE=M057W;DTYPE=G

$\chi_{c2}(1P)$ DECAY MODES

Fraction (Γ_i/Γ) Scale factor/
Confidence level p
(MeV/c)

Hadronic decays

$2(\pi^+\pi^-)$	$(1.11 \pm 0.07) \%$	S=1.3 1751	NODE=M057215;NODE=M057;CLUMP=A
$\pi^+\pi^-\pi^0\pi^0$	$(1.83 \pm 0.23) \%$	1752	DESIG=3
$\rho^+\pi^-\pi^0 + \text{c.c.}$	$(2.19 \pm 0.34) \%$	1682	DESIG=50
$4\pi^0$	$(1.11 \pm 0.15) \times 10^{-3}$	1752	DESIG=51
$K^+K^-\pi^0\pi^0$	$(2.1 \pm 0.4) \times 10^{-3}$	1658	DESIG=62
$K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$	$(1.38 \pm 0.20) \%$	1657	DESIG=52
$\rho^-K^+\bar{K}^0 + \text{c.c.}$	$(4.1 \pm 1.2) \times 10^{-3}$	1540	DESIG=54
$K^*(892)^0K^-\pi^+ \rightarrow$	$(2.9 \pm 0.8) \times 10^{-3}$	—	DESIG=55
$K^-\pi^+K^0\pi^0 + \text{c.c.}$			DESIG=60
$K^*(892)^0\bar{K}^0\pi^0 \rightarrow$	$(3.8 \pm 0.9) \times 10^{-3}$	—	DESIG=56
$K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$			
$K^*(892)^-K^+\pi^0 \rightarrow$	$(3.7 \pm 0.8) \times 10^{-3}$	—	DESIG=57
$K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$			
$K^*(892)^+\bar{K}^0\pi^- \rightarrow$	$(2.9 \pm 0.8) \times 10^{-3}$	—	DESIG=58
$K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$			
$K^+K^-\eta\pi^0$	$(1.3 \pm 0.4) \times 10^{-3}$	1549	DESIG=59
$K^+K^-\pi^+\pi^-$	$(8.4 \pm 1.1) \times 10^{-3}$	S=1.2 1656	DESIG=5
$K^+K^-\pi^+\pi^-\pi^0$	$(1.17 \pm 0.13) \%$	1623	DESIG=67
$K_S^0K^\pm\pi^\mp\pi^+\pi^-$	$(7.3 \pm 0.8) \times 10^{-3}$	1621	DESIG=78
$K^+\bar{K}^*(892)^0\pi^- + \text{c.c.}$	$(2.1 \pm 1.1) \times 10^{-3}$	1602	DESIG=10
$K^*(892)^0\bar{K}^*(892)^0$	$(2.3 \pm 0.9) \times 10^{-3}$	S=2.2 1538	DESIG=21
$3(\pi^+\pi^-)$	$(1.53 \pm 0.17) \%$	S=3.4 1707	DESIG=4
$\phi\phi$	$(1.23 \pm 0.07) \times 10^{-3}$	S=1.9 1457	DESIG=16
$\phi\phi\eta$	$(5.3 \pm 0.7) \times 10^{-4}$	1206	DESIG=99
$\omega\omega$	$(8.7 \pm 0.4) \times 10^{-4}$	1597	DESIG=25
ωK^+K^-	$(7.3 \pm 0.9) \times 10^{-4}$	1540	DESIG=79
$\omega\phi$	$(9.9 \pm 1.3) \times 10^{-6}$	1529	DESIG=68
$\pi\pi$	$(2.23 \pm 0.10) \times 10^{-3}$	1773	DESIG=22
$\rho^0\pi^+\pi^-$	$(4.0 \pm 1.7) \times 10^{-3}$	1682	DESIG=9
$\pi^+\pi^-\pi^0(\text{non-resonant})$	$(2.0 \pm 0.4) \times 10^{-5}$	1765	DESIG=95
$\rho(770)^\pm\pi^\mp$	$(6 \pm 4) \times 10^{-6}$	—	DESIG=96
$\pi^+\pi^-\eta$	$(4.8 \pm 1.3) \times 10^{-4}$	1724	DESIG=39
$2\pi^+ 2\pi^- \eta$	$(5.8 \pm 0.6) \times 10^{-3}$	1690	DESIG=113
$\pi^+\pi^-\eta'$	$(5.0 \pm 1.8) \times 10^{-4}$	1636	DESIG=42
$\eta\eta$	$(5.4 \pm 0.4) \times 10^{-4}$	1692	DESIG=14
K^+K^-	$(1.01 \pm 0.14) \times 10^{-3}$	S=2.2 1708	DESIG=2
$K_S^0K_S^0$	$(5.2 \pm 0.4) \times 10^{-4}$	1707	DESIG=15
$K^*(892)^\pm K^\mp$	$(1.44 \pm 0.21) \times 10^{-4}$	1627	DESIG=87
$K^*(892)^0\bar{K}^0 + \text{c.c.}$	$(1.24 \pm 0.27) \times 10^{-4}$	1627	DESIG=88
$K_2^*(1430)^\pm K^\mp$	$(1.48 \pm 0.12) \times 10^{-3}$	—	DESIG=89

$K_2^*(1430)^0 \bar{K}^0 + \text{c.c.}$	$(1.24 \pm 0.17) \times 10^{-3}$	1443	DESIG=90
$K_3^*(1780)^\pm K^\mp$	$(5.2 \pm 0.8) \times 10^{-4}$	—	DESIG=91
$K_3^*(1780)^0 \bar{K}^0 + \text{c.c.}$	$(5.6 \pm 2.1) \times 10^{-4}$	1274	DESIG=92
$a_2(1320)^0 \pi^0$	$(1.29 \pm 0.34) \times 10^{-3}$	—	DESIG=93
$a_2(1320)^\pm \pi^\mp$	$(1.8 \pm 0.6) \times 10^{-3}$	1530	DESIG=94
$\bar{K}^0 K^+ \pi^- + \text{c.c.}$	$(1.28 \pm 0.19) \times 10^{-3}$	1685	DESIG=17
$K^+ K^- \pi^0$	$(3.0 \pm 0.8) \times 10^{-4}$	1686	DESIG=36
$K^+ K^- \eta$	$< 3.2 \times 10^{-4}$	1592	DESIG=40
$K^+ K^- \eta'(958)$	$(1.55 \pm 0.09) \times 10^{-4}$	1488	DESIG=82
$\eta \eta'$	$(2.2 \pm 0.5) \times 10^{-5}$	1600	DESIG=34
$\eta' \eta'$	$(4.6 \pm 0.6) \times 10^{-5}$	1498	DESIG=35
$\pi^+ \pi^- K_S^0 K_S^0$	$(2.2 \pm 0.5) \times 10^{-3}$	1655	DESIG=29
$K^+ K^- K_S^0 K_S^0$	$< 4 \times 10^{-4}$	1418	DESIG=30
$K_S^0 K_S^0 K_S^0 K_S^0$	$(1.14 \pm 0.18) \times 10^{-4}$	1415	DESIG=97
$K^+ K^- K^+ K^-$	$(1.65 \pm 0.22) \times 10^{-3}$	1421	DESIG=24
$K^+ K^- \phi$	$(1.42 \pm 0.29) \times 10^{-3}$	1468	DESIG=32
$\bar{K}^0 K^+ \pi^- \phi + \text{c.c.}$	$(4.8 \pm 0.7) \times 10^{-3}$	1416	DESIG=83
$K^+ K^- \pi^0 \phi$	$(2.7 \pm 0.5) \times 10^{-3}$	1419	DESIG=84
$K_S^0 K_S^0 K_S^0 K^\pm \pi^\mp$	$(1.72 \pm 0.17) \times 10^{-4}$	1351	DESIG=114
$3(K^+ K^-)$	$(7.1 \pm 1.4) \times 10^{-6}$	818	DESIG=109
$\phi \pi^+ \pi^- \pi^0$	$(9.3 \pm 1.2) \times 10^{-4}$	1603	DESIG=80
$p \bar{p}$	$(8.14 \pm 0.34) \times 10^{-5}$	1510	DESIG=11
$p \bar{p} \pi^0$	$(4.7 \pm 0.4) \times 10^{-4}$	1465	DESIG=37
$p \bar{p} \eta$	$(1.74 \pm 0.25) \times 10^{-4}$	1285	DESIG=41
$p \bar{p} \omega$	$(3.6 \pm 0.4) \times 10^{-4}$	1152	DESIG=61
$p \bar{p} \pi^+ \pi^-$	$(1.32 \pm 0.34) \times 10^{-3}$	1410	DESIG=8
$p \bar{p} \pi^0 \pi^0$	$(7.8 \pm 2.4) \times 10^{-4}$	1414	DESIG=53
$p \bar{p} \eta \pi^0$	$(1.31 \pm 0.09) \times 10^{-4}$	1212	DESIG=115
$p \bar{p} K^+ K^-$	$(2.55 \pm 0.17) \times 10^{-4}$	1013	DESIG=116
$p \bar{p} K^+ K^- (\text{non-resonant})$	$(1.91 \pm 0.32) \times 10^{-4}$	1013	DESIG=63
$K^+ \bar{p} \Lambda(1520) + \text{c.c.}$	$(2.8 \pm 0.7) \times 10^{-4}$	992	DESIG=64
$\Lambda(1520) \bar{\Lambda}(1520)$	$(4.6 \pm 1.5) \times 10^{-4}$	924	DESIG=65
$p \bar{p} \phi$	$(2.8 \pm 0.9) \times 10^{-5}$	1002	DESIG=66
$p \bar{p} K_S^0 K_S^0$	$< 7.9 \times 10^{-4}$	1007	DESIG=28
$p \bar{p} K_S^0 K^- \pi^+ + \text{c.c.}$	$(5.6 \pm 0.5) \times 10^{-5}$	900	DESIG=110
$p \bar{n} \pi^-$	$(8.5 \pm 1.0) \times 10^{-4}$	1463	DESIG=31
$\bar{p} n \pi^+$	$(8.9 \pm 0.8) \times 10^{-4}$	1463	DESIG=75
$p \bar{n} \pi^- \pi^0$	$(2.18 \pm 0.18) \times 10^{-3}$	1411	DESIG=76
$\bar{p} n \pi^+ \pi^0$	$(2.11 \pm 0.19) \times 10^{-3}$	1411	DESIG=77
$\Lambda \bar{\Lambda}$	$(1.83 \pm 0.16) \times 10^{-4}$	1384	DESIG=19
$\Lambda \bar{\Lambda} \pi^+ \pi^-$	$(1.26 \pm 0.15) \times 10^{-3}$	1255	DESIG=27
$\Lambda \bar{\Lambda} \pi^+ \pi^- (\text{non-resonant})$	$(6.6 \pm 1.5) \times 10^{-4}$	1255	DESIG=70
$\Sigma(1385)^+ \bar{\Lambda} \pi^- + \text{c.c.}$	$< 4 \times 10^{-4}$	1192	DESIG=71
$\Sigma(1385)^- \bar{\Lambda} \pi^+ + \text{c.c.}$	$< 6 \times 10^{-4}$	1192	DESIG=72
$\Lambda \bar{\Lambda} \eta$	$(1.05 \pm 0.26) \times 10^{-4}$	1096	DESIG=105
$\Lambda \bar{\Lambda} \omega$	$(1.40 \pm 0.21) \times 10^{-4}$	921	DESIG=108
$\Lambda \bar{\Lambda} \phi$	$(7.1 \pm 0.9) \times 10^{-5}$	691	DESIG=107
$K^+ \bar{p} \Lambda + \text{c.c.}$	$(7.8 \pm 0.5) \times 10^{-4}$	1236	DESIG=38
$n K_S^0 \bar{\Lambda} + \text{c.c.}$	$(3.58 \pm 0.28) \times 10^{-4}$	1233	DESIG=104
$K^*(892)^+ \bar{p} \Lambda + \text{c.c.}$	$(8.2 \pm 1.2) \times 10^{-4}$	976	DESIG=101
$\bar{p} \Lambda(1520) K_S^0 \pi^+ + \text{c.c.}$	$(4.1 \pm 1.0) \times 10^{-5}$	876	DESIG=111
$\Sigma^0 \bar{\Sigma}^0$	$(3.7 \pm 0.6) \times 10^{-5}$	1319	DESIG=47
$\Sigma^+ \bar{p} K_S^0 + \text{c.c.}$	$(8.3 \pm 1.0) \times 10^{-5}$	1197	DESIG=100
$\Sigma^0 \bar{p} K^+ + \text{c.c.}$	$(9.1 \pm 0.8) \times 10^{-5}$	1197	DESIG=103
$\Sigma^+ \bar{\Sigma}^-$	$(3.4 \pm 0.7) \times 10^{-5}$	1322	DESIG=48
$\Sigma^+ \bar{\Sigma}^- \eta$	$(5.5 \pm 1.3) \times 10^{-5}$	998	DESIG=112
$\Sigma^- \bar{\Sigma}^+$	$(4.4 \pm 1.8) \times 10^{-5}$	1314	DESIG=102
$\Sigma(1385)^+ \bar{\Sigma}(1385)^-$	$< 1.6 \times 10^{-4}$	1118	DESIG=73
$\Sigma(1385)^- \bar{\Sigma}(1385)^+$	$< 8 \times 10^{-5}$	1118	DESIG=74
$K^- \bar{\Lambda} \Xi^+ + \text{c.c.}$	$(1.77 \pm 0.32) \times 10^{-4}$	1004	DESIG=85
$\Xi^0 \Xi^0$	$(1.83 \pm 0.22) \times 10^{-4}$	1197	DESIG=49
$\Xi^- \Xi^+$	$(1.44 \pm 0.12) \times 10^{-4}$	1189	DESIG=26
$\Omega^- \bar{\Omega}^+$	$(4.52 \pm 0.30) \times 10^{-5}$	604	DESIG=106
$J/\psi(1S) \pi^+ \pi^- \pi^0$	$< 1.5 \%$	185	DESIG=12
$\pi^0 \eta_c$	$< 3.2 \times 10^{-3}$	511	DESIG=81
$\eta_c(1S) \pi^+ \pi^-$	$< 5.4 \times 10^{-3}$	459	DESIG=69

Radiative decays

$\gamma J/\psi(1S)$	$(19.1 \pm 0.8) \%$	S=1.6	430
$\gamma \rho^0$	$< 1.9 \times 10^{-5}$	CL=90%	1694
$\gamma \omega$	$< 6 \times 10^{-6}$	CL=90%	1692
$\gamma \phi$	$< 7 \times 10^{-6}$	CL=90%	1632
$\gamma \gamma$	$(2.91 \pm 0.11) \times 10^{-4}$	S=1.1	1778
$e^+ e^- J/\psi(1S)$	$(2.16 \pm 0.15) \times 10^{-3}$		430
$\mu^+ \mu^- J/\psi(1S)$	$(2.03 \pm 0.33) \times 10^{-4}$		381

NODE=M057;CLUMP=B

DESIG=6

DESIG=44

DESIG=45

DESIG=46

DESIG=7

DESIG=86

DESIG=98

 $\eta_c(2S)$

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

NODE=M059

Quantum numbers are quark model predictions.

Mass $m = 3637.8 \pm 0.6$ MeV (S = 1.1)Full width $\Gamma = 11.6 \pm 1.4$ MeV

NODE=M059M;DTYPE=M

NODE=M059W;DTYPE=G

$\eta_c(2S)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
hadrons	seen		—
$K \bar{K} \pi$	$(1.9^{+1.2}_{-1.0}) \%$		1729
$K \bar{K} \eta$	$(7^{+5}_{-4}) \times 10^{-3}$		1637
$K \bar{K} \eta'$	$(2.1 \pm 1.6) \times 10^{-3}$		1537
$2\pi^+ 2\pi^-$	$< 2.6 \times 10^{-3}$	90%	1792
$a_0(1450)\pi$	seen		1531
$a_2(1700)\pi$	seen		1415
$a_0(1710)\pi$	seen		1412
$\rho^0 \rho^0$	$< 2.3 \times 10^{-3}$	90%	1645
$3\pi^+ 3\pi^-$	$(1.7^{+0.9}_{-1.1}) \%$		1749
$K^+ K^- \pi^+ \pi^-$	$< 2.5 \times 10^{-3}$	90%	1700
$K^{*0} \bar{K}^{*0}$	$< 4 \times 10^{-3}$	90%	1585
$K^+ K^- \pi^+ \pi^- \pi^0$	$(1.5^{+1.0}_{-0.9}) \%$		1668
$K^+ K^- 2\pi^+ 2\pi^-$	$< 1.8 \%$	90%	1627
$K_S^0 K^- 2\pi^+ \pi^- + \text{c.c.}$	$(1.4^{+0.8}_{-1.0}) \%$		1666
$2K^+ 2K^-$	$< 1.4 \times 10^{-3}$	90%	1470
$K_2^*(1430) \bar{K} + \text{c.c.}$	seen		1493
$K_0^*(1950) \bar{K} + \text{c.c.}$	seen		1231
$K_0^*(2600) \bar{K} + \text{c.c.}$	seen		—
$\phi \phi$	$< 1.4 \times 10^{-3}$	90%	1506
$\omega \omega$	$< 1.9 \times 10^{-3}$	90%	1642
$\omega \phi$	$< 3.4 \times 10^{-4}$	90%	1577
$p \bar{p}$	$< 3.2 \times 10^{-4}$	90%	1558
$p \bar{p} \pi^+ \pi^-$	seen		1461
$p \bar{p} K^+ K^-$	$(3.6 \pm 2.9) \times 10^{-4}$		1079
$\gamma \gamma$	$(1.8^{+1.0}_{-1.1}) \times 10^{-4}$		1819
$\gamma J/\psi(1S)$	$< 1.8 \%$	90%	501
$\pi^+ \pi^- \eta$	$(5.5^{+3.3}_{-4.0}) \times 10^{-3}$		1766
$2\pi^+ 2\pi^- \eta$	$(1.6^{+0.9}_{-1.0}) \%$		1733
$\pi^+ \pi^- \eta'$	$(2.7^{+2.0}_{-1.8}) \times 10^{-3}$		1680
$\pi^+ \pi^- \eta_c(1S)$	$< 4 \%$	90%	537

NODE=M059215;DESIG=1;OUR EST;
DESIG=4 → UNCHECKED ←

DESIG=20

DESIG=35

DESIG=5

DESIG=27

DESIG=28

DESIG=26

DESIG=16

DESIG=8

DESIG=6

DESIG=17

DESIG=9

DESIG=10

DESIG=11

DESIG=7

DESIG=24

DESIG=25

DESIG=29

DESIG=18

DESIG=33

DESIG=34

DESIG=3

DESIG=22

DESIG=30

DESIG=2

DESIG=21

DESIG=12

DESIG=31

DESIG=13

DESIG=15

 $\psi(2S)$

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

NODE=M071

Mass $m = 3686.097 \pm 0.011$ MeV (S = 1.1)Full width $\Gamma = 294 \pm 9$ keV (S = 1.2)

NODE=M071M;DTYPE=M

NODE=M071W;DTYPE=G

$\psi(2S)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)	
hadrons	(97.85 $\pm$ 0.13) %	—	—	NODE=M071220;DESIG=3
virtual $\gamma \rightarrow$ hadrons	(1.79 $\pm$ 0.04) %	—	—	DESIG=4
$g g g$	(10.6 $\pm$ 1.6) %	—	—	DESIG=255
$\gamma g g$	(1.03 $\pm$ 0.29) %	—	—	DESIG=256
light hadrons	(15.4 $\pm$ 1.5) %	—	—	DESIG=226
K_S^0 anything	(16.0 $\pm$ 1.1) %	—	—	DESIG=325
$e^+ e^-$	(7.93 $\pm$ 0.22) $\times 10^{-3}$	S=1.3	1843	DESIG=1
$\mu^+ \mu^-$	(8.0 $\pm$ 0.6) $\times 10^{-3}$	—	1840	DESIG=2
$\tau^+ \tau^-$	(3.1 $\pm$ 0.4) $\times 10^{-3}$	—	489	DESIG=68
Decays into $J/\psi(1S)$ and anything				NODE=M071;CLUMP=A
$J/\psi(1S)$ anything	(61.4 $\pm$ 0.7) %	S=1.3	—	DESIG=11
$J/\psi(1S)$ neutrals	(25.4 $\pm$ 0.5) %	S=1.6	—	DESIG=12
$J/\psi(1S) \pi^+ \pi^-$	(34.68 $\pm$ 0.34) %	S=1.1	477	DESIG=13
$J/\psi(1S) \pi^0 \pi^0$	(18.2 $\pm$ 0.5) %	S=1.6	481	DESIG=14
$J/\psi(1S) \eta$	(3.37 $\pm$ 0.06) %	S=1.2	199	DESIG=15
$J/\psi(1S) \pi^0$	(1.268 $\pm$ 0.032) $\times 10^{-3}$	—	528	DESIG=18
Hadronic decays				NODE=M071;CLUMP=B
$\pi^+ \pi^-$	(7.8 $\pm$ 2.6) $\times 10^{-6}$	—	1838	DESIG=21
$\pi^+ \pi^- \pi^0$	(2.01 $\pm$ 0.17) $\times 10^{-4}$	S=1.7	1830	DESIG=36
$\rho(770) \pi \rightarrow \pi^+ \pi^- \pi^0$	(3.2 $\pm$ 1.2) $\times 10^{-5}$	S=1.8	—	DESIG=22
$\rho(2150) \pi \rightarrow \pi^+ \pi^- \pi^0$	(1.9 $\pm$ 1.2) $\times 10^{-4}$	—	—	DESIG=201
$2(\pi^+ \pi^-)$	(2.4 $\pm$ 0.6) $\times 10^{-4}$	S=2.2	1817	DESIG=24
$\rho^0 \pi^+ \pi^-$	(2.2 $\pm$ 0.6) $\times 10^{-4}$	S=1.4	1750	DESIG=33
$2(\pi^+ \pi^-) \pi^0$	(2.9 $\pm$ 1.0) $\times 10^{-3}$	S=4.7	1799	DESIG=25
$\rho a_2(1320)$	(2.6 $\pm$ 0.9) $\times 10^{-4}$	—	1500	DESIG=65
$\pi^+ \pi^- \pi^0 \pi^0 \pi^0$	(5.3 $\pm$ 1.0) $\times 10^{-3}$	—	1800	DESIG=312
$\rho^\pm \pi^\mp \pi^0 \pi^0$	< 2.7 $\times 10^{-3}$	CL=90%	1737	DESIG=315
$\pi^+ \pi^- 4\pi^0$	(1.4 $\pm$ 1.0) $\times 10^{-3}$	—	1778	DESIG=332
$3(\pi^+ \pi^-)$	(3.5 $\pm$ 2.0) $\times 10^{-4}$	S=2.8	1774	DESIG=32
$2(\pi^+ \pi^- \pi^0)$	(4.8 $\pm$ 1.5) $\times 10^{-3}$	—	1776	DESIG=221
$3(\pi^+ \pi^-) \pi^0$	(3.5 $\pm$ 1.6) $\times 10^{-3}$	—	1746	DESIG=37
$2(\pi^+ \pi^-) 3\pi^0$	(1.42 $\pm$ 0.31) %	—	1748	DESIG=329
$\eta \pi^+ \pi^-$	< 1.6 $\times 10^{-4}$	CL=90%	1791	DESIG=202
$\eta \pi^+ \pi^- \pi^0$	(9.5 $\pm$ 1.7) $\times 10^{-4}$	—	1778	DESIG=203
$\eta 2(\pi^+ \pi^-)$	(1.2 $\pm$ 0.6) $\times 10^{-3}$	—	1758	DESIG=251
$\eta \pi^+ \pi^- \pi^0 \pi^0$	< 4 $\times 10^{-4}$	CL=90%	1760	DESIG=313
$\eta \pi^+ \pi^- 3\pi^0$	< 2.1 $\times 10^{-3}$	CL=90%	1736	DESIG=334
$\eta 2(\pi^+ \pi^- \pi^0)$	< 2.1 $\times 10^{-3}$	CL=90%	1705	DESIG=328
$\rho \eta$	(2.2 $\pm$ 0.6) $\times 10^{-5}$	S=1.1	1717	DESIG=94
$\eta' \pi^+ \pi^- \pi^0$	(4.5 $\pm$ 2.1) $\times 10^{-4}$	—	1692	DESIG=204
$\eta' \rho$	(1.9 $\pm$ 1.7) $\times 10^{-5}$	—	1625	DESIG=93
$\omega \pi^0$	(2.1 $\pm$ 0.6) $\times 10^{-5}$	—	1757	DESIG=92
$\omega \pi^+ \pi^-$	(7.3 $\pm$ 1.2) $\times 10^{-4}$	S=2.1	1748	DESIG=75
$\omega \pi^+ \pi^- 2\pi^0$	(8.7 $\pm$ 2.4) $\times 10^{-3}$	—	1715	DESIG=327
$b_1^\pm \pi^\mp$	(4.0 $\pm$ 0.6) $\times 10^{-4}$	S=1.1	1635	DESIG=40
$\omega f_2(1270)$	(2.2 $\pm$ 0.4) $\times 10^{-4}$	—	1515	DESIG=64
$\omega \pi^0 \pi^0$	(1.11 $\pm$ 0.35) $\times 10^{-3}$	—	1749	DESIG=314
$\omega 3\pi^0$	< 8 $\times 10^{-4}$	CL=90%	1736	DESIG=333
$b_1^0 \pi^0$	(2.4 $\pm$ 0.6) $\times 10^{-4}$	—	—	DESIG=193
$\omega \eta$	< 1.1 $\times 10^{-5}$	CL=90%	1715	DESIG=95
$\omega \eta'$	(3.2 $\pm$ 2.5) $\times 10^{-5}$	—	1623	DESIG=91
$\phi \pi^0$	< 4 $\times 10^{-7}$	CL=90%	1699	DESIG=96
$\phi \pi^+ \pi^-$	(1.18 $\pm$ 0.26) $\times 10^{-4}$	S=1.5	1690	DESIG=78
$\phi f_0(980) \rightarrow \pi^+ \pi^-$	(7.5 $\pm$ 3.3) $\times 10^{-5}$	S=1.6	—	DESIG=81
$\phi \eta$	(3.10 $\pm$ 0.31) $\times 10^{-5}$	—	1654	DESIG=89

$\eta\phi(2170), \phi(2170) \rightarrow$	< 2.2	$\times 10^{-6}$	CL=90%	—	DESIG=316
$\phi f_0(980), f_0 \rightarrow \pi^+\pi^-$					
$\phi\eta'$	(1.54 ± 0.20)	$\times 10^{-5}$		1555	DESIG=90
$\phi\eta\eta'$	(3.14 ± 0.29)	$\times 10^{-5}$		1331	DESIG=361
$h_1(1900)\eta \rightarrow \phi\eta\eta'$	(3.8 ± 2.1)	$\times 10^{-6}$		—	DESIG=362
$\phi(2170)\eta \rightarrow \phi\eta\eta'$	(3.3 ± 1.8)	$\times 10^{-6}$		—	DESIG=363
$\phi(2170)\eta' \rightarrow \phi\eta\eta'$	(3.8 ± 1.0)	$\times 10^{-6}$		—	DESIG=364
$h_1(2300)\eta \rightarrow \phi\eta\eta'$	(2.2 ± 1.0)	$\times 10^{-6}$		—	DESIG=365
$h_1(2300)\eta' \rightarrow \phi\eta\eta'$	(4.8 ± 1.5)	$\times 10^{-6}$		—	DESIG=366
$\phi\phi\phi$	(1.46 ± 0.18)	$\times 10^{-5}$		989	DESIG=354
$\phi f_1(1285)$	(3.0 ± 1.3)	$\times 10^{-5}$		1436	DESIG=319
$\phi\eta(1405) \rightarrow \phi\pi^+\pi^-\eta$	(8.5 ± 1.7)	$\times 10^{-6}$		—	DESIG=320
$\phi f_2'(1525)$	(4.4 ± 1.6)	$\times 10^{-5}$		1325	DESIG=67
K^+K^-	(7.5 ± 0.5)	$\times 10^{-5}$		1776	DESIG=23
$K^+K^-\pi^+\pi^-$	(7.3 ± 0.5)	$\times 10^{-4}$		1726	DESIG=26
$K^+K^-\pi^0$	(4.07 ± 0.31)	$\times 10^{-5}$		1754	DESIG=38
$K_S^0 K_S^0$	< 4.6	$\times 10^{-6}$		1775	DESIG=86
$K_S^0 K_L^0$	(5.34 ± 0.33)	$\times 10^{-5}$		1775	DESIG=85
$K_S^0 K_L^0 \pi^0$	< 3.0	$\times 10^{-4}$	CL=90%	1753	DESIG=303
$K^+K^-\pi^0\pi^0$	(2.6 ± 1.3)	$\times 10^{-4}$		1728	DESIG=298
$K^+K^-\pi^0\pi^0\pi^0$	(6.6 ± 2.8)	$\times 10^{-4}$		1696	DESIG=341
$K_S^0 K^\pm\pi^\mp\pi^0\pi^0$	(1.7 ± 0.6)	$\times 10^{-3}$		1694	DESIG=342
$K_S^0 K^\pm\pi^\mp\pi^+\pi^-$	(2.2 ± 0.4)	$\times 10^{-3}$		1692	DESIG=343
$K^+K^-\pi^+\pi^-\pi^0$	(1.26 ± 0.09)	$\times 10^{-3}$		1694	DESIG=206
$\omega f_0(1710) \rightarrow \omega K^+K^-$	(5.9 ± 2.2)	$\times 10^{-5}$		—	DESIG=216
$K^*(892)^0 K^-\pi^+\pi^0 + \text{c.c.}$	(8.6 ± 2.2)	$\times 10^{-4}$		—	DESIG=217
$K^*(892)^+ K^-\pi^+\pi^- + \text{c.c.}$	(9.6 ± 2.8)	$\times 10^{-4}$		—	DESIG=218
$K^*(892)^+ K^-\rho^0 + \text{c.c.}$	(7.3 ± 2.6)	$\times 10^{-4}$		—	DESIG=219
$K^*(892)^0 K^-\rho^+ + \text{c.c.}$	(6.1 ± 1.8)	$\times 10^{-4}$		—	DESIG=220
$K_S^0 K_S^0 \pi^+\pi^-$	(2.2 ± 0.4)	$\times 10^{-4}$		1724	DESIG=225
$K_S^0 K_L^0 \pi^0\pi^0$	(1.3 ± 0.6)	$\times 10^{-3}$		1726	DESIG=304
$K_S^0 K^*(892)^0 \pi^0\pi^0$	(3.0 ± 1.3)	$\times 10^{-4}$		1645	DESIG=348
$K_S^0 K^\pm \rho(770)^\mp \pi^0$	< 7	$\times 10^{-4}$	CL=90%	—	DESIG=352
$K_S^0 K^\pm \pi^\mp \rho(770)^0$	< 7	$\times 10^{-4}$	CL=90%	—	DESIG=353
$K^\mp K^*(892)^\pm \pi^0\pi^0$	(7.0 ± 2.9)	$\times 10^{-4}$		1646	DESIG=349
$K^*(892)^+ K^*(892)^- \pi^0$	(3.6 ± 1.8)	$\times 10^{-3}$		1573	DESIG=350
$K_S^0 K_L^0 \eta$	(1.3 ± 0.5)	$\times 10^{-3}$		1661	DESIG=305
$K^+K^-\rho^0$	(2.2 ± 0.4)	$\times 10^{-4}$		1616	DESIG=205
$K^*(892)^0 \bar{K}_2^*(1430)^0$	(1.9 ± 0.5)	$\times 10^{-4}$		1417	DESIG=66
$K^+K^-\pi^+\pi^-\eta$	(1.3 ± 0.7)	$\times 10^{-3}$		1574	DESIG=252
$K^+K^-\pi^+\pi^-\pi^0$	(1.9 ± 0.9)	$\times 10^{-3}$		1654	DESIG=222
$K^+K^-\pi^+\pi^-\pi^0$	(1.00 ± 0.31)	$\times 10^{-3}$		1611	DESIG=240
$K^+K^*(892)^- + \text{c.c.}$	(2.9 ± 0.4)	$\times 10^{-5}$	S=1.2	1698	DESIG=39
$2(K^+K^-)$	(6.3 ± 1.3)	$\times 10^{-5}$		1499	DESIG=208
$2(K^+K^-)\pi^0$	(1.10 ± 0.28)	$\times 10^{-4}$		1440	DESIG=209
$K^+K^-\phi$	(7.0 ± 1.6)	$\times 10^{-5}$		1546	DESIG=79
$K_S^0 K_S^0 \phi$	(3.53 ± 0.29)	$\times 10^{-5}$		1543	DESIG=347
$K_1(1270)^\pm K^\mp$	(1.00 ± 0.28)	$\times 10^{-3}$		1587	DESIG=41
$K^+ \bar{K}^*(892)^0 \pi^- + \text{c.c.}$	(6.7 ± 2.5)	$\times 10^{-4}$		1674	DESIG=34
$\eta K^+K^-, \text{ no } \eta\phi$	(3.49 ± 0.17)	$\times 10^{-5}$		1664	DESIG=207
ηK^+K^-	< 2.6	$\times 10^{-4}$	CL=90%	1664	DESIG=351
$X(1750)\eta \rightarrow K^+K^-\eta$	(4.8 ± 2.8)	$\times 10^{-6}$		—	DESIG=324
$K_1(1400)^\pm K^\mp$	< 3.1	$\times 10^{-4}$	CL=90%	1532	DESIG=42
$K_2^*(1430)^\pm K^\mp$	(7.1 ± 1.3)	$\times 10^{-5}$		—	DESIG=265
$K^*(892)^0 \bar{K}^0 + \text{c.c.}$	(1.09 ± 0.20)	$\times 10^{-4}$		1697	DESIG=194
ωK^+K^-	(1.62 ± 0.11)	$\times 10^{-4}$	S=1.1	1614	DESIG=76
$\omega K_S^0 K_S^0$	(7.0 ± 0.5)	$\times 10^{-5}$		1612	DESIG=330

$\omega K^*(892)^+ K^- + \text{c.c.}$	$(2.07 \pm 0.26) \times 10^{-4}$		1482	DESIG=276
$\omega K_2^*(1430)^+ K^- + \text{c.c.}$	$(6.1 \pm 1.2) \times 10^{-5}$		1252	DESIG=277
$\omega \bar{K}^*(892)^0 K^0$	$(1.68 \pm 0.30) \times 10^{-4}$		1481	DESIG=278
$\omega \bar{K}_2^*(1430)^0 K^0$	$(5.8 \pm 2.2) \times 10^{-5}$		1250	DESIG=279
$\omega X(1440) \rightarrow \omega K_S^0 K^- \pi^+ + \text{c.c.}$	$(1.6 \pm 0.4) \times 10^{-5}$		—	DESIG=282
$\omega X(1440) \rightarrow \omega K^+ K^- \pi^0$	$(1.09 \pm 0.26) \times 10^{-5}$		—	DESIG=283
$\omega f_1(1285) \rightarrow \omega K_S^0 K^- \pi^+ + \text{c.c.}$	$(3.0 \pm 1.0) \times 10^{-6}$		—	DESIG=284
$\omega f_1(1285) \rightarrow \omega K^+ K^- \pi^0$	$(1.2 \pm 0.7) \times 10^{-6}$		—	DESIG=285
$p\bar{p}$	$(2.94 \pm 0.09) \times 10^{-4}$	S=1.3	1586	DESIG=27
$n\bar{n}$	$(3.06 \pm 0.15) \times 10^{-4}$		1586	DESIG=309
$p\bar{p}\pi^0$	$1.2 \times 10^{-4} \text{ to } 2.4 \times 10^{-4}$		1543	DESIG=35
$N(940)\bar{p} + \text{c.c.} \rightarrow p\bar{p}\pi^0$	$(1.14 \pm 0.12) \times 10^{-4}$		—	DESIG=267
$N(1440)\bar{p} + \text{c.c.} \rightarrow p\bar{p}\pi^0$	$(7.5 \pm 1.1) \times 10^{-5}$	S=1.7	—	DESIG=261
$N(1520)\bar{p} + \text{c.c.} \rightarrow p\bar{p}\pi^0$	$(6.6 \pm 2.0) \times 10^{-6}$		—	DESIG=268
$N(1535)\bar{p} + \text{c.c.} \rightarrow p\bar{p}\pi^0$	$(1.7 \pm 0.4) \times 10^{-5}$		—	DESIG=269
$N(1650)\bar{p} + \text{c.c.} \rightarrow p\bar{p}\pi^0$	$(9.1 \pm 3.3) \times 10^{-6}$		—	DESIG=270
$N(1710)\bar{p} + \text{c.c.} \rightarrow p\bar{p}\pi^0$	$(4 \pm 4) \times 10^{-6}$		—	DESIG=367
$N(1720)\bar{p} + \text{c.c.} \rightarrow p\bar{p}\pi^0$	$(6.2 \pm 2.5) \times 10^{-6}$		—	DESIG=271
$N(2100)\bar{p} + \text{c.c.} \rightarrow p\bar{p}\pi^0$	$(8 \pm 4) \times 10^{-6}$		—	DESIG=368
$N(2300)\bar{p} + \text{c.c.} \rightarrow p\bar{p}\pi^0$	$(3.6 \pm 3.1) \times 10^{-6}$		—	DESIG=272
$N(2570)\bar{p} + \text{c.c.} \rightarrow p\bar{p}\pi^0$	$(1.9 \pm 1.5) \times 10^{-5}$		—	DESIG=273
$p\bar{p}\pi^+\pi^-$	$(6.0 \pm 0.4) \times 10^{-4}$		1491	DESIG=31
$p\bar{p}K^+K^-$	$(2.7 \pm 0.7) \times 10^{-5}$		1118	DESIG=212
$p\bar{p}\eta$	$5.5 \times 10^{-5} \text{ to } 9.1 \times 10^{-5}$		1373	DESIG=200
$N(1535)\bar{p} + \text{c.c.} \rightarrow p\bar{p}\eta$	$(4.7 \pm 0.5) \times 10^{-5}$		—	DESIG=264
$N(1710)\bar{p} + \text{c.c.} \rightarrow p\bar{p}\eta$	$(7.8 \pm 3.2) \times 10^{-6}$		—	DESIG=369
$p\bar{p}\pi^+\pi^-\pi^0$	$(7.3 \pm 0.7) \times 10^{-4}$		1435	DESIG=211
$p\bar{p}\rho^0$	$(5.0 \pm 2.2) \times 10^{-5}$		1252	DESIG=210
$p\bar{p}\omega$	$(6.9 \pm 2.1) \times 10^{-5}$		1247	DESIG=77
$p\bar{p}\eta'$	$(1.10 \pm 0.13) \times 10^{-5}$		1141	DESIG=317
$p\bar{p}\phi$	$(6.1 \pm 0.6) \times 10^{-6}$		1109	DESIG=80
$\phi X(1835) \rightarrow p\bar{p}\phi$	$< 1.82 \times 10^{-7}$	CL=90%	—	DESIG=318
$p\bar{n}\pi^- \text{ or c.c.}$	$(2.48 \pm 0.17) \times 10^{-4}$		—	DESIG=227
$p\bar{n}\pi^-\pi^0$	$(3.2 \pm 0.7) \times 10^{-4}$		1492	DESIG=228
$\Lambda\bar{\Lambda}$	$(3.81 \pm 0.13) \times 10^{-4}$	S=1.4	1467	DESIG=28
$\Lambda\bar{\Lambda}\pi^0$	$(1.4 \pm 0.7) \times 10^{-6}$		1412	DESIG=238
$\Lambda\bar{\Lambda}\eta$	$(2.43 \pm 0.32) \times 10^{-5}$		1197	DESIG=239
$\Lambda(1670)\bar{\Lambda} \rightarrow \Lambda\bar{\Lambda}\eta$	$(1.3 \pm 0.7) \times 10^{-5}$		—	DESIG=336
$\Lambda\bar{\Lambda}\eta'$	$(7.3 \pm 1.0) \times 10^{-6}$		892	DESIG=346
$\Lambda\bar{\Lambda}\omega(782)$	$(3.3 \pm 0.4) \times 10^{-5}$		1037	DESIG=340
$\Lambda\bar{\Lambda}\pi^+\pi^-$	$(2.8 \pm 0.6) \times 10^{-4}$		1346	DESIG=213
$\Lambda\bar{p}K^+$	$(1.00 \pm 0.14) \times 10^{-4}$		1327	DESIG=214
$\Lambda\bar{p}K^*(892)^+ + \text{c.c.}$	$(6.3 \pm 0.7) \times 10^{-5}$		1087	DESIG=321
$\Lambda\bar{p}K^+\pi^+\pi^-$	$(1.8 \pm 0.4) \times 10^{-4}$		1167	DESIG=215
$\bar{\Lambda}nK_S^0 + \text{c.c.}$	$(8.1 \pm 1.8) \times 10^{-5}$		1324	DESIG=237
$\Delta^{++}\bar{\Delta}^{--}$	$(1.28 \pm 0.35) \times 10^{-4}$		1371	DESIG=70
$\Lambda\bar{\Sigma}^+\pi^- + \text{c.c.}$	$(1.40 \pm 0.13) \times 10^{-4}$		1376	DESIG=280
$\Lambda\bar{\Sigma}^-\pi^+ + \text{c.c.}$	$(1.54 \pm 0.14) \times 10^{-4}$		1379	DESIG=281
$\Lambda\bar{\Sigma}^0 + \text{c.c.}$	$(1.6 \pm 0.7) \times 10^{-6}$		1437	DESIG=326
$\Lambda\bar{\Sigma}^0\pi^0 + \text{c.c.}$	$(1.54 \pm 0.07) \times 10^{-4}$		1380	DESIG=358
$\Lambda(1520)\bar{\Xi}^+K^- + \text{c.c.},$ $\Lambda(1520) \rightarrow pK^-$	$(9.5 \pm 1.2) \times 10^{-7}$		—	DESIG=359
$\Sigma^0\bar{p}K^+ + \text{c.c.}$	$(1.67 \pm 0.18) \times 10^{-5}$		1291	DESIG=274
$\Sigma^+\bar{\Sigma}^-$	$(2.43 \pm 0.10) \times 10^{-4}$	S=1.4	1408	DESIG=223
$\Sigma^0\bar{\Sigma}^0$	$(2.35 \pm 0.09) \times 10^{-4}$	S=1.1	1405	DESIG=71
$\Sigma^-\bar{\Sigma}^+$	$(2.82 \pm 0.09) \times 10^{-4}$		1401	DESIG=335

$\Sigma^+ \bar{\Sigma}^- \eta$	$(9.6 \pm 2.4) \times 10^{-6}$		1108	DESIG=339
$\Sigma^+ \bar{\Sigma}^- \omega$	$(1.89 \pm 0.28) \times 10^{-5}$		926	DESIG=344
$\Sigma^0 \bar{\Sigma}^0 \omega(782)$	$(1.24 \pm 0.19) \times 10^{-5}$		921	DESIG=357
$\Sigma^+ \bar{\Sigma}^- \phi$	$(3.0 \pm 0.7) \times 10^{-6}$		686	DESIG=345
$\Sigma^0 \bar{\Sigma}^0 \phi$	$(2.64 \pm 0.34) \times 10^{-6}$		679	DESIG=360
$\Sigma(1385)^+ \bar{\Sigma}(1385)^-$	$(8.5 \pm 0.7) \times 10^{-5}$		1218	DESIG=72
$\Sigma(1385)^- \bar{\Sigma}(1385)^+$	$(8.5 \pm 0.8) \times 10^{-5}$		1218	DESIG=297
$\Sigma(1385)^0 \bar{\Sigma}(1385)^0$	$(6.9 \pm 0.7) \times 10^{-5}$		1218	DESIG=299
$\Xi^- \bar{\Xi}^+$	$(2.87 \pm 0.11) \times 10^{-4}$	S=1.1	1284	DESIG=29
$\Xi^0 \bar{\Xi}^0$	$(2.3 \pm 0.4) \times 10^{-4}$	S=4.2	1291	DESIG=224
$\Xi(1530)^0 \bar{\Xi}(1530)^0$	$(6.8 \pm 0.4) \times 10^{-5}$		1025	DESIG=73
$\Lambda \bar{\Xi}^+ K^- + \text{c.c.}$	$(3.67 \pm 0.22) \times 10^{-5}$		1114	DESIG=293
$\Xi(1690)^- \bar{\Xi}^+ \rightarrow K^- \Lambda \bar{\Xi}^+ + \text{c.c.}$	$(6.2 \pm 2.1) \times 10^{-6}$	S=1.5	—	DESIG=294
$\Xi(1820)^- \bar{\Xi}^+ \rightarrow K^- \Lambda \bar{\Xi}^+ + \text{c.c.}$	$(1.48 \pm 0.29) \times 10^{-5}$	S=1.2	—	DESIG=295
$\Xi(1530)^- \bar{\Xi}(1530)^+$	$(1.15 \pm 0.07) \times 10^{-4}$		1025	DESIG=322
$\Xi(1530)^- \bar{\Xi}^+$	$(7.0 \pm 1.2) \times 10^{-6}$		1165	DESIG=323
$\Xi(1530)^0 \bar{\Xi}^0$	$(5.3 \pm 0.5) \times 10^{-6}$		1169	DESIG=331
$\Sigma^0 \bar{\Xi}^+ K^- + \text{c.c.}$	$(3.7 \pm 0.4) \times 10^{-5}$		1060	DESIG=296
$\Omega^- K^+ \bar{\Xi}^0 + \text{c.c.}$	$(2.8 \pm 0.4) \times 10^{-6}$		606	DESIG=355
$\bar{\Omega}^+ K_S^0 \Xi^- + \text{c.c.}$	$(2.9 \pm 0.6) \times 10^{-6}$		590	DESIG=356
$\Omega^- \bar{\Omega}^+$	$(5.66 \pm 0.30) \times 10^{-5}$	S=1.3	774	DESIG=74
$\eta_c \pi^+ \pi^- \pi^0$	$< 1.0 \times 10^{-3}$	CL=90%	512	DESIG=229
$h_c(1P) \pi^0$	$(7.4 \pm 0.5) \times 10^{-4}$		85	DESIG=254
$\Lambda_c^+ \bar{p} e^+ e^- + \text{c.c.}$	$< 1.7 \times 10^{-6}$	CL=90%	830	DESIG=310
$\Theta(1540) \bar{\Theta}(1540) \rightarrow K_S^0 p K^- \bar{n} + \text{c.c.}$	$[I] < 8.8 \times 10^{-6}$	CL=90%	—	DESIG=195
$\Theta(1540) K^- \bar{n} \rightarrow K_S^0 p K^- \bar{n}$	$[I] < 1.0 \times 10^{-5}$	CL=90%	—	DESIG=196
$\Theta(1540) K_S^0 \bar{p} \rightarrow K_S^0 \bar{p} K^+ n$	$[I] < 7.0 \times 10^{-6}$	CL=90%	—	DESIG=197
$\bar{\Theta}(1540) K^+ n \rightarrow K_S^0 \bar{p} K^+ n$	$[I] < 2.6 \times 10^{-5}$	CL=90%	—	DESIG=198
$\bar{\Theta}(1540) K_S^0 p \rightarrow K_S^0 p K^- \bar{n}$	$[I] < 6.0 \times 10^{-6}$	CL=90%	—	DESIG=199

Radiative decays

$\gamma \chi_{c0}(1P)$	$(9.91 \pm 0.27) \%$	S=1.4	261	DESIG=56
$\gamma \chi_{c1}(1P)$	$(9.85 \pm 0.26) \%$	S=1.2	171	DESIG=58
$\gamma \chi_{c2}(1P)$	$(9.51 \pm 0.22) \%$	S=1.2	128	DESIG=59
$\gamma \eta_c(1S)$	$(3.6 \pm 0.5) \times 10^{-3}$	S=1.3	635	DESIG=61
$\gamma \eta_c(2S)$	$(5.4 \pm_{-2.9}^{+3.4}) \times 10^{-4}$		48	DESIG=63
$\gamma 2(\pi^+ \pi^-)$	$(4.0 \pm 0.6) \times 10^{-4}$		1817	DESIG=241
$\gamma 3(\pi^+ \pi^-)$	$< 1.7 \times 10^{-4}$	CL=90%	1774	DESIG=249
$\gamma \eta'(958)$	$(1.24 \pm 0.04) \times 10^{-4}$		1719	DESIG=54
$\gamma f_2(1270)$	$(2.73 \pm_{-0.25}^{+0.29}) \times 10^{-4}$	S=1.8	1622	DESIG=82
$\gamma f_0(1370) \rightarrow \gamma K \bar{K}$	$(3.1 \pm 1.7) \times 10^{-5}$		1588	DESIG=286
$\gamma f_0(1500)$	$(9.3 \pm 1.9) \times 10^{-5}$		1529	DESIG=287
$\gamma f_2'(1525)$	$(3.3 \pm 0.8) \times 10^{-5}$		1531	DESIG=288
$\gamma f_0(1710)$	seen		1436	DESIG=236;OUR EST;→ UNCHECKED ←
$\gamma f_0(1710) \rightarrow \gamma \pi \pi$	$(3.5 \pm 0.6) \times 10^{-5}$		—	DESIG=83
$\gamma f_0(1710) \rightarrow \gamma K \bar{K}$	$(6.6 \pm 0.7) \times 10^{-5}$		—	DESIG=84
$\gamma f_0(2100) \rightarrow \gamma \pi \pi$	$(4.8 \pm 1.0) \times 10^{-6}$		1244	DESIG=289
$\gamma f_0(2200) \rightarrow \gamma K \bar{K}$	$(3.2 \pm 1.0) \times 10^{-6}$		1193	DESIG=290
$\gamma f_J(2220) \rightarrow \gamma \pi \pi$	$< 5.8 \times 10^{-6}$	CL=90%	1168	DESIG=291
$\gamma f_J(2220) \rightarrow \gamma K \bar{K}$	$< 9.5 \times 10^{-6}$	CL=90%	1168	DESIG=292
$\gamma \eta$	$(9.2 \pm 1.8) \times 10^{-7}$		1802	DESIG=53
$\gamma \eta \pi^+ \pi^-$	$(8.7 \pm 2.1) \times 10^{-4}$		1791	DESIG=230
$\gamma \eta(1405)$	seen		1574	DESIG=231;OUR EST;→ UNCHECKED ←
$\gamma \eta(1405) \rightarrow \gamma K \bar{K} \pi$	$< 9 \times 10^{-5}$	CL=90%	1569	DESIG=62

NODE=M071;CLUMP=C

$\gamma\eta(1405) \rightarrow \gamma\eta\pi^+\pi^-$	$(3.6 \pm 2.5) \times 10^{-5}$	—	DESIG=232
$\gamma\eta(1405) \rightarrow \gamma f_0(980)\pi^0 \rightarrow \gamma\pi^+\pi^-\pi^0$	$< 5.0 \times 10^{-7}$ CL=90%	—	DESIG=308
$\gamma\eta(1475)$	seen	1548	DESIG=233;OUR EST;→ UNCHECKED ←
$\gamma\eta(1475) \rightarrow \gamma K \bar{K} \pi$	$< 1.4 \times 10^{-4}$ CL=90%	—	DESIG=234
$\gamma\eta(1475) \rightarrow \gamma\eta\pi^+\pi^-$	$< 8.8 \times 10^{-5}$ CL=90%	—	DESIG=235
$\gamma K^{*0} K^+ \pi^- + \text{c.c.}$	$(3.7 \pm 0.9) \times 10^{-4}$	1674	DESIG=242
$\gamma K^{*0} \bar{K}^{*0}$	$(2.4 \pm 0.7) \times 10^{-4}$	1613	DESIG=243
$\gamma K_S^0 K^+ \pi^- + \text{c.c.}$	$(2.6 \pm 0.5) \times 10^{-4}$	1753	DESIG=244
$\gamma K^+ K^- \pi^+ \pi^-$	$(1.9 \pm 0.5) \times 10^{-4}$	1726	DESIG=245
$\gamma K^+ K^- 2(\pi^+ \pi^-)$	$< 2.2 \times 10^{-4}$ CL=90%	1654	DESIG=248
$\gamma 2(K^+ K^-)$	$< 4 \times 10^{-5}$ CL=90%	1499	DESIG=250
$\gamma p \bar{p}$	$(3.9 \pm 0.5) \times 10^{-5}$ S=2.0	1586	DESIG=246
$\gamma f_2(1950) \rightarrow \gamma p \bar{p}$	$(1.20 \pm 0.22) \times 10^{-5}$	—	DESIG=257
$\gamma f_2(2150) \rightarrow \gamma p \bar{p}$	$(7.2 \pm 1.8) \times 10^{-6}$	—	DESIG=258
$\gamma X(1835) \rightarrow \gamma p \bar{p}$	$(4.6 \pm 1.8 \text{ } ^{+1.8}_{-4.0}) \times 10^{-6}$	—	DESIG=259
$\gamma X \rightarrow \gamma p \bar{p}$	$[r] < 2 \times 10^{-6}$ CL=90%	—	DESIG=260
$\gamma p \bar{p} \pi^+ \pi^-$	$(2.8 \pm 1.4) \times 10^{-5}$	1491	DESIG=247
$\gamma\gamma$	$< 1.5 \times 10^{-4}$ CL=90%	1843	DESIG=51
$\gamma\gamma J/\psi$	$(3.1 \pm 1.0 \text{ } ^{+1.0}_{-1.2}) \times 10^{-4}$	542	DESIG=266
$e^+ e^- \eta'$	$(1.90 \pm 0.26) \times 10^{-6}$	1719	DESIG=311
$e^+ e^- \eta_c(1S)$	$(3.8 \pm 0.4) \times 10^{-5}$	635	DESIG=338
$e^+ e^- \chi_{c0}(1P)$	$(1.09 \pm 0.26) \times 10^{-3}$	261	DESIG=300
$e^+ e^- \chi_{c1}(1P)$	$(8.6 \pm 0.7) \times 10^{-4}$	171	DESIG=301
$e^+ e^- \chi_{c2}(1P)$	$(6.9 \pm 0.8) \times 10^{-4}$	128	DESIG=302
Weak decays			
$D^0 e^+ e^- + \text{c.c.}$	$< 1.4 \times 10^{-7}$ CL=90%	1371	NODE=M071;CLUMP=E DESIG=306
$\Lambda_c^+ \bar{\Sigma}^- + \text{c.c.}$	$< 1.4 \times 10^{-5}$ CL=90%	586	DESIG=337
Other decays			
invisible	< 1.6 % CL=90%	—	NODE=M071;CLUMP=D DESIG=275

 $\psi(3770)$

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

$$\text{Mass } m = 3773.7 \pm 0.7 \text{ MeV } (S = 2.3)$$

$$\text{Full width } \Gamma = 27.2 \pm 1.0 \text{ MeV}$$

NODE=M053

NODE=M053M;DTYPE=M

NODE=M053W;DTYPE=G

$\psi(3770)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)	
$D\bar{D}$	(93 $^{+8}_{-9}$) %	S=2.0	287	NODE=M053220;DESIG=2
$D^0\bar{D}^0$	(52 $^{+4}_{-5}$) %	S=2.0	287	DESIG=5
D^+D^-	(41 ± 4) %	S=2.0	254	DESIG=6
$J/\psi X$	(5.0 ± 2.2) $\times 10^{-3}$		—	DESIG=235
$J/\psi \pi^+\pi^-$	(1.93 ± 0.28) $\times 10^{-3}$		561	DESIG=4
$J/\psi \pi^0\pi^0$	(8.0 ± 3.0) $\times 10^{-4}$		565	DESIG=46
$J/\psi \eta$	(8.7 ± 1.2) $\times 10^{-4}$		361	DESIG=47
$J/\psi \pi^0$	< 2.8 $\times 10^{-4}$	CL=90%	604	DESIG=48
e^+e^-	(9.6 ± 0.7) $\times 10^{-6}$	S=1.3	1887	DESIG=1
Decays to light hadrons				
$b_1(1235)\pi$	< 1.4 $\times 10^{-5}$	CL=90%	1684	NODE=M053;CLUMP=H DESIG=20
$\phi\eta'$	< 2.3 $\times 10^{-5}$	CL=90%	1607	DESIG=17
$\omega\eta'$	< 4 $\times 10^{-4}$	CL=90%	1672	DESIG=16
$\rho^0\eta'$	< 6 $\times 10^{-4}$	CL=90%	1674	DESIG=15
$\phi\eta$	(3.1 ± 0.7) $\times 10^{-4}$		1703	DESIG=8
$\omega\eta$	< 1.4 $\times 10^{-5}$	CL=90%	1762	DESIG=14
$\rho^0\eta$	< 5 $\times 10^{-4}$	CL=90%	1764	DESIG=13
$\phi\pi^0$	< 3 $\times 10^{-5}$	CL=90%	1746	DESIG=12
$\omega\pi^0$	< 6 $\times 10^{-4}$	CL=90%	1803	DESIG=11
$\pi^+\pi^-\pi^0$	< 5 $\times 10^{-6}$	CL=90%	1874	DESIG=9
$\rho\pi$	< 5 $\times 10^{-6}$	CL=90%	1805	DESIG=10
K^+K^-	not seen		1821	DESIG=234;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
$K^*(892)^+K^- + \text{c.c.}$	< 1.4 $\times 10^{-5}$	CL=90%	1745	DESIG=19
$K^*(892)^0\bar{K}^0 + \text{c.c.}$	< 1.2 $\times 10^{-3}$	CL=90%	1745	DESIG=18
$K_S^0 K_L^0$	(2.6 $^{+1.4}_{-1.6}$) $\times 10^{-5}$		1820	DESIG=3
$2(\pi^+\pi^-)$	< 1.12 $\times 10^{-3}$	CL=90%	1861	DESIG=21
$2(\pi^+\pi^-)\pi^0$	< 1.06 $\times 10^{-3}$	CL=90%	1844	DESIG=22
$2(\pi^+\pi^-\pi^0)$	< 5.85 %	CL=90%	1821	DESIG=208
$\omega\pi^+\pi^-$	< 6.0 $\times 10^{-4}$	CL=90%	1794	DESIG=24
$3(\pi^+\pi^-)$	< 9.1 $\times 10^{-3}$	CL=90%	1820	DESIG=52
$3(\pi^+\pi^-)\pi^0$	< 1.37 %	CL=90%	1792	DESIG=55
$3(\pi^+\pi^-)2\pi^0$	< 11.74 %	CL=90%	1760	DESIG=210
$\eta\pi^+\pi^-$	< 1.24 $\times 10^{-3}$	CL=90%	1836	DESIG=23
$\pi^+\pi^-2\pi^0$	< 8.9 $\times 10^{-3}$	CL=90%	1862	DESIG=206
$\rho^0\pi^+\pi^-$	< 6.9 $\times 10^{-3}$	CL=90%	1796	DESIG=64
$\eta 3\pi$	< 1.34 $\times 10^{-3}$	CL=90%	1824	DESIG=25
$\eta 2(\pi^+\pi^-)$	< 2.43 %	CL=90%	1804	DESIG=53
$\eta\rho^0\pi^+\pi^-$	< 1.45 %	CL=90%	1708	DESIG=221
$\eta' 3\pi$	< 2.44 $\times 10^{-3}$	CL=90%	1741	DESIG=26
$K^+K^-\pi^+\pi^-$	< 9.0 $\times 10^{-4}$	CL=90%	1773	DESIG=27
$\phi\pi^+\pi^-$	< 4.1 $\times 10^{-4}$	CL=90%	1737	DESIG=28
$K^+K^-2\pi^0$	< 4.2 $\times 10^{-3}$	CL=90%	1774	DESIG=207
$4(\pi^+\pi^-)$	< 1.67 %	CL=90%	1757	DESIG=62
$4(\pi^+\pi^-)\pi^0$	< 3.06 %	CL=90%	1720	DESIG=63
$\phi f_0(980)$	< 4.5 $\times 10^{-4}$	CL=90%	1597	DESIG=29
$K^+K^-\pi^+\pi^-\pi^0$	< 2.36 $\times 10^{-3}$	CL=90%	1741	DESIG=30
$K^+K^-\rho^0\pi^0$	< 8 $\times 10^{-4}$	CL=90%	1624	DESIG=67
$K^+K^-\rho^+\pi^-$	< 1.46 %	CL=90%	1623	DESIG=68
ωK^+K^-	< 3.4 $\times 10^{-4}$	CL=90%	1664	DESIG=32
$\phi\pi^+\pi^-\pi^0$	< 3.8 $\times 10^{-3}$	CL=90%	1723	DESIG=69
$K^{*0}K^-\pi^+\pi^0 + \text{c.c.}$	< 1.62 %	CL=90%	1694	DESIG=70
$K^{*+}K^-\pi^+\pi^- + \text{c.c.}$	< 3.23 %	CL=90%	1693	DESIG=71
$K^+K^-\pi^+\pi^-2\pi^0$	< 2.67 %	CL=90%	1705	DESIG=209
$K^+K^-2(\pi^+\pi^-)$	< 1.03 %	CL=90%	1702	DESIG=57
$K^+K^-2(\pi^+\pi^-)\pi^0$	< 3.60 %	CL=90%	1661	DESIG=58
ηK^+K^-	< 4.1 $\times 10^{-4}$	CL=90%	1712	DESIG=31

$\eta K^+ K^- \pi^+ \pi^-$	< 1.24	%	CL=90%	1624	DESIG=222
$\rho^0 K^+ K^-$	< 5.0	$\times 10^{-3}$	CL=90%	1666	DESIG=65
$2(K^+ K^-)$	< 6.0	$\times 10^{-4}$	CL=90%	1552	DESIG=33
$\phi K^+ K^-$	< 7.5	$\times 10^{-4}$	CL=90%	1598	DESIG=34
$2(K^+ K^-) \pi^0$	< 2.9	$\times 10^{-4}$	CL=90%	1494	DESIG=35
$2(K^+ K^-) \pi^+ \pi^-$	< 3.2	$\times 10^{-3}$	CL=90%	1426	DESIG=59
$K_S^0 K^- \pi^+$	< 3.2	$\times 10^{-3}$	CL=90%	1799	DESIG=200
$K_S^0 K^- \pi^+ \pi^0$	< 1.33	%	CL=90%	1773	DESIG=201
$K_S^0 K^- \rho^+$	< 6.6	$\times 10^{-3}$	CL=90%	1665	DESIG=214
$K_S^0 K^- 2\pi^+ \pi^-$	< 8.7	$\times 10^{-3}$	CL=90%	1740	DESIG=202
$K_S^0 K^- \pi^+ \rho^0$	< 1.6	%	CL=90%	1621	DESIG=215
$K_S^0 K^- \pi^+ \eta$	< 1.3	%	CL=90%	1670	DESIG=216
$K_S^0 K^- 2\pi^+ \pi^- \pi^0$	< 4.18	%	CL=90%	1703	DESIG=203
$K_S^0 K^- 2\pi^+ \pi^- \eta$	< 4.8	%	CL=90%	1570	DESIG=217
$K_S^0 K^- \pi^+ 2(\pi^+ \pi^-)$	< 1.22	%	CL=90%	1658	DESIG=204
$K_S^0 K^- \pi^+ 2\pi^0$	< 2.65	%	CL=90%	1742	DESIG=205
$K_S^0 K^- K^+ K^- \pi^+$	< 4.9	$\times 10^{-3}$	CL=90%	1491	DESIG=218
$K_S^0 K^- K^+ K^- \pi^+ \pi^0$	< 3.0	%	CL=90%	1427	DESIG=219
$K_S^0 K^- K^+ K^- \pi^+ \eta$	< 2.2	%	CL=90%	1214	DESIG=220
$K^{*0} K^- \pi^+ + \text{c.c.}$	< 9.7	$\times 10^{-3}$	CL=90%	1722	DESIG=60
$p\bar{p}$	not seen			1637	DESIG=233;OUR EST;→ UNCHECKED ←
$p\bar{p}\pi^0$	< 4	$\times 10^{-5}$	CL=90%	1595	DESIG=54
$p\bar{p}\pi^+ \pi^-$	< 5.8	$\times 10^{-4}$	CL=90%	1544	DESIG=36
$\Lambda\bar{\Lambda}$	< 1.2	$\times 10^{-4}$	CL=90%	1522	DESIG=42
$p\bar{p}\pi^+ \pi^- \pi^0$	< 1.85	$\times 10^{-3}$	CL=90%	1490	DESIG=37
$\omega p\bar{p}$	< 2.9	$\times 10^{-4}$	CL=90%	1310	DESIG=39
$\Lambda\bar{\Lambda}\pi^0$	< 7	$\times 10^{-5}$	CL=90%	1469	DESIG=72
$p\bar{p}2(\pi^+ \pi^-)$	< 2.6	$\times 10^{-3}$	CL=90%	1426	DESIG=61
$\eta p\bar{p}$	< 5.4	$\times 10^{-4}$	CL=90%	1431	DESIG=38
$\eta p\bar{p}\pi^+ \pi^-$	< 3.3	$\times 10^{-3}$	CL=90%	1284	DESIG=223
$\rho^0 p\bar{p}$	< 1.7	$\times 10^{-3}$	CL=90%	1314	DESIG=66
$p\bar{p}K^+ K^-$	< 3.2	$\times 10^{-4}$	CL=90%	1186	DESIG=40
$\eta p\bar{p}K^+ K^-$	< 6.9	$\times 10^{-3}$	CL=90%	737	DESIG=224
$\pi^0 p\bar{p}K^+ K^-$	< 1.2	$\times 10^{-3}$	CL=90%	1094	DESIG=225
$\phi p\bar{p}$	< 1.3	$\times 10^{-4}$	CL=90%	1178	DESIG=41
$\Lambda\bar{\Lambda}\pi^+ \pi^-$	< 2.5	$\times 10^{-4}$	CL=90%	1405	DESIG=43
$\Lambda\bar{p}K^+$	< 2.8	$\times 10^{-4}$	CL=90%	1387	DESIG=44
$\Lambda\bar{p}K^+ \pi^+ \pi^-$	< 6.3	$\times 10^{-4}$	CL=90%	1234	DESIG=45
$\Lambda\bar{\Lambda}\eta$	< 1.9	$\times 10^{-4}$	CL=90%	1263	DESIG=226
$\Sigma^+ \bar{\Sigma}^-$	< 1.0	$\times 10^{-4}$	CL=90%	1465	DESIG=227
$\Sigma^0 \bar{\Sigma}^0$	< 4	$\times 10^{-5}$	CL=90%	1462	DESIG=228
$\Xi^0 \bar{\Xi}^0$	< 3.4	$\times 10^{-4}$	CL=90%	1353	DESIG=230
$\Xi^- \bar{\Xi}^+$	(1.4 $\pm$ 0.4)	$\times 10^{-4}$		1347	DESIG=236
$\Lambda\bar{\Xi}^+ K^- + \text{c.c.}$	< 1.0	$\times 10^{-4}$	CL=90%	1185	DESIG=237
$\Sigma^0 \bar{\Xi}^+ K^- + \text{c.c.}$	< 3.4	$\times 10^{-4}$	CL=90%	1134	DESIG=238

Radiative decays

$\gamma\chi_{c2}$	< 6.4	$\times 10^{-4}$	CL=90%	211	NODE=M053;CLUMP=R DESIG=51
$\gamma\chi_{c1}$	(2.49 $\pm$ 0.23)	$\times 10^{-3}$		254	DESIG=50
$\gamma\chi_{c0}$	(7.0 $\pm$ 0.6)	$\times 10^{-3}$		342	DESIG=49
$\gamma\eta_c$	< 8	$\times 10^{-4}$	CL=90%	707	DESIG=231
$\gamma\eta_c(2S)$	< 9	$\times 10^{-4}$	CL=90%	133	DESIG=232
$\gamma\eta'$	< 1.8	$\times 10^{-4}$	CL=90%	1765	DESIG=213
$\gamma\eta$	< 1.5	$\times 10^{-4}$	CL=90%	1847	DESIG=212
$\gamma\pi^0$	< 2	$\times 10^{-4}$	CL=90%	1884	DESIG=211

 $\psi_2(3823)$
 $I^G(J^{PC}) = 0^-(2^{--})$
 I, J, P need confirmation.

NODE=M212

was $\psi(3823)$, $X(3823)$

Mass $m = 3823.51 \pm 0.34$ MeV
 Full width $\Gamma < 2.9$ MeV, CL = 90%

NODE=M212M;DTYPE=M
 NODE=M212W;DTYPE=G

Branching fractions are given relative to the one **DEFINED AS 1**.

NODE=M212215;NODE=M212

$\psi_2(3823)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$J/\psi(1S)\pi^+\pi^-$	<0.06	90%	607
$J/\psi(1S)\pi^0\pi^0$	<0.11	90%	610
$J/\psi(1S)\pi^0$	<0.030	90%	646
$J/\psi(1S)\eta$	<0.14	90%	431
$\chi_{c0}\gamma$	<0.24	90%	387
$\chi_{c1}\gamma$	DEFINED AS 1		300
$\chi_{c2}\gamma$	0.28 $^{+0.14}_{-0.11}$		258

DESIG=3
DESIG=5
DESIG=6
DESIG=7
DESIG=4
DESIG=1
DESIG=2

 $\psi_3(3842)$

$$J^G(J^{PC}) = 0^-(3^--)$$

J, P need confirmation.

Mass $m = 3842.71 \pm 0.20$ MeVFull width $\Gamma = 2.8 \pm 0.6$ MeV

NODE=M241

NODE=M241M;DTYPE=M

NODE=M241W;DTYPE=G

$\psi_3(3842)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
D^+D^-	seen	443
$D^0\bar{D}^0$	seen	463

NODE=M241215;DESIG=1
DESIG=2

 $\chi_{c1}(3872)$

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

also known as $X(3872)$ Mass $m = 3871.64 \pm 0.06$ MeV $m_{\chi_{c1}(3872)} - m_{J/\psi} = 775 \pm 4$ MeVFull width $\Gamma = 1.19 \pm 0.21$ MeV ($S = 1.1$)

NODE=M176

NODE=M176M;DTYPE=M

NODE=M176DM;DTYPE=D

NODE=M176W;DTYPE=G

$\chi_{c1}(3872)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
e^+e^-	< 2.7 $\times 10^{-7}$	90%	1936
$\pi^+\pi^-\pi^0$	< 1.0 %	90%	1924
$\pi^+\pi^-J/\psi(1S)$	(4.3 $\pm$ 1.4) %		650
$\pi^+\pi^-\pi^0J/\psi(1S)$	not seen		588
$\omega\eta_c(1S)$	< 40 %	90%	368
$\rho(770)^0J/\psi(1S)$	(3.4 $\pm$ 1.1) %		—
$\omega J/\psi(1S)$	(5.0 $\pm$ 1.9) %		†
$\phi\phi$	not seen		1646
$D^0\bar{D}^0\pi^0$	(55 $\pm$ 28) %		116
$\bar{D}^{*0}D^0$	(46 $\pm$ 16) %		†
$\gamma\gamma$	< 13 %	90%	1936
$D^0\bar{D}^0$	< 32 %	90%	519
D^+D^-	< 22 %	90%	502
$\pi^0\chi_{c2}$	< 5 %	90%	273
$\pi^0\chi_{c1}$	(3.8 $^{+1.9}_{-1.7}$) %		319
$\pi^0\chi_{c0}$	< 16 %	90%	411
$\pi^+\pi^-\eta_c(1S)$	< 16 %	90%	745
$\pi^0\pi^0\chi_{c0}$	< 7 %	90%	347
$\pi^0\pi^0\chi_{c1}$	< 5 %	90%	228
$\pi^0\pi^0\chi_{c2}$	< 2.2 %	90%	156
$\pi^+\pi^-\chi_{c0}$	< 2.4 %	90%	340
$\pi^+\pi^-\chi_{c1}$	< 8 $\times 10^{-3}$	90%	218
$p\bar{p}$	< 2.7 $\times 10^{-5}$	95%	1693
$\pi^+\pi^-\eta$	< 5 $\times 10^{-3}$	90%	1887

NODE=M176215;DESIG=1
DESIG=29
DESIG=2
DESIG=25
DESIG=24
DESIG=32
DESIG=13
DESIG=26
DESIG=8
DESIG=12
DESIG=5
DESIG=6
DESIG=7
DESIG=20
DESIG=18
DESIG=19
DESIG=14
DESIG=28
DESIG=36
DESIG=37
DESIG=27
DESIG=17
DESIG=16
DESIG=34

Radiative decays

$\gamma D^+ D^-$	< 4	%	90%	502
$\gamma \bar{D}^0 D^0$	< 7	%	90%	519
$\gamma J/\psi$	$(10 \pm 4) \times 10^{-3}$			697
$\gamma \chi_{c1}$	< 1.0	%	90%	344
$\gamma \chi_{c2}$	< 4	%	90%	303
$\gamma \psi(2S)$	possibly seen			181
$\gamma \psi_2(3823)$	< 3.3	$\times 10^{-3}$	90%	48

C-violating decays

$\eta J/\psi$	< 2.1	%	90%	491
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NODE=M176;CLUMP=B

DESIG=21

DESIG=23

DESIG=9

DESIG=3

DESIG=15

DESIG=11

DESIG=35

NODE=M176;CLUMP=A

DESIG=4

 $\chi_{c0}(3915)$

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

was $X(3915)$ Mass $m = 3922.1 \pm 1.8$ MeV ($S = 1.5$)Full width $\Gamma = 20 \pm 4$ MeV ($S = 1.1$)

NODE=M159

NODE=M159M;DTYPE=M

NODE=M159W;DTYPE=G

 $\chi_{c0}(3915)$ DECAY MODES

	Fraction (Γ_i/Γ)	p (MeV/c)
$\omega J/\psi$	seen	232
$\bar{D}^{*0} D^0$	not seen	313
$D^+ D^-$	seen	592
$D_s^+ D_s^-$	seen	†
$\pi^+ \pi^- \eta_c(1S)$	not seen	788
$\eta_c \eta$	not seen	668
$\eta_c \pi^0$	not seen	817
$K \bar{K}$	not seen	1898
$\gamma \gamma$	seen	1961
$\gamma \psi(2S)$	not seen	229
$\pi^0 \chi_{c1}$	not seen	368

NODE=M159215;DESIG=1;OUR EST;

→ UNCHECKED ←

DESIG=3;OUR EVAL;→ UNCHECKED ←

DESIG=9

DESIG=11;OUR EST;→ UNCHECKED ←

DESIG=4;OUR EVAL;→ UNCHECKED ←

DESIG=6

DESIG=7

DESIG=5;OUR EVAL;→ UNCHECKED ←

DESIG=2

DESIG=10;OUR EST;→ UNCHECKED ←

DESIG=8

 $\chi_{c2}(3930)$

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

Mass $m = 3922.5 \pm 1.0$ MeV ($S = 1.7$)Full width $\Gamma = 35.2 \pm 2.2$ MeV ($S = 1.2$)

NODE=M050

NODE=M050M;DTYPE=M

NODE=M050W;DTYPE=G

 $\chi_{c2}(3930)$ DECAY MODES

	Fraction (Γ_i/Γ)	p (MeV/c)
$\gamma \gamma$	seen	1961
$K \bar{K} \pi$	not seen	1878
$K^+ K^- \pi^+ \pi^- \pi^0$	not seen	1822
$D \bar{D}$	seen	607
$D^+ D^-$	seen	592
$D^0 \bar{D}^0$	seen	607
$\pi^+ \pi^- \eta_c(1S)$	not seen	788
$K \bar{K}$	not seen	1898

NODE=M050215;DESIG=1;OUR EVAL;

→ UNCHECKED ←

DESIG=5;OUR EVAL;→ UNCHECKED ←

DESIG=6;OUR EVAL;→ UNCHECKED ←

DESIG=2;OUR EVAL;→ UNCHECKED ←

DESIG=3;OUR EVAL;→ UNCHECKED ←

DESIG=4;OUR EVAL;→ UNCHECKED ←

DESIG=7;OUR EVAL;→ UNCHECKED ←

DESIG=8;OUR EVAL;→ UNCHECKED ←

 $\psi(4040)$ [s]

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

Mass $m = 4040 \pm 4$ MeVFull width $\Gamma = 84 \pm 12$ MeV

NODE=M072

NODE=M072M;DTYPE=M

NODE=M072W;DTYPE=G

Due to the complexity of the $c\bar{c}$ threshold region, in this listing, “seen” (“not seen”) means that a cross section for the mode in question has been measured at effective $\sqrt{s}$ near this particle’s central mass value, more (less) than 2σ above zero, without regard to any peaking behavior in $\sqrt{s}$ or absence thereof. See mode listing(s) for details and references.

NODE=M072215;NODE=M072

$\psi(4040)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	P (MeV/c)	
e^+e^-	$(1.02 \pm 0.17) \times 10^{-5}$		2020	DESIG=5
$D\bar{D}$	seen		776	DESIG=17;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
$D^0\bar{D}^0$	seen		776	DESIG=1
D^+D^-	seen		764	DESIG=18
$D^*\bar{D} + \text{c.c.}$	seen		570	DESIG=19;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
$D^*(2007)^0\bar{D}^0 + \text{c.c.}$	seen		576	DESIG=2
$D^*(2010)^+D^- + \text{c.c.}$	seen		562	DESIG=20
$D^*\bar{D}^*$	seen		196	DESIG=21;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
$D^*(2007)^0\bar{D}^*(2007)^0$	seen		228	DESIG=3
$D^*(2010)^+D^*(2010)^-$	seen		196	DESIG=22
$D\bar{D}\pi$ (excl. $D^*\bar{D}$)	not seen		—	DESIG=23;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
$D^0D^-\pi^+ + \text{c.c.}$ (excl. $D^*(2010)^+D^- + \text{c.c.}$)	not seen		—	DESIG=24
$D\bar{D}^*\pi$ (excl. $D^*\bar{D}^*$)	not seen		—	DESIG=25
$D^0\bar{D}^{*-}\pi^+ + \text{c.c.}$ (excl. $D^*(2010)^+D^*(2010)^-$)	seen		—	DESIG=26
$D_s^+D_s^-$	seen		453	DESIG=27
$\pi^+\pi^+\pi^-\pi^-\pi^0$	seen		1979	DESIG=37;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
$J/\psi(1S)$ hadrons	seen		—	DESIG=4;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
$J/\psi\pi^+\pi^-$	$< 4 \times 10^{-3}$	90%	795	DESIG=7
$J/\psi\pi^0\pi^0$	$< 2 \times 10^{-3}$	90%	797	DESIG=8
$J/\psi\eta$	$(5.2 \pm 0.7) \times 10^{-3}$		676	DESIG=9
$J/\psi\pi^0$	$< 2.8 \times 10^{-4}$	90%	824	DESIG=10
$J/\psi\pi^+\pi^-\pi^0$	$< 2 \times 10^{-3}$	90%	747	DESIG=11
$\chi_{c1}\gamma$	$< 3.4 \times 10^{-3}$	90%	494	DESIG=12
$\chi_{c2}\gamma$	$< 5 \times 10^{-3}$	90%	455	DESIG=13
$\chi_{c1}\pi^+\pi^-\pi^0$	$< 1.1 \%$	90%	307	DESIG=14
$\chi_{c2}\pi^+\pi^-\pi^0$	$< 3.2 \%$	90%	234	DESIG=15
$h_c(1P)\pi^+\pi^-$	$< 3 \times 10^{-3}$	90%	404	DESIG=28
$\phi\pi^+\pi^-$	$< 3 \times 10^{-3}$	90%	1880	DESIG=16
$\Lambda\bar{\Lambda}\pi^+\pi^-$	$< 2.9 \times 10^{-4}$	90%	1579	DESIG=29
$\Lambda\bar{\Lambda}\pi^0$	$< 9 \times 10^{-5}$	90%	1636	DESIG=30
$\Lambda\bar{\Lambda}\eta$	$< 3.0 \times 10^{-4}$	90%	1452	DESIG=31
$\Lambda\bar{\Lambda}$	$< 6 \times 10^{-6}$	90%	1684	DESIG=36
$\Sigma^+\bar{\Sigma}^-$	$< 1.3 \times 10^{-4}$	90%	1632	DESIG=32
$\Sigma^0\bar{\Sigma}^0$	$< 7 \times 10^{-5}$	90%	1630	DESIG=33
$\Xi^+\bar{\Xi}^-$	$< 1.6 \times 10^{-4}$	90%	1527	DESIG=34
$\Xi^0\bar{\Xi}^0$	$< 1.8 \times 10^{-4}$	90%	1533	DESIG=35
$\Xi^-\bar{\Xi}^+$	$< 6 \times 10^{-5}$	90%	1527	DESIG=38
$\Lambda\bar{\Xi}^+K^- + \text{c.c.}$	$< 7 \times 10^{-5}$	90%	1386	DESIG=39
$\Sigma^0\bar{\Xi}^+K^- + \text{c.c.}$	$< 1.5 \times 10^{-5}$	90%	1343	DESIG=40
$\mu^+\mu^-$	$(9 \pm 6) \times 10^{-6}$		2017	DESIG=6

 $\chi_{c1}(4140)$

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

NODE=M193

was $X(4140)$

$$\text{Mass } m = 4146.5 \pm 3.0 \text{ MeV} \quad (S = 1.3)$$

$$\text{Full width } \Gamma = 19^{+7}_{-5} \text{ MeV}$$

NODE=M193M;DTYPE=M

NODE=M193W;DTYPE=G

$\chi_{c1}(4140)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$J/\psi\phi$	seen	216
$\gamma\gamma$	not seen	2073

NODE=M193215;DESIG=1
DESIG=2

$\psi(4160)$ [s]

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

Mass $m = 4191 \pm 5$ MeV

Full width $\Gamma = 69 \pm 10$ MeV

Due to the complexity of the $c\bar{c}$ threshold region, in this listing, "seen" ("not seen") means that a cross section for the mode in question has been measured at effective $\sqrt{s}$ near this particle's central mass value, more (less) than 2σ above zero, without regard to any peaking behavior in $\sqrt{s}$ or absence thereof. See mode listing(s) for details and references.

NODE=M025
NODE=M025M;DTYPE=M
NODE=M025W;DTYPE=G
NODE=M025215;NODE=M025

$\psi(4160)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
e^+e^-	$(6.9 \pm 3.3) \times 10^{-6}$		2096
$\mu^+\mu^-$	seen		2093
$D\bar{D}$	seen		956
$D^0\bar{D}^0$	seen		956
D^+D^-	seen		947
$D^*\bar{D} + \text{c.c.}$	seen		798
$D^*(2007)^0\bar{D}^0 + \text{c.c.}$	seen		802
$D^*(2010)^+D^- + \text{c.c.}$	seen		792
$D^*\bar{D}^*$	seen		592
$D^*(2007)^0\bar{D}^*(2007)^0$	seen		604
$D^*(2010)^+D^*(2010)^-$	seen		592
$D^0D^-\pi^+ + \text{c.c. (excl. } D^*(2010)^+D^- + \text{c.c.)}$	not seen		—
$D\bar{D}^*\pi + \text{c.c. (excl. } D^*\bar{D}^*)$	seen		—
$D^0D^*\pi^+ + \text{c.c. (excl. } D^*(2010)^+D^*(2010)^-)$	not seen		—
$D_s^+D_s^-$	not seen		719
$D_s^{*+}D_s^- + \text{c.c.}$	seen		478
$J/\psi\pi^+\pi^-$	$< 3 \times 10^{-3}$	90%	919
$J/\psi\pi^0\pi^0$	$< 3 \times 10^{-3}$	90%	921
$J/\psi K^+K^-$	$< 2 \times 10^{-3}$	90%	407
$J/\psi\eta$	$< 8 \times 10^{-3}$	90%	821
$J/\psi\pi^0$	$< 1 \times 10^{-3}$	90%	944
$J/\psi\eta'$	$< 5 \times 10^{-3}$	90%	456
$J/\psi\pi^+\pi^-\pi^0$	$< 1 \times 10^{-3}$	90%	879
$\psi(2S)\pi^+\pi^-$	$< 4 \times 10^{-3}$	90%	395
$\chi_{c1}\gamma$	$< 5 \times 10^{-3}$	90%	625
$\chi_{c2}\gamma$	$< 1.3 \%$	90%	587
$\chi_{c1}\pi^+\pi^-\pi^0$	$< 2 \times 10^{-3}$	90%	496
$\chi_{c2}\pi^+\pi^-\pi^0$	$< 8 \times 10^{-3}$	90%	444
$h_c(1P)\pi^+\pi^-$	$< 5 \times 10^{-3}$	90%	556
$h_c(1P)\pi^0\pi^0$	$< 2 \times 10^{-3}$	90%	560
$h_c(1P)\eta$	$< 2 \times 10^{-3}$	90%	348
$h_c(1P)\pi^0$	$< 4 \times 10^{-4}$	90%	600
$\omega\pi^+\pi^-$	seen		2013
$\phi\pi^+\pi^-$	$< 2 \times 10^{-3}$	90%	1961
$\gamma\chi_{c1}(3872)$	$< 1.6 \times 10^{-3}$	90%	307
$\gamma\chi_{c0}(3915) \rightarrow \gamma J/\psi\pi^+\pi^-$	$< 1.36 \times 10^{-4}$	90%	—
$\gamma X(3930) \rightarrow \gamma J/\psi\pi^+\pi^-$	$< 1.18 \times 10^{-4}$	90%	—
$\gamma X(3940) \rightarrow \gamma J/\psi\pi^+\pi^-$	$< 1.47 \times 10^{-4}$	90%	—

DESIG=1
DESIG=33
DESIG=15;OUR EVAL;→ UNCHECKED ←
DESIG=16
DESIG=17
DESIG=18;OUR EVAL;→ UNCHECKED ←
DESIG=19
DESIG=20
DESIG=21;OUR EVAL;→ UNCHECKED ←
DESIG=22
DESIG=23
DESIG=24
DESIG=25
DESIG=26
DESIG=27
DESIG=28
DESIG=2
DESIG=3
DESIG=4
DESIG=5
DESIG=6
DESIG=7
DESIG=8
DESIG=9
DESIG=10
DESIG=11
DESIG=12
DESIG=13
DESIG=29
DESIG=30
DESIG=31
DESIG=32
DESIG=49;OUR EVAL;→ UNCHECKED ←
DESIG=14
DESIG=44
DESIG=35
DESIG=36
DESIG=37

$\gamma\chi_{c0}(3915) \rightarrow \gamma\gamma J/\psi$	$< 1.26 \times 10^{-4}$	90%	—	DESIG=39
$\gamma X(3930) \rightarrow \gamma\gamma J/\psi$	$< 8.8 \times 10^{-5}$	90%	—	DESIG=40
$\gamma X(3940) \rightarrow \gamma\gamma J/\psi$	$< 1.79 \times 10^{-4}$	90%	—	DESIG=41
$\omega\pi^0$	not seen		2020	DESIG=47
$\omega\eta$	not seen		1984	DESIG=48
K^+K^-	not seen		2037	DESIG=42;OUR EVAL;→ UNCHECKED ←
$K_S^0 K^\pm \pi^\mp$	seen		2017	DESIG=43;OUR EVAL;→ UNCHECKED ←
$p\bar{p}p\bar{p}$	not seen		834	DESIG=45
$\Lambda\bar{\Lambda}$	$< 1.5 \times 10^{-6}$	90%	1774	DESIG=46
$\Sigma^+ \bar{\Sigma}^-$	$< 2.0 \times 10^{-4}$	90%	1725	DESIG=52
$\Sigma^0 \bar{\Sigma}^0$	$< 5 \times 10^{-5}$	90%	1723	DESIG=56
$\Xi^0 \bar{\Xi}^0$	$< 1.4 \times 10^{-4}$	90%	1632	DESIG=55
$\Xi^- \bar{\Xi}^+$	$< 8 \times 10^{-5}$	90%	1626	DESIG=50
$pK^- \bar{\Lambda} + \text{c.c.}$	$< 6 \times 10^{-6}$	90%	1659	DESIG=51
$\Lambda \bar{\Xi}^+ K^- + \text{c.c.}$	seen		1494	DESIG=53;OUR EVAL;→ UNCHECKED ←
$\Sigma^0 \bar{\Xi}^+ K^- + \text{c.c.}$	$< 3.1 \times 10^{-6}$	90%	1454	DESIG=54

 $\psi(4230)$

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

NODE=M074

also known as $Y(4230)$; was $\psi(4260)$

$$\text{Mass } m = 4221.7 \pm 2.5 \text{ MeV} \quad (S = 1.9)$$

$$\text{Full width } \Gamma = 51 \pm 7 \text{ MeV} \quad (S = 3.4)$$

NODE=M074M;DTYPE=M

NODE=M074W;DTYPE=G

$\psi(4230)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)	
$\mu^+ \mu^-$	$(3.0 \pm 2.7) \times 10^{-5}$	2107	NODE=M074215;DESIG=63
$\eta_c(1S) \pi^+ \pi^-$	not seen	1027	DESIG=65
$\eta_c(1S) \pi^+ \pi^- \pi^0$	seen	992	DESIG=64
$J/\psi \pi^+ \pi^-$	seen	942	DESIG=2
$J/\psi f_0(980), f_0(980) \rightarrow \pi^+ \pi^-$	seen	—	DESIG=41;OUR EVAL;→ UNCHECKED ←
$T_{c\bar{c}1}(3900)^\pm \pi^\mp, T_{c\bar{c}1}^\pm \rightarrow$	seen	—	DESIG=43;OUR EVAL;→ UNCHECKED ←
$J/\psi \pi^\pm$			
$J/\psi \pi^0 \pi^0$	seen	944	DESIG=4
$J/\psi K^+ K^-$	seen	460	DESIG=5;OUR EVAL;→ UNCHECKED ←
$J/\psi K_S^0 K_S^0$	not seen	447	DESIG=44
$J/\psi \eta$	seen	848	DESIG=6
$J/\psi \pi^0$	not seen	966	DESIG=7;OUR EVAL;→ UNCHECKED ←
$J/\psi \eta'$	seen	504	DESIG=8;OUR EVAL;→ UNCHECKED ←
$J/\psi \pi^+ \pi^- \pi^0$	not seen	904	DESIG=9;OUR EVAL;→ UNCHECKED ←
$J/\psi \eta \pi^0$	not seen	770	DESIG=45
$J/\psi \eta \eta$	not seen	211	DESIG=10;OUR EVAL;→ UNCHECKED ←
$\psi(2S) \pi^+ \pi^-$	seen	426	DESIG=11
$\psi(2S) \eta$	not seen	†	DESIG=12;OUR EVAL;→ UNCHECKED ←
$\chi_{c0} \omega$	seen	171	DESIG=13
$\chi_{c1} \pi^+ \pi^- \pi^0$	not seen	527	DESIG=16;OUR EVAL;→ UNCHECKED ←
$\chi_{c2} \pi^+ \pi^- \pi^0$	not seen	477	DESIG=17;OUR EVAL;→ UNCHECKED ←
$h_c(1P) \pi^+ \pi^-$	seen	583	DESIG=40
$h_c(1P) \eta$	seen	391	DESIG=83
$\phi \pi^+ \pi^-$	not seen	1976	DESIG=18;OUR EVAL;→ UNCHECKED ←
$\phi f_0(980) \rightarrow \phi \pi^+ \pi^-$	not seen	—	DESIG=22;OUR EVAL;→ UNCHECKED ←
$\phi K^+ K^-$	not seen	1856	DESIG=72;OUR EVAL;→ UNCHECKED ←
$\phi K_S^0 K_S^0$	not seen	1854	DESIG=73;OUR EVAL;→ UNCHECKED ←
$\phi \eta$	not seen	1947	DESIG=76
$\phi \eta'$	not seen	1864	DESIG=70;OUR EVAL;→ UNCHECKED ←
$D\bar{D}$	not seen	987	DESIG=19;OUR EVAL;→ UNCHECKED ←
$D^0 \bar{D}^0$	possibly seen	987	DESIG=31
$D^+ D^-$	possibly seen	978	DESIG=32
$D^* \bar{D} + \text{c.c.}$	not seen	835	DESIG=23;OUR EVAL;→ UNCHECKED ←
$D^*(2007)^0 \bar{D}^0 + \text{c.c.}$	not seen	839	DESIG=33

$D^*(2010)^+ D^- + c.c.$	not seen	829	DESIG=34
$D^* \bar{D}^*$	not seen	641	DESIG=24;OUR EST;→ UNCHECKED ←
$D^*(2007)^0 \bar{D}^*(2007)^0$	not seen	652	DESIG=35
$D^*(2010)^+ D^*(2010)^-$	not seen	641	DESIG=36
$D \bar{D} \pi + c.c.$	not seen	847	DESIG=37;OUR EST;→ UNCHECKED ←
$D^0 D^- \pi^+ + c.c. \text{ (excl. } D^*(2007)^0 \bar{D}^{*0} + c.c., D^*(2010)^+ D^- + c.c.)$	not seen	—	DESIG=38
$D \bar{D}^* \pi + c.c. \text{ (excl. } D^* \bar{D}^*)$	not seen	723	DESIG=25
$D^0 D^*(2010)^- \pi^+ + c.c.$	seen	650	DESIG=30
$D_1(2420) \bar{D} + c.c.$	not seen	†	DESIG=50
$D^* \bar{D}^* \pi$	seen	367	DESIG=26
$D^{*0} D^{*-} \pi^+$	seen	364	DESIG=74;OUR EVAL;→ UNCHECKED ←
$D_s^+ D_s^-$	not seen	760	DESIG=27
$D_s^{*+} D_s^- + c.c.$	not seen	538	DESIG=28
$D_s^{*+} D_s^{*-}$	not seen	†	DESIG=29
$p \bar{p}$	not seen	1890	DESIG=3;OUR EVAL;→ UNCHECKED ←
$p \bar{p} \pi^0$	not seen	1854	DESIG=46;OUR EVAL;→ UNCHECKED ←
$p \bar{p} \eta$	not seen	1712	DESIG=61
$\omega \pi^+ \pi^-$	seen	2028	DESIG=71;OUR EVAL;→ UNCHECKED ←
$p \bar{p} \omega$	not seen	1610	DESIG=62
$\Xi^- \Xi^+$	not seen	1645	DESIG=51;OUR EVAL;→ UNCHECKED ←
$\pi^+ \pi^+ \pi^- \pi^-$	not seen	2087	DESIG=53;OUR EVAL;→ UNCHECKED ←
$\pi^+ \pi^+ \pi^- \pi^- \pi^0$	not seen	2071	DESIG=54;OUR EVAL;→ UNCHECKED ←
$\omega \pi^0$	not seen	2035	DESIG=68
$\omega \eta$	not seen	1999	DESIG=69
$K_S^0 K^\pm \pi^\mp$	not seen	2032	DESIG=20;OUR EVAL;→ UNCHECKED ←
$K_S^0 K^\pm \pi^\mp \pi^0$	not seen	2009	DESIG=48;OUR EVAL;→ UNCHECKED ←
$K_S^0 K^\pm \pi^\mp \eta$	not seen	1917	DESIG=49;OUR EVAL;→ UNCHECKED ←
$K^+ K^- \pi^0$	not seen	2033	DESIG=21;OUR EVAL;→ UNCHECKED ←
$K^+ K^- \pi^+ \pi^-$	not seen	2008	DESIG=55;OUR EVAL;→ UNCHECKED ←
$K^+ K^- \pi^+ \pi^- \pi^0$	not seen	1981	DESIG=56;OUR EVAL;→ UNCHECKED ←
$K^+ K^+ K^- K^-$	not seen	1813	DESIG=57;OUR EVAL;→ UNCHECKED ←
$K^+ K^+ K^- K^- \pi^0$	not seen	1762	DESIG=58;OUR EVAL;→ UNCHECKED ←
$p \bar{p} \pi^+ \pi^-$	not seen	1810	DESIG=59;OUR EVAL;→ UNCHECKED ←
$p \bar{p} \pi^+ \pi^- \pi^0$	not seen	1764	DESIG=60;OUR EVAL;→ UNCHECKED ←
$p \bar{p} p \bar{p}$	not seen	864	DESIG=67
$\Lambda \bar{\Lambda}$	not seen	1791	DESIG=52;OUR EVAL;→ UNCHECKED ←
$\Sigma^+ \bar{\Sigma}^-$	not seen	1743	DESIG=77;OUR EVAL;→ UNCHECKED ←
$p K^- \bar{\Lambda} + c.c.$	not seen	1677	DESIG=75;OUR EVAL;→ UNCHECKED ←
$\Lambda \Xi^+ K^- + c.c.$	not seen	1514	DESIG=78;OUR EVAL;→ UNCHECKED ←
$\Sigma^0 \Xi^+ K^- + c.c.$	not seen	1474	DESIG=79;OUR EVAL;→ UNCHECKED ←

Radiative decays

$\eta_c(1S) \gamma$	possibly seen	1055	NODE=M074;CLUMP=C DESIG=47
$\eta_c(1S) \pi^0 \gamma$	not seen	1048	DESIG=66
$\eta_c(1S) \eta \gamma$	not seen	943	DESIG=81
$\eta_c(1S) \eta' \gamma$	not seen	661	DESIG=82
$\chi_{c1} \gamma$	not seen	650	DESIG=14;OUR EVAL;→ UNCHECKED ←
$\chi_{c2} \gamma$	not seen	612	DESIG=15;OUR EVAL;→ UNCHECKED ←
$\chi_{c1}(3872) \gamma$	seen	334	DESIG=42

 $\chi_{c1}(4274)$

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

NODE=M233

was $X(4274)$

Mass $m = 4290 \pm 6 \text{ MeV}$ ($S = 1.5$)
 Full width $\Gamma = 54 \pm 8 \text{ MeV}$ ($S = 1.2$)

NODE=M233M;DTYPE=M
 NODE=M233W;DTYPE=G

$\chi_{c1}(4274)$ DECAY MODESFraction (Γ_i/Γ) p (MeV/c)

Decay Mode	Fraction (Γ_i/Γ)	p (MeV/c)
$J/\psi \phi$	seen	529

NODE=M233215;DESIG=1

 $\psi(4360)$

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

NODE=M181

also known as $Y(4360)$; was $X(4360)$ Mass $m = 4373 \pm 7$ MeV ($S = 2.3$)

NODE=M181M;DTYPE=M

Full width $\Gamma = 124 \pm 13$ MeV ($S = 2.4$)

NODE=M181W;DTYPE=G

 $\psi(4360)$ DECAY MODESFraction (Γ_i/Γ) p (MeV/c)

Decay Mode	Fraction (Γ_i/Γ)	p (MeV/c)
$e^+ e^-$	seen	2187
$h_c \pi^+ \pi^-$	seen	722
$J/\psi \pi^+ \pi^-$	seen	1063
$\psi(2S) \pi^+ \pi^-$	seen	578
$\psi(3770) \pi^+ \pi^-$	possibly seen	494
$\psi_2(3823) \pi^+ \pi^-$	seen	443
$J/\psi \eta$	seen	982
$D^0 D^{*-} \pi^+$	not seen	867
$D^+ D^- \pi^+ \pi^-$	seen	861
$D_1(2420) \bar{D} + \text{c.c.}$	possibly seen	429
$\phi \eta$	not seen	2029
$\omega \pi^0$	not seen	2114
$\omega \eta$	not seen	2080
$p \bar{p} \eta$	not seen	1805
$p \bar{p} \omega$	not seen	1708
$\chi_{c1} \gamma$	not seen	777
$\chi_{c2} \gamma$	not seen	741
$\Sigma^+ \bar{\Sigma}^-$	not seen	1835
$\Xi^- \bar{\Xi}^+$	not seen	1742
$p K^- \bar{\Lambda} + \text{c.c.}$	not seen	1772
$\Lambda \Xi^+ K^- + \text{c.c.}$	not seen	1619
$\Sigma^0 \Xi^+ K^- + \text{c.c.}$	not seen	1582

NODE=M181215;DESIG=1;OUR EVAL;

→ UNCHECKED ←

DESIG=12

DESIG=8;OUR EVAL;→ UNCHECKED ←

DESIG=2

DESIG=11

DESIG=5

DESIG=4

DESIG=3;OUR EVAL;→ UNCHECKED ←

DESIG=17

DESIG=10

DESIG=20

DESIG=15

DESIG=16

DESIG=13

DESIG=14

DESIG=6;OUR EVAL;→ UNCHECKED ←

DESIG=7;OUR EVAL;→ UNCHECKED ←

DESIG=21;OUR EVAL;→ UNCHECKED ←

DESIG=18;OUR EVAL;→ UNCHECKED ←

DESIG=19;OUR EVAL;→ UNCHECKED ←

DESIG=22;OUR EVAL;→ UNCHECKED ←

DESIG=23;OUR EVAL;→ UNCHECKED ←

 $\psi(4415)$ [s]

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

NODE=M073

Mass $m = 4415 \pm 5$ MeV

NODE=M073M;DTYPE=M

Full width $\Gamma = 110 \pm 13$ MeV ($S = 1.6$)

NODE=M073W;DTYPE=G

Due to the complexity of the $c\bar{c}$ threshold region, in this listing, “seen” (“not seen”) means that a cross section for the mode in question has been measured at effective $\sqrt{s}$ near this particle’s central mass value, more (less) than 2σ above zero, without regard to any peaking behavior in $\sqrt{s}$ or absence thereof. See mode listing(s) for details and references.

NODE=M073215;NODE=M073

$\psi(4415)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	P (MeV/c)	
$D\bar{D}$	seen		1181	DESIG=7;OUR EVAL;→ UNCHECKED ←
$D^0\bar{D}^0$	seen		1181	DESIG=8
D^+D^-	seen		1173	DESIG=9
$D^*\bar{D} + \text{c.c.}$	seen		1057	DESIG=10;OUR EVAL;→ UNCHECKED ←
$D^*(2007)^0\bar{D}^0 + \text{c.c.}$	seen		1060	DESIG=11
$D^*(2010)^+D^- + \text{c.c.}$	seen		1052	DESIG=12
$D^*\bar{D}^*$	seen		911	DESIG=13;OUR EVAL;→ UNCHECKED ←
$D^*(2007)^0\bar{D}^*(2007)^0 + \text{c.c.}$	seen		919	DESIG=14
$D^*(2010)^+D^*(2010)^- + \text{c.c.}$	seen		911	DESIG=15
$D^0D^-\pi^+$ (excl. $D^*(2010)^+D^- + \text{c.c.}$)	< 2.3 %	90%	—	DESIG=4
$D\bar{D}_2^*(2460) \rightarrow D^0D^-\pi^+ + \text{c.c.}$	(10 ± 4) %		—	DESIG=5
$D^0\bar{D}^{*-}\pi^+ + \text{c.c.}$	< 31 %	90%	918	DESIG=6
$D_1(2420)\bar{D} + \text{c.c.}$	possibly seen		523	DESIG=25
$D_s^+D_s^-$	not seen		999	DESIG=16
$\omega\chi_{c2}$	(9 ± 4) $\times 10^{-3}$		317	DESIG=20
$D_s^{*+}D_s^- + \text{c.c.}$	seen		842	DESIG=17
$D_s^{*+}D_s^{*-}$	seen		641	DESIG=18
$\psi_2(3823)\pi^+\pi^-$	possibly seen		486	DESIG=21
$\psi(3770)\pi^+\pi^-$	possibly seen		535	DESIG=24
$J/\psi\eta$	< 1.0 %	90%	1017	DESIG=19
$\chi_{c1}\gamma$	< 1.3 $\times 10^{-3}$	90%	811	DESIG=22
$\chi_{c2}\gamma$	< 7 $\times 10^{-3}$	90%	775	DESIG=23
$\Lambda\bar{\Lambda}$	< 5 $\times 10^{-6}$	90%	1905	DESIG=27
$\Sigma^+\bar{\Sigma}^-$	< 1.8 $\times 10^{-4}$	90%	1859	DESIG=32
$\Sigma^0\bar{\Sigma}^0$	< 4 $\times 10^{-5}$	90%	1857	DESIG=36
$\Xi^0\bar{\Xi}^0$	< 1.4 $\times 10^{-4}$	90%	1773	DESIG=35
$\Xi^-\bar{\Xi}^+$	< 6 $\times 10^{-5}$	90%	1768	DESIG=30
$pK^-\bar{\Lambda} + \text{c.c.}$	< 1.0 $\times 10^{-5}$	90%	1798	DESIG=31
$\Lambda\bar{\Xi}^+K^- + \text{c.c.}$	< 4 $\times 10^{-5}$	90%	1647	DESIG=33
$\Sigma^0\bar{\Xi}^+K^- + \text{c.c.}$	< 2.5 $\times 10^{-4}$	90%	1610	DESIG=34
$\omega\pi^0$	not seen		2136	DESIG=28
$\omega\eta$	not seen		2102	DESIG=29
e^+e^-	(3.2±1.2) $\times 10^{-6}$		2207	DESIG=1
$\mu^+\mu^-$	(1.1±0.4) $\times 10^{-5}$		2205	DESIG=26

$\psi(4660)$

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

NODE=M189

also known as $Y(4660)$; was $X(4660)$

Mass $m = 4623 \pm 10$ MeV ($S = 3.7$)
Full width $\Gamma = 55 \pm 9$ MeV ($S = 1.9$)

NODE=M189M;DTYPE=M
NODE=M189W;DTYPE=G

$\psi(4660)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$e^+ e^-$	not seen	2311
$\psi(2S)\pi^+\pi^-$	seen	803
$J/\psi\eta$	not seen	1186
$D^0 D^{*-}\pi^+$	not seen	1146
$D^{*0} D^{*-}\pi^+$	seen	1011
$\psi_2(3823)\pi^+\pi^-$	seen	684
$\chi_{c0}\phi$	not seen	559
$\chi_{c1}\gamma$	not seen	978
$\chi_{c1}\phi$	not seen	387
$\chi_{c2}\gamma$	not seen	943
$\chi_{c2}\phi$	seen	275
$\Lambda_c^+ \Lambda_c^-$	seen	338
$D_s^+ D_{s1}(2536)^-$	seen	517
$D_s^+ D_{s2}^*(2573)^-$	seen	—
$\omega\pi^0$	not seen	2243
$\omega\eta$	not seen	2211
$\Sigma^+ \bar{\Sigma}^-$	not seen	1982
$\Xi^0 \bar{\Xi}^0$	not seen	1901
$\Xi^- \bar{\Xi}^+$	not seen	1896
$pK^- \bar{\Lambda} + \text{c.c.}$	not seen	1924
$\Lambda \bar{\Xi}^+ K^- + \text{c.c.}$	not seen	1784
$\Sigma^0 \bar{\Xi}^+ K^- + \text{c.c.}$	not seen	1749

NODE=M189215;DESIG=1;OUR EVAL;
 → UNCHECKED ←
 DESIG=2;OUR EVAL;→ UNCHECKED ←
 DESIG=4;OUR EVAL;→ UNCHECKED ←
 DESIG=3;OUR EVAL;→ UNCHECKED ←
 DESIG=15;OUR EVAL;→ UNCHECKED ←
 DESIG=10
 DESIG=22;OUR EVAL;→ UNCHECKED ←
 DESIG=6;OUR EVAL;→ UNCHECKED ←
 DESIG=13;OUR EVAL;→ UNCHECKED ←
 DESIG=7;OUR EVAL;→ UNCHECKED ←
 DESIG=14;OUR EVAL;→ UNCHECKED ←
 DESIG=5;OUR EVAL;→ UNCHECKED ←
 DESIG=8;OUR EVAL;→ UNCHECKED ←
 DESIG=9;OUR EVAL;→ UNCHECKED ←
 DESIG=11
 DESIG=12
 DESIG=18;OUR EVAL;→ UNCHECKED ←
 DESIG=21;OUR EVAL;→ UNCHECKED ←
 DESIG=16;OUR EVAL;→ UNCHECKED ←
 DESIG=17;OUR EVAL;→ UNCHECKED ←
 DESIG=19;OUR EVAL;→ UNCHECKED ←
 DESIG=20;OUR EVAL;→ UNCHECKED ←

$b\bar{b}$ MESONS (including possibly non- $q\bar{q}$ states)

NODE=MXXX030

$\eta_b(1S)$

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

Mass $m = 9398.7 \pm 2.0$ MeV ($S = 1.5$)

Full width $\Gamma = 10^{+5}_{-4}$ MeV

NODE=M171

NODE=M171M;DTYPE=M

NODE=M171W;DTYPE=G

$\eta_b(1S)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
hadrons	seen	—	—
$3h^+3h^-$	not seen		4672
$2h^+2h^-$	not seen		4689
$4h^+4h^-$	not seen		4648
$\gamma\gamma$	not seen		4699
$\mu^+\mu^-$	$<9 \times 10^{-3}$	90%	4698
$\tau^+\tau^-$	$<8\%$	90%	4350

NODE=M171225;DESIG=7

DESIG=1;OUR EST;→ UNCHECKED ←

DESIG=2;OUR EST;→ UNCHECKED ←

DESIG=4;OUR EST;→ UNCHECKED ←

DESIG=3;OUR EST;→ UNCHECKED ←

DESIG=5

DESIG=6

$\tau(1S)$

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

Mass $m = 9460.40 \pm 0.10$ MeV

Full width $\Gamma = 54.02 \pm 1.25$ keV

NODE=M049

NODE=M049M;DTYPE=M

NODE=M049W;DTYPE=G;OUR EVAL;
 → UNCHECKED ←

$\Upsilon(1S)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)	
$\tau^+ \tau^-$	(2.60 $\pm$ 0.10) %		4384	NODE=M049215;DESIG=3
$e^+ e^-$	(2.39 $\pm$ 0.08) %		4730	DESIG=2
$\mu^+ \mu^-$	(2.48 $\pm$ 0.04) %		4729	DESIG=1
Hadronic decays				NODE=M049;CLUMP=A
$g g g$	(81.7 $\pm$ 0.7) %		—	DESIG=117
$\gamma g g$	(2.2 $\pm$ 0.6) %		—	DESIG=118
$\eta'(958)$ anything	(2.94 $\pm$ 0.24) %		—	DESIG=73
$J/\psi(1S)$ anything	(5.4 $\pm$ 0.4) $\times 10^{-4}$	S=1.4	4223	DESIG=12
$J/\psi(1S)\eta_c$	< 2.2	$\times 10^{-6}$ CL=90%	3623	DESIG=146
$J/\psi(1S)\chi_{c0}$	< 3.4	$\times 10^{-6}$ CL=90%	3429	DESIG=147
$J/\psi(1S)\chi_{c1}$	(3.9 $\pm$ 1.2) $\times 10^{-6}$		3382	DESIG=148
$J/\psi(1S)\chi_{c2}$	< 1.4	$\times 10^{-6}$ CL=90%	3359	DESIG=149
$J/\psi(1S)\eta_c(2S)$	< 2.2	$\times 10^{-6}$ CL=90%	3317	DESIG=150
$J/\psi(1S)X(3940)$	< 5.4	$\times 10^{-6}$ CL=90%	3148	DESIG=151
$J/\psi(1S)X(4160)$	< 5.4	$\times 10^{-6}$ CL=90%	3020	DESIG=152
$X(4350)$ anything, $X \rightarrow J/\psi(1S)\phi$	< 8.1	$\times 10^{-6}$ CL=90%	—	DESIG=167
$T_{c\bar{c}1}(3900)^\pm$ anything, $T_{c\bar{c}1} \rightarrow J/\psi(1S)\pi^\pm$	< 1.3	$\times 10^{-5}$ CL=90%	—	DESIG=168
$T_{c\bar{c}1}(4200)^\pm$ anything, $Z_c \rightarrow J/\psi(1S)\pi^\pm$	< 6.0	$\times 10^{-5}$ CL=90%	—	DESIG=169
$T_{c\bar{c}1}(4430)^\pm$ anything, $T_{c\bar{c}1} \rightarrow J/\psi(1S)\pi^\pm$	< 4.9	$\times 10^{-5}$ CL=90%	—	DESIG=170
$P_{c\bar{c}s}(4459)$ anything, $\bar{P}_{c\bar{c}s}(4459)$ anything	(3.5 $\pm$ 2.0) $\times 10^{-6}$		—	DESIG=201
$J/\psi(1S)\Lambda$ anything, $J/\psi(1S)\bar{\Lambda}$ anything	(3.7 $\pm$ 0.6) $\times 10^{-5}$		—	DESIG=202
$X_{cs}^\pm$ anything, $X \rightarrow J/\psi K^\pm$	< 5.7	$\times 10^{-6}$ CL=90%	—	DESIG=173
$\psi(4230)$ anything, $\psi \rightarrow J/\psi(1S)\pi^+\pi^-$	< 3.8	$\times 10^{-5}$ CL=90%	—	DESIG=161
$\psi(4230)$ anything, $\psi \rightarrow J/\psi(1S)K^+K^-$	< 7.5	$\times 10^{-6}$ CL=90%	—	DESIG=165
$\chi_{c1}(4140)$ anything, $\chi_{c1} \rightarrow J/\psi(1S)\phi$	< 5.2	$\times 10^{-6}$ CL=90%	—	DESIG=166
χ_{c0} anything	< 4	$\times 10^{-3}$ CL=90%	—	DESIG=5
χ_{c1} anything	(1.90 $\pm$ 0.35) $\times 10^{-4}$		—	DESIG=6
$\chi_{c1}(1P)X_{tetra}$	< 3.78	$\times 10^{-5}$ CL=90%	—	DESIG=175
χ_{c2} anything	(2.8 $\pm$ 0.8) $\times 10^{-4}$		—	DESIG=7
$\psi(2S)$ anything	(1.23 $\pm$ 0.20) $\times 10^{-4}$		—	DESIG=8
$\psi(2S)\eta_c$	< 3.6	$\times 10^{-6}$ CL=90%	3345	DESIG=153
$\psi(2S)\chi_{c0}$	< 6.5	$\times 10^{-6}$ CL=90%	3124	DESIG=154
$\psi(2S)\chi_{c1}$	< 4.5	$\times 10^{-6}$ CL=90%	3070	DESIG=155
$\psi(2S)\chi_{c2}$	< 2.1	$\times 10^{-6}$ CL=90%	3043	DESIG=156
$\psi(2S)\eta_c(2S)$	< 3.2	$\times 10^{-6}$ CL=90%	2994	DESIG=157
$\psi(2S)X(3940)$	< 2.9	$\times 10^{-6}$ CL=90%	2797	DESIG=158
$\psi(2S)X(4160)$	< 2.9	$\times 10^{-6}$ CL=90%	2645	DESIG=159
$\psi(4230)$ anything, $\psi \rightarrow \psi(2S)\pi^+\pi^-$	< 7.9	$\times 10^{-5}$ CL=90%	—	DESIG=162
$\psi(4360)$ anything, $\psi \rightarrow \psi(2S)\pi^+\pi^-$	< 5.2	$\times 10^{-5}$ CL=90%	—	DESIG=163
$\psi(4660)$ anything, $\psi \rightarrow \psi(2S)\pi^+\pi^-$	< 2.2	$\times 10^{-5}$ CL=90%	—	DESIG=164
$T_{c\bar{c}}(4050)^\pm$ anything, $X \rightarrow \psi(2S)\pi^\pm$	< 8.8	$\times 10^{-5}$ CL=90%	—	DESIG=171
$T_{c\bar{c}1}(4430)^\pm$ anything, $T_{c\bar{c}1} \rightarrow \psi(2S)\pi^\pm$	< 6.7	$\times 10^{-5}$ CL=90%	—	DESIG=172

$\chi_{c1}(3872)$ anything	< 2.2	$\times 10^{-4}$	CL=90%	—	DESIG=194
$T_{c\bar{c}1}(4200)^+ T_{c\bar{c}1}(4200)^-$	< 2.23	$\times 10^{-5}$	CL=90%	—	DESIG=178
$T_{c\bar{c}1}(3900)^\pm T_{c\bar{c}1}(4200)^\mp$	< 8.1	$\times 10^{-6}$	CL=90%	—	DESIG=179
$T_{c\bar{c}1}(3900)^+ T_{c\bar{c}1}(3900)^-$	< 1.8	$\times 10^{-6}$	CL=90%	—	DESIG=180
$T_{c\bar{c}}(4050)^+ T_{c\bar{c}}(4050)^-$	< 1.58	$\times 10^{-5}$	CL=90%	—	DESIG=181
$T_{c\bar{c}}(4250)^+ T_{c\bar{c}}(4250)^-$	< 2.66	$\times 10^{-5}$	CL=90%	—	DESIG=182
$T_{c\bar{c}}(4050)^\pm T_{c\bar{c}}(4250)^\mp$	< 4.42	$\times 10^{-5}$	CL=90%	—	DESIG=183
$T_{c\bar{c}1}(4430)^+ T_{c\bar{c}1}(4430)^-$	< 2.03	$\times 10^{-5}$	CL=90%	—	DESIG=184
$T_{c\bar{c}}(4055)^\pm T_{c\bar{c}}(4055)^\mp$	< 2.33	$\times 10^{-5}$	CL=90%	—	DESIG=186
$T_{c\bar{c}}(4055)^\pm T_{c\bar{c}1}(4430)^\mp$	< 4.55	$\times 10^{-5}$	CL=90%	—	DESIG=189
$\rho\pi$	< 3.68	$\times 10^{-6}$	CL=90%	4697	DESIG=11
$\omega\pi^0$	< 3.90	$\times 10^{-6}$	CL=90%	4697	DESIG=131
$\pi^+\pi^-$	< 5	$\times 10^{-4}$	CL=90%	4728	DESIG=23
K^+K^-	< 5	$\times 10^{-4}$	CL=90%	4704	DESIG=24
$p\bar{p}$	< 5	$\times 10^{-4}$	CL=90%	4636	DESIG=25
$\pi^+\pi^-\pi^0$	$(2.1 \pm 0.8) \times 10^{-6}$			4725	DESIG=72
ϕK^+K^-	$(2.4 \pm 0.5) \times 10^{-6}$			4623	DESIG=136
$\omega\pi^+\pi^-$	$(4.5 \pm 1.0) \times 10^{-6}$			4694	DESIG=137
$K^{*}(892)^0 K^- \pi^+ + \text{c.c.}$	$(4.4 \pm 0.8) \times 10^{-6}$			4667	DESIG=138
$\phi f_2'(1525)$	< 1.63	$\times 10^{-6}$	CL=90%	4551	DESIG=139
$\omega f_2(1270)$	< 1.79	$\times 10^{-6}$	CL=90%	4611	DESIG=140
$\rho(770) a_2(1320)$	< 2.24	$\times 10^{-6}$	CL=90%	4605	DESIG=141
$K^{*}(892)^0 \bar{K}_2^{*}(1430)^0 + \text{c.c.}$	$(3.0 \pm 0.8) \times 10^{-6}$			4579	DESIG=142
$K_1(1270)^\pm K^\mp$	< 2.41	$\times 10^{-6}$	CL=90%	4634	DESIG=143
$K_1(1400)^\pm K^\mp$	$(1.0 \pm 0.4) \times 10^{-6}$			4613	DESIG=144
$b_1(1235)^\pm \pi^\mp$	< 1.25	$\times 10^{-6}$	CL=90%	4649	DESIG=145
$\pi^+\pi^-\pi^0\pi^0$	$(1.28 \pm 0.30) \times 10^{-5}$			4720	DESIG=132
$K_S^0 K^+ \pi^- + \text{c.c.}$	$(1.6 \pm 0.4) \times 10^{-6}$			4696	DESIG=133
$K^{*}(892)^0 \bar{K}^0 + \text{c.c.}$	$(2.9 \pm 0.9) \times 10^{-6}$			4675	DESIG=134
$K^{*}(892)^- K^+ + \text{c.c.}$	< 1.11	$\times 10^{-6}$	CL=90%	4675	DESIG=135
$f_1(1285)$ anything	$(4.6 \pm 3.1) \times 10^{-3}$			—	DESIG=174
$D^{*}(2010)^\pm$ anything	$(2.52 \pm 0.20) \%$			—	DESIG=30
$f_1(1285) X_{tetra}$	< 6.24	$\times 10^{-5}$	CL=90%	—	DESIG=176
2H anything	$(2.85 \pm 0.25) \times 10^{-5}$			—	DESIG=107
Sum of 100 exclusive modes	$(1.200 \pm 0.017) \%$			—	DESIG=128

Radiative decays

$\gamma\pi^+\pi^-$	$(6.3 \pm 1.8) \times 10^{-5}$	4728	DESIG=70
$\gamma\pi^0\pi^0$	$(1.7 \pm 0.7) \times 10^{-5}$	4728	DESIG=71
$\gamma\pi\pi$ (S-wave)	$(4.6 \pm 0.7) \times 10^{-5}$	4728	DESIG=190
$\gamma\pi^0\eta$	$< 2.4 \times 10^{-6}$ CL=90%	4713	DESIG=111
γK^+K^-	[t] $(1.14 \pm 0.13) \times 10^{-5}$	4704	DESIG=102
$\gamma p\bar{p}$	[u] $< 6 \times 10^{-6}$ CL=90%	4636	DESIG=103
$\gamma 2h^+2h^-$	$(7.0 \pm 1.5) \times 10^{-4}$	4720	DESIG=20
$\gamma 3h^+3h^-$	$(5.4 \pm 2.0) \times 10^{-4}$	4703	DESIG=21
$\gamma 4h^+4h^-$	$(7.4 \pm 3.5) \times 10^{-4}$	4679	DESIG=22
$\gamma\pi^+\pi^-K^+K^-$	$(2.9 \pm 0.9) \times 10^{-4}$	4686	DESIG=14
$\gamma 2\pi^+2\pi^-$	$(2.5 \pm 0.9) \times 10^{-4}$	4720	DESIG=13
$\gamma 3\pi^+3\pi^-$	$(2.5 \pm 1.2) \times 10^{-4}$	4703	DESIG=17
$\gamma 2\pi^+2\pi^-K^+K^-$	$(2.4 \pm 1.2) \times 10^{-4}$	4659	DESIG=18
$\gamma\pi^+\pi^-p\bar{p}$	$(1.5 \pm 0.6) \times 10^{-4}$	4604	DESIG=15
$\gamma 2\pi^+2\pi^-p\bar{p}$	$(4 \pm 6) \times 10^{-5}$	4563	DESIG=19
$\gamma 2K^+2K^-$	$(2.0 \pm 2.0) \times 10^{-5}$	4601	DESIG=16
$\gamma\eta'(958)$	$< 1.9 \times 10^{-6}$ CL=90%	4682	DESIG=55
$\gamma\eta$	$< 1.0 \times 10^{-6}$ CL=90%	4714	DESIG=54
$\gamma f_0(980)$	$< 3 \times 10^{-5}$ CL=90%	4678	DESIG=105
$\gamma f_2'(1525)$	$(2.9 \pm 0.6) \times 10^{-5}$	4609	DESIG=52
$\gamma f_2(1270)$	$(1.01 \pm 0.06) \times 10^{-4}$	4644	DESIG=51
$\gamma\eta(1405)$	$< 8.2 \times 10^{-5}$ CL=90%	4625	DESIG=65
$\gamma f_0(1500)$	$< 1.5 \times 10^{-5}$ CL=90%	4608	DESIG=108
$\gamma f_0(1500) \rightarrow \gamma K^+K^-$	$(1.0 \pm 0.4) \times 10^{-5}$	-	DESIG=192

NODE=M049;CLUMP=B

$\gamma f_0(1710)$	< 2.6	$\times 10^{-4}$	CL=90%	4571	DESIG=53
$\gamma f_0(1710) \rightarrow \gamma K^+ K^-$	(1.01 ± 0.32)	$\times 10^{-5}$	—	—	DESIG=112
$\gamma f_0(1710) \rightarrow \gamma \pi^+ \pi^-$	(5.3 ± 2.0)	$\times 10^{-6}$	—	—	DESIG=191
$\gamma f_0(1710) \rightarrow \gamma \pi^0 \pi^0$	< 1.4	$\times 10^{-6}$	CL=90%	—	DESIG=109
$\gamma f_0(1710) \rightarrow \gamma \eta \eta$	< 1.8	$\times 10^{-6}$	CL=90%	—	DESIG=110
$\gamma f_4(2050)$	< 5.3	$\times 10^{-5}$	CL=90%	4515	DESIG=104
$\gamma f_0(2200) \rightarrow \gamma K^+ K^-$	< 2	$\times 10^{-4}$	CL=90%	4475	DESIG=69
$\gamma f_J(2220) \rightarrow \gamma K^+ K^-$	< 8	$\times 10^{-7}$	CL=90%	4469	DESIG=60
$\gamma f_J(2220) \rightarrow \gamma \pi^+ \pi^-$	< 6	$\times 10^{-7}$	CL=90%	—	DESIG=61
$\gamma f_J(2220) \rightarrow \gamma p \bar{p}$	< 1.1	$\times 10^{-6}$	CL=90%	—	DESIG=62
$\gamma \eta(2225) \rightarrow \gamma \phi \phi$	< 3	$\times 10^{-3}$	CL=90%	4469	DESIG=68
$\gamma \eta_c(1S)$	< 2.9	$\times 10^{-5}$	CL=90%	4260	DESIG=119
$\gamma \eta_c(2S)$	< 4	$\times 10^{-4}$	CL=90%	4031	DESIG=193
$\gamma \chi_{c0}$	< 6.6	$\times 10^{-5}$	CL=90%	4114	DESIG=120
$\gamma \chi_{c1}$	$(4.7^{+2.4}_{-1.9})$	$\times 10^{-5}$	—	4079	DESIG=121
$\gamma \chi_{c2}$	< 7.6	$\times 10^{-6}$	CL=90%	4062	DESIG=122
$\gamma \chi_{c1}(3872)$	< 4	$\times 10^{-5}$	CL=90%	3938	DESIG=195
$\gamma \chi_{c1}(3872), \chi_{c1} \rightarrow \pi^+ \pi^- \pi^0 J/\psi$	< 2.8	$\times 10^{-6}$	CL=90%	—	DESIG=124
$\gamma \chi_{c0}(3915) \rightarrow \omega J/\psi$	< 3.0	$\times 10^{-6}$	CL=90%	—	DESIG=125
$\gamma \chi_{c1}(4140) \rightarrow \phi J/\psi$	< 2.2	$\times 10^{-6}$	CL=90%	—	DESIG=126
$\gamma X \bar{X} (m_X < 3.1 \text{ GeV})$	$[v] < 1$	$\times 10^{-3}$	CL=90%	—	DESIG=67
$\gamma X \bar{X} (m_X < 4.5 \text{ GeV})$	$[x] < 2.4$	$\times 10^{-4}$	CL=90%	—	DESIG=127
$\gamma X \rightarrow \gamma + \geq 4 \text{ prongs}$	$[y] < 1.78$	$\times 10^{-4}$	CL=95%	—	DESIG=113
$\gamma A^0 \rightarrow \gamma \mu^+ \mu^-$	$[z] < 9$	$\times 10^{-6}$	CL=90%	—	DESIG=114
$\gamma A^0 \rightarrow \gamma \tau^+ \tau^-$	$[t] < 1.30$	$\times 10^{-4}$	CL=90%	—	DESIG=115
$\gamma A^0 \rightarrow \gamma g g$	$[aa] < 1$	%	CL=90%	—	DESIG=129
$\gamma A^0 \rightarrow \gamma s \bar{s}$	$[aa] < 1$	$\times 10^{-3}$	CL=90%	—	DESIG=130

Lepton Family number (LF) violating modes

$e^\pm \mu^\mp$	LF	< 3.9	$\times 10^{-7}$	CL=90%	4730	NODE=M049;CLUMP=C DESIG=196
$\mu^\pm \tau^\mp$	LF	< 2.7	$\times 10^{-6}$	CL=90%	4563	DESIG=116
$e^\pm \tau^\mp$	LF	< 2.7	$\times 10^{-6}$	CL=90%	4563	DESIG=197
$\gamma e^\pm \mu^\mp$	LF	< 4.2	$\times 10^{-7}$	CL=90%	4730	DESIG=198
$\gamma \mu^\pm \tau^\mp$	LF	< 6.1	$\times 10^{-6}$	CL=90%	4563	DESIG=199
$\gamma e^\pm \tau^\mp$	LF	< 6.5	$\times 10^{-6}$	CL=90%	4563	DESIG=200

Other decays

invisible	< 3.0	$\times 10^{-4}$	CL=90%	—	NODE=M049;CLUMP=D DESIG=106
hadrons	(96 ± 4)	%	—	—	DESIG=101

 $\chi_{b0}(1P)$

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

J needs confirmation.

NODE=M076

$$\text{Mass } m = 9859.44 \pm 0.42 \pm 0.31 \text{ MeV}$$

NODE=M076M;DTYPE=M;OUR EVAL;
→ UNCHECKED ←

$\chi_{b0}(1P)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	P (MeV/c)	
$\gamma \Upsilon(1S)$	(1.94 ± 0.27) %		391	NODE=M076215;DESIG=1
$D^0 X$	< 10.4 %	90%	—	DESIG=2
$\pi^+ \pi^- K^+ K^- \pi^0$	< 1.6 × 10 ⁻⁴	90%	4875	DESIG=3
$2\pi^+ \pi^- K^- K_S^0$	< 5 × 10 ⁻⁵	90%	4875	DESIG=4
$2\pi^+ \pi^- K^- K_S^0 2\pi^0$	< 5 × 10 ⁻⁴	90%	4846	DESIG=5
$2\pi^+ 2\pi^- 2\pi^0$	< 2.1 × 10 ⁻⁴	90%	4905	DESIG=6
$2\pi^+ 2\pi^- K^+ K^-$	(1.1 ± 0.6) × 10 ⁻⁴		4861	DESIG=7
$2\pi^+ 2\pi^- K^+ K^- \pi^0$	< 2.7 × 10 ⁻⁴	90%	4846	DESIG=8
$2\pi^+ 2\pi^- K^+ K^- 2\pi^0$	< 5 × 10 ⁻⁴	90%	4828	DESIG=9
$3\pi^+ 2\pi^- K^- K_S^0 \pi^0$	< 1.6 × 10 ⁻⁴	90%	4827	DESIG=10
$3\pi^+ 3\pi^-$	< 8 × 10 ⁻⁵	90%	4904	DESIG=11
$3\pi^+ 3\pi^- 2\pi^0$	< 6 × 10 ⁻⁴	90%	4881	DESIG=12
$3\pi^+ 3\pi^- K^+ K^-$	(2.4 ± 1.2) × 10 ⁻⁴		4827	DESIG=13
$3\pi^+ 3\pi^- K^+ K^- \pi^0$	< 1.0 × 10 ⁻³	90%	4808	DESIG=14
$4\pi^+ 4\pi^-$	< 8 × 10 ⁻⁵	90%	4880	DESIG=15
$4\pi^+ 4\pi^- 2\pi^0$	< 2.1 × 10 ⁻³	90%	4850	DESIG=16
$J/\psi J/\psi$	< 7 × 10 ⁻⁵	90%	3836	DESIG=17
$J/\psi \psi(2S)$	< 1.2 × 10 ⁻⁴	90%	3571	DESIG=18
$\psi(2S) \psi(2S)$	< 3.1 × 10 ⁻⁵	90%	3273	DESIG=19
$J/\psi(1S)$ anything	< 2.3 × 10 ⁻³	90%	—	DESIG=20

 $\chi_{b1}(1P)$

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

J needs confirmation.

NODE=M077

$$\text{Mass } m = 9892.78 \pm 0.26 \pm 0.31 \text{ MeV}$$

$$m_{\chi_{b1}(1P)} - m_{\Upsilon(1S)} = 432.10 \pm 0.28 \text{ MeV}$$

NODE=M077M;DTYPE=M;OUR EVAL;
 → UNCHECKED ←
 NODE=M077A00;DTYPE=D

$\chi_{b1}(1P)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	P (MeV/c)	
$\gamma \Upsilon(1S)$	(35.2 ± 2.0) %		423	NODE=M077215;DESIG=1
$D^0 X$	(12.6 ± 2.2) %		—	DESIG=2
$\pi^+ \pi^- K^+ K^- \pi^0$	(2.0 ± 0.6) × 10 ⁻⁴		4892	DESIG=3
$2\pi^+ \pi^- K^- K_S^0$	(1.3 ± 0.5) × 10 ⁻⁴		4892	DESIG=4
$2\pi^+ \pi^- K^- K_S^0 2\pi^0$	< 6 × 10 ⁻⁴	90%	4863	DESIG=5
$2\pi^+ 2\pi^- 2\pi^0$	(8.0 ± 2.5) × 10 ⁻⁴		4921	DESIG=6
$2\pi^+ 2\pi^- K^+ K^-$	(1.5 ± 0.5) × 10 ⁻⁴		4878	DESIG=7
$2\pi^+ 2\pi^- K^+ K^- \pi^0$	(3.5 ± 1.2) × 10 ⁻⁴		4863	DESIG=8
$2\pi^+ 2\pi^- K^+ K^- 2\pi^0$	(8.6 ± 3.2) × 10 ⁻⁴		4845	DESIG=9
$3\pi^+ 2\pi^- K^- K_S^0 \pi^0$	(9.3 ± 3.3) × 10 ⁻⁴		4844	DESIG=10
$3\pi^+ 3\pi^-$	(1.9 ± 0.6) × 10 ⁻⁴		4921	DESIG=11
$3\pi^+ 3\pi^- 2\pi^0$	(1.7 ± 0.5) × 10 ⁻³		4898	DESIG=12
$3\pi^+ 3\pi^- K^+ K^-$	(2.6 ± 0.8) × 10 ⁻⁴		4844	DESIG=13
$3\pi^+ 3\pi^- K^+ K^- \pi^0$	(7.5 ± 2.6) × 10 ⁻⁴		4825	DESIG=14
$4\pi^+ 4\pi^-$	(2.6 ± 0.9) × 10 ⁻⁴		4897	DESIG=15
$4\pi^+ 4\pi^- 2\pi^0$	(1.4 ± 0.6) × 10 ⁻³		4867	DESIG=16
ω anything	(4.9 ± 1.4) %		—	DESIG=21
ωX_{tetra}	< 4.44 × 10 ⁻⁴	90%	—	DESIG=22
$J/\psi J/\psi$	< 2.7 × 10 ⁻⁵	90%	3857	DESIG=17
$J/\psi \psi(2S)$	< 1.7 × 10 ⁻⁵	90%	3594	DESIG=18
$\psi(2S) \psi(2S)$	< 6 × 10 ⁻⁵	90%	3298	DESIG=19
$J/\psi(1S)$ anything	< 1.1 × 10 ⁻³	90%	—	DESIG=20
$J/\psi(1S) X_{tetra}$	< 2.27 × 10 ⁻⁴	90%	—	DESIG=23

 $h_b(1P)$

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

NODE=M204

$$\text{Mass } m = 9899.3 \pm 0.8 \text{ MeV}$$

NODE=M204M;DTYPE=M

$h_b(1P)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	P (MeV/c)
$\eta_b(1S)\gamma$	$(52 \pm 6) \%$		488
$\Upsilon(1S)\pi^0$	$< 1.8 \times 10^{-3}$	90%	408

NODE=M204215;DESIG=1

DESIG=2

 $\chi_{b2}(1P)$

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

 J needs confirmation.

NODE=M078

$$\text{Mass } m = 9912.21 \pm 0.26 \pm 0.31 \text{ MeV}$$

NODE=M078M;DTYPE=M;OUR EVAL;
→ UNCHECKED ←

$\chi_{b2}(1P)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	P (MeV/c)
$\gamma \Upsilon(1S)$	$(18.0 \pm 1.0) \%$		442
$D^0 X$	$< 7.9 \%$	90%	—
$\pi^+ \pi^- K^+ K^- \pi^0$	$(8 \pm 5) \times 10^{-5}$		4902
$2\pi^+ \pi^- K^- K_S^0$	$< 1.0 \times 10^{-4}$	90%	4901
$2\pi^+ \pi^- K^- K_S^0 2\pi^0$	$(5.3 \pm 2.4) \times 10^{-4}$		4873
$2\pi^+ 2\pi^- 2\pi^0$	$(3.5 \pm 1.4) \times 10^{-4}$		4931
$2\pi^+ 2\pi^- K^+ K^-$	$(1.1 \pm 0.4) \times 10^{-4}$		4888
$2\pi^+ 2\pi^- K^+ K^- \pi^0$	$(2.1 \pm 0.9) \times 10^{-4}$		4872
$2\pi^+ 2\pi^- K^+ K^- 2\pi^0$	$(3.9 \pm 1.8) \times 10^{-4}$		4855
$3\pi^+ 2\pi^- K^- K_S^0 \pi^0$	$< 5 \times 10^{-4}$	90%	4854
$3\pi^+ 3\pi^-$	$(7.0 \pm 3.1) \times 10^{-5}$		4931
$3\pi^+ 3\pi^- 2\pi^0$	$(1.0 \pm 0.4) \times 10^{-3}$		4908
$3\pi^+ 3\pi^- K^+ K^-$	$< 8 \times 10^{-5}$	90%	4854
$3\pi^+ 3\pi^- K^+ K^- \pi^0$	$(3.6 \pm 1.5) \times 10^{-4}$		4835
$4\pi^+ 4\pi^-$	$(8 \pm 4) \times 10^{-5}$		4907
$4\pi^+ 4\pi^- 2\pi^0$	$(1.8 \pm 0.7) \times 10^{-3}$		4877
$J/\psi J/\psi$	$< 4 \times 10^{-5}$	90%	3869
$J/\psi \psi(2S)$	$< 5 \times 10^{-5}$	90%	3608
$\psi(2S) \psi(2S)$	$< 1.6 \times 10^{-5}$	90%	3313
$J/\psi(1S)$ anything	$(1.5 \pm 0.4) \times 10^{-3}$		—

NODE=M078215;DESIG=1

DESIG=2

DESIG=3

DESIG=4

DESIG=5

DESIG=6

DESIG=7

DESIG=8

DESIG=9

DESIG=10

DESIG=11

DESIG=12

DESIG=13

DESIG=14

DESIG=15

DESIG=16

DESIG=17

DESIG=18

DESIG=19

DESIG=20

 $\Upsilon(2S)$

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

$$\text{Mass } m = 10023.4 \pm 0.5 \text{ MeV}$$

NODE=M052

$$m_{\Upsilon(2S)} - m_{\Upsilon(1S)} = 562.81 \pm 0.11 \text{ MeV}$$

NODE=M052M;DTYPE=M

$$\text{Full width } \Gamma = 31.98 \pm 2.63 \text{ keV}$$

NODE=M052A00;DTYPE=D

NODE=M052W;DTYPE=G;OUR EVAL;
→ UNCHECKED ←

$\Upsilon(2S)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)	
$\Upsilon(1S)\pi^+\pi^-$	(17.85 $\pm$ 0.26) %		475	NODE=M052215;DESIG=4
$\Upsilon(1S)\pi^0\pi^0$	(8.6 $\pm$ 0.4) %		480	DESIG=5
$\tau^+\tau^-$	(2.00 $\pm$ 0.21) %		4686	DESIG=3
$\mu^+\mu^-$	(1.93 $\pm$ 0.17) %	S=2.2	5011	DESIG=1
e^+e^-	(1.91 $\pm$ 0.16) %		5012	DESIG=2
$\Upsilon(1S)\pi^0$	< 4 $\times 10^{-5}$	CL=90%	531	DESIG=10
$\Upsilon(1S)\eta$	(2.9 $\pm$ 0.4) $\times 10^{-4}$	S=2.0	126	DESIG=6
$J/\psi(1S)$ anything	< 6 $\times 10^{-3}$	CL=90%	4533	DESIG=20
$J/\psi(1S)\eta_c$	< 5.4 $\times 10^{-6}$	CL=90%	3984	DESIG=143
$J/\psi(1S)\chi_{c0}$	< 3.4 $\times 10^{-6}$	CL=90%	3808	DESIG=144
$J/\psi(1S)\chi_{c1}$	< 1.2 $\times 10^{-6}$	CL=90%	3765	DESIG=145
$J/\psi(1S)\chi_{c2}$	< 2.0 $\times 10^{-6}$	CL=90%	3745	DESIG=146
$J/\psi(1S)\eta_c(2S)$	< 2.5 $\times 10^{-6}$	CL=90%	3706	DESIG=147
$J/\psi(1S)X(3940)$	< 2.0 $\times 10^{-6}$	CL=90%	3555	DESIG=148
$J/\psi(1S)X(4160)$	< 2.0 $\times 10^{-6}$	CL=90%	3442	DESIG=149
χ_{c1} anything	(2.2 $\pm$ 0.5) $\times 10^{-4}$		—	DESIG=157
$\chi_{c1}(1P)^0 X_{tetra}$	< 3.67 $\times 10^{-5}$	CL=90%	—	DESIG=160
χ_{c2} anything	(2.3 $\pm$ 0.8) $\times 10^{-4}$		—	DESIG=158
$\psi(2S)\eta_c$	< 5.1 $\times 10^{-6}$	CL=90%	3732	DESIG=150
$\psi(2S)\chi_{c0}$	< 4.7 $\times 10^{-6}$	CL=90%	3536	DESIG=151
$\psi(2S)\chi_{c1}$	< 2.5 $\times 10^{-6}$	CL=90%	3488	DESIG=152
$\psi(2S)\chi_{c2}$	< 1.9 $\times 10^{-6}$	CL=90%	3464	DESIG=153
$\psi(2S)\eta_c(2S)$	< 3.3 $\times 10^{-6}$	CL=90%	3422	DESIG=154
$\psi(2S)X(3940)$	< 3.9 $\times 10^{-6}$	CL=90%	3250	DESIG=155
$\psi(2S)X(4160)$	< 3.9 $\times 10^{-6}$	CL=90%	3120	DESIG=156
$T_{c\bar{c}1}(3900)^+ T_{c\bar{c}1}(3900)^-$	< 1.0 $\times 10^{-6}$	CL=90%	—	DESIG=162
$T_{c\bar{c}1}(4200)^+ T_{c\bar{c}1}(4200)^-$	< 1.67 $\times 10^{-5}$	CL=90%	—	DESIG=163
$T_{c\bar{c}1}(3900)^\pm T_{c\bar{c}1}(4200)^\mp$	< 7.3 $\times 10^{-6}$	CL=90%	—	DESIG=164
$T_{c\bar{c}}(4050)^+ T_{c\bar{c}}(4050)^-$	< 1.35 $\times 10^{-5}$	CL=90%	—	DESIG=165
$T_{c\bar{c}}(4250)^+ T_{c\bar{c}}(4250)^-$	< 2.67 $\times 10^{-5}$	CL=90%	—	DESIG=166
$T_{c\bar{c}}(4050)^\pm T_{c\bar{c}}(4250)^\mp$	< 2.72 $\times 10^{-5}$	CL=90%	—	DESIG=167
$T_{c\bar{c}1}(4430)^+ T_{c\bar{c}1}(4430)^-$	< 2.03 $\times 10^{-5}$	CL=90%	—	DESIG=168
$T_{c\bar{c}}(4055)^\pm T_{c\bar{c}}(4055)^\mp$	< 1.11 $\times 10^{-5}$	CL=90%	—	DESIG=170
$T_{c\bar{c}}(4055)^\pm T_{c\bar{c}1}(4430)^\mp$	< 2.11 $\times 10^{-5}$	CL=90%	—	DESIG=171
$P_{c\bar{c}s}(4459)$ anything,	(2.9 $\pm$ 1.7) $\times 10^{-6}$		—	DESIG=189
$\bar{P}_{c\bar{c}s}(4459)$ anything			—	
$J/\psi(1S)\Lambda$ anything,	(2.2 $\pm$ 0.6) $\times 10^{-5}$		—	DESIG=190
$J/\psi(1S)\bar{\Lambda}$ anything			—	
$^2\bar{H}$ anything	(2.78 $^{+0.30}_{-0.26}$) $\times 10^{-5}$	S=1.2	—	DESIG=16
hadrons	(94 $\pm$ 11) %		—	DESIG=101
ggg	(58.8 $\pm$ 1.2) %		—	DESIG=105
γgg	(1.87 $\pm$ 0.28) %		—	DESIG=106
$\phi K^+ K^-$	(1.6 $\pm$ 0.4) $\times 10^{-6}$		4910	DESIG=133
$\omega\pi^+\pi^-$	< 2.58 $\times 10^{-6}$	CL=90%	4977	DESIG=134
$K^*(892)^0 K^- \pi^+ + c.c.$	(2.3 $\pm$ 0.7) $\times 10^{-6}$		4952	DESIG=135
$\phi f'_2(1525)$	< 1.33 $\times 10^{-6}$	CL=90%	4843	DESIG=136
$\omega f_2(1270)$	< 5.7 $\times 10^{-7}$	CL=90%	4899	DESIG=137
$\rho(770) a_2(1320)$	< 8.8 $\times 10^{-7}$	CL=90%	4894	DESIG=138
$K^*(892)^0 \bar{K}_2^*(1430)^0 + c.c.$	(1.5 $\pm$ 0.6) $\times 10^{-6}$		4869	DESIG=139
$K_1(1270)^\pm K^\mp$	< 3.22 $\times 10^{-6}$	CL=90%	4920	DESIG=140
$K_1(1400)^\pm K^\mp$	< 8.3 $\times 10^{-7}$	CL=90%	4901	DESIG=141
$b_1(1235)^\pm \pi^\mp$	< 4.0 $\times 10^{-7}$	CL=90%	4935	DESIG=142
$\rho\pi$	< 1.16 $\times 10^{-6}$	CL=90%	4981	DESIG=126
$\pi^+\pi^-\pi^0$	< 8.0 $\times 10^{-7}$	CL=90%	5007	DESIG=127
$\omega\pi^0$	< 1.63 $\times 10^{-6}$	CL=90%	4980	DESIG=128

$\pi^+\pi^-\pi^0\pi^0$	$(1.30 \pm 0.28) \times 10^{-5}$	5002	DESIG=129
$K_S^0 K^+\pi^- + \text{c.c.}$	$(1.14 \pm 0.33) \times 10^{-6}$	4979	DESIG=130
$K^*(892)^0 \bar{K}^0 + \text{c.c.}$	$< 4.22 \times 10^{-6}$	CL=90% 4959	DESIG=131
$K^*(892)^- K^+ + \text{c.c.}$	$< 1.45 \times 10^{-6}$	CL=90% 4960	DESIG=132
$f_1(1285) \text{ anything}$	$(2.2 \pm 1.6) \times 10^{-3}$	—	DESIG=159
$f_1(1285) X_{tetra}$	$< 6.47 \times 10^{-5}$	CL=90% —	DESIG=161
$D_s^+ D_{s1}(2536)^-, D_{s1}^- \rightarrow K^- D^*(2007)^0$	$(1.6 \pm 0.4) \times 10^{-5}$	—	DESIG=178
$D_s^+ D_{s1}(2536)^-, D_{s1}^- \rightarrow K_S^0 D^*(2010)^-$	$(8.4 \pm 2.3) \times 10^{-6}$	—	DESIG=179
$D_s^{*+} D_{s1}(2536)^-, D_{s1}^- \rightarrow K^- D^*(2007)^0$	$(1.4 \pm 0.4) \times 10^{-5}$	—	DESIG=181
$D_s^{*+} D_{s1}(2536)^-, D_{s1}^- \rightarrow K_S^0 D^*(2010)^-$	$(8.2 \pm 3.1) \times 10^{-6}$	—	DESIG=182
$D_s^+ D_{s2}^*(2573)^-, D_{s2}^{*-} \rightarrow K^- D^0$	$(1.4 \pm 0.4) \times 10^{-5}$	—	DESIG=184
$D_s^+ D_{s2}^*(2573)^-, D_{s2}^{*-} \rightarrow K_S^0 D^-$	$(6.9 \pm 3.0) \times 10^{-6}$	—	DESIG=185
$D_s^{*+} D_{s2}^*(2573)^-, D_{s2}^{*-} \rightarrow K^- D^0$	$(9 \pm 5) \times 10^{-6}$	—	DESIG=187
$D_s^{*+} D_{s2}^*(2573)^-, D_{s2}^{*-} \rightarrow K_S^0 D^-$	$(5 \pm 6) \times 10^{-6}$	—	DESIG=188
Sum of 100 exclusive modes	$(2.90 \pm 0.30) \times 10^{-3}$	—	DESIG=121

Radiative decays

$\gamma \chi_{b1}(1P)$	$(6.9 \pm 0.4) \%$	130	NODE=M052;CLUMP=A DESIG=8
$\gamma \chi_{b2}(1P)$	$(7.15 \pm 0.35) \%$	111	DESIG=7
$\gamma \chi_{b0}(1P)$	$(3.8 \pm 0.4) \%$	163	DESIG=9
$\gamma f_0(1710)$	$< 5.9 \times 10^{-4}$	CL=90% 4862	DESIG=13
$\gamma f_2'(1525)$	$< 5.3 \times 10^{-4}$	CL=90% 4897	DESIG=12
$\gamma f_2(1270)$	$< 2.41 \times 10^{-4}$	CL=90% 4931	DESIG=11
$\gamma \eta_c(1S)$	$< 2.7 \times 10^{-5}$	CL=90% 4567	DESIG=111
$\gamma \chi_{c0}$	$< 1.0 \times 10^{-4}$	CL=90% 4430	DESIG=112
$\gamma \chi_{c1}$	$< 3.6 \times 10^{-6}$	CL=90% 4397	DESIG=113
$\gamma \chi_{c2}$	$< 1.5 \times 10^{-5}$	CL=90% 4381	DESIG=114
$\gamma \chi_{c1}(3872)$	$< 1.8 \times 10^{-5}$	CL=90% 4264	DESIG=172
$\gamma \chi_{c1}(3872), \chi_{c1} \rightarrow \pi^+\pi^-\pi^0 J/\psi$	$< 2.4 \times 10^{-6}$	CL=90% —	DESIG=116
$\gamma \chi_{c0}(3915) \rightarrow \omega J/\psi$	$< 2.8 \times 10^{-6}$	CL=90% —	DESIG=117
$\gamma \chi_{c1}(4140) \rightarrow \phi J/\psi$	$< 1.2 \times 10^{-6}$	CL=90% —	DESIG=118
$\gamma X(4350) \rightarrow \phi J/\psi$	$< 1.3 \times 10^{-6}$	CL=90% —	DESIG=119
$\gamma \eta_b(1S)$	$(5.5 \pm 1.1 \pm 0.9) \times 10^{-4}$	S=1.2 605	DESIG=102
$\gamma \eta_b(1S) \rightarrow \gamma \text{Sum of 26 exclusive modes}$	$< 3.7 \times 10^{-6}$	CL=90% —	DESIG=124
$\gamma X_{b\bar{b}} \rightarrow \gamma \text{Sum of 26 exclusive modes}$	$< 4.9 \times 10^{-6}$	CL=90% —	DESIG=125
$\gamma X \rightarrow \gamma + \geq 4 \text{ prongs}$	$[bb] < 1.95 \times 10^{-4}$	CL=95% —	DESIG=103
$\gamma A^0 \rightarrow \gamma \text{hadrons}$	$< 8 \times 10^{-5}$	CL=90% —	DESIG=108
$\gamma A^0 \rightarrow \gamma \mu^+ \mu^-$	$< 8.3 \times 10^{-6}$	CL=90% —	DESIG=123

Lepton Family number (LF) violating modes

$e^\pm \tau^\mp$	LF	$< 1.12 \times 10^{-6}$	CL=90% 4854	NODE=M052;CLUMP=B DESIG=107
$\mu^\pm \tau^\mp$	LF	$< 2.3 \times 10^{-7}$	CL=90% 4854	DESIG=104

 $\tau_2(1D)$

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

NODE=M177

was $\Upsilon(1D)$

$$\text{Mass } m = 10163.7 \pm 1.4 \text{ MeV } (S = 1.7)$$

NODE=M177M;DTYPE=M

$\Upsilon(1D)$ DECAY MODES

	Fraction (Γ_i/Γ)	p (MeV/c)
$\gamma\gamma \Upsilon(1S)$	seen	679
$\gamma\chi_{bJ}(1P)$	seen	300
$\eta \Upsilon(1S)$	not seen	426
$\pi^+\pi^- \Upsilon(1S)$	$(6.6 \pm 1.6) \times 10^{-3}$	623

NODE=M177215;DESIG=1;OUR EVAL;
 → UNCHECKED ←
 DESIG=2;OUR EVAL;→ UNCHECKED ←
 DESIG=3;OUR EVAL;→ UNCHECKED ←
 DESIG=4

 $\chi_{b0}(2P)$

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

J needs confirmation.

$$\text{Mass } m = 10232.5 \pm 0.4 \pm 0.5 \text{ MeV}$$

NODE=M079

NODE=M079M;DTYPE=M;OUR EVAL;
 → UNCHECKED ←

$\chi_{b0}(2P)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$\gamma \Upsilon(2S)$	$(1.38 \pm 0.30) \%$		207
$\gamma \Upsilon(1S)$	$(3.8 \pm 1.7) \times 10^{-3}$		743
$D^0 X$	$< 8.2 \%$	90%	—
$\pi^+\pi^- K^+ K^- \pi^0$	$< 3.4 \times 10^{-5}$	90%	5064
$2\pi^+\pi^- K^- K_S^0$	$< 5 \times 10^{-5}$	90%	5063
$2\pi^+\pi^- K^- K_S^0 2\pi^0$	$< 2.2 \times 10^{-4}$	90%	5036
$2\pi^+ 2\pi^- 2\pi^0$	$< 2.4 \times 10^{-4}$	90%	5092
$2\pi^+ 2\pi^- K^+ K^-$	$< 1.5 \times 10^{-4}$	90%	5050
$2\pi^+ 2\pi^- K^+ K^- \pi^0$	$< 2.2 \times 10^{-4}$	90%	5035
$2\pi^+ 2\pi^- K^+ K^- 2\pi^0$	$< 1.1 \times 10^{-3}$	90%	5019
$3\pi^+ 2\pi^- K^- K_S^0 \pi^0$	$< 7 \times 10^{-4}$	90%	5018
$3\pi^+ 3\pi^-$	$< 7 \times 10^{-5}$	90%	5091
$3\pi^+ 3\pi^- 2\pi^0$	$< 1.2 \times 10^{-3}$	90%	5070
$3\pi^+ 3\pi^- K^+ K^-$	$< 1.5 \times 10^{-4}$	90%	5017
$3\pi^+ 3\pi^- K^+ K^- \pi^0$	$< 7 \times 10^{-4}$	90%	4999
$4\pi^+ 4\pi^-$	$< 1.7 \times 10^{-4}$	90%	5069
$4\pi^+ 4\pi^- 2\pi^0$	$< 6 \times 10^{-4}$	90%	5039

NODE=M079215;DESIG=2
 DESIG=1
 DESIG=3
 DESIG=4
 DESIG=5
 DESIG=6
 DESIG=7
 DESIG=8
 DESIG=9
 DESIG=10
 DESIG=11
 DESIG=12
 DESIG=13
 DESIG=14
 DESIG=15
 DESIG=16
 DESIG=17

 $\chi_{b1}(2P)$

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

J needs confirmation.

$$\text{Mass } m = 10255.46 \pm 0.22 \pm 0.50 \text{ MeV}$$

$$m_{\chi_{b1}(2P)} - m_{\chi_{b0}(2P)} = 23.5 \pm 1.0 \text{ MeV}$$

$$m_{\chi_{b1}(2P)} - m_{\Upsilon(1S)} = 793.6 \pm 0.8 \text{ MeV}$$

NODE=M080

NODE=M080M;DTYPE=M;OUR EVAL;
 → UNCHECKED ←
 NODE=M080M2;DTYPE=D
 NODE=M080A02;DTYPE=D

$\chi_{b1}(2P)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\omega \Upsilon(1S)$	$(1.63^{+0.40}_{-0.34}) \%$	134
$\gamma \Upsilon(2S)$	$(18.1 \pm 1.9) \%$	229
$\gamma \Upsilon(1S)$	$(9.9 \pm 1.0) \%$	764
$\pi\pi\chi_{b1}(1P)$	$(9.1 \pm 1.3) \times 10^{-3}$	238
$D^0 X$	$(8.8 \pm 1.7) \%$	—
$\pi^+\pi^- K^+ K^- \pi^0$	$(3.1 \pm 1.0) \times 10^{-4}$	5075
$2\pi^+\pi^- K^- K_S^0$	$(1.1 \pm 0.5) \times 10^{-4}$	5075
$2\pi^+\pi^- K^- K_S^0 2\pi^0$	$(7.7 \pm 3.2) \times 10^{-4}$	5047
$2\pi^+ 2\pi^- 2\pi^0$	$(5.9 \pm 2.0) \times 10^{-4}$	5104
$2\pi^+ 2\pi^- K^+ K^-$	$(10 \pm 4) \times 10^{-5}$	5062
$2\pi^+ 2\pi^- K^+ K^- \pi^0$	$(5.5 \pm 1.8) \times 10^{-4}$	5047
$2\pi^+ 2\pi^- K^+ K^- 2\pi^0$	$(10 \pm 4) \times 10^{-4}$	5030
$3\pi^+ 2\pi^- K^- K_S^0 \pi^0$	$(6.7 \pm 2.6) \times 10^{-4}$	5029
$3\pi^+ 3\pi^-$	$(1.2 \pm 0.4) \times 10^{-4}$	5103
$3\pi^+ 3\pi^- 2\pi^0$	$(1.2 \pm 0.4) \times 10^{-3}$	5081
$3\pi^+ 3\pi^- K^+ K^-$	$(2.0 \pm 0.8) \times 10^{-4}$	5029
$3\pi^+ 3\pi^- K^+ K^- \pi^0$	$(6.1 \pm 2.2) \times 10^{-4}$	5011
$4\pi^+ 4\pi^-$	$(1.7 \pm 0.6) \times 10^{-4}$	5080
$4\pi^+ 4\pi^- 2\pi^0$	$(1.9 \pm 0.7) \times 10^{-3}$	5051

NODE=M080215;DESIG=3

DESIG=2
 DESIG=1
 DESIG=4
 DESIG=5
 DESIG=6
 DESIG=7
 DESIG=8
 DESIG=9
 DESIG=10
 DESIG=11
 DESIG=12
 DESIG=13
 DESIG=14
 DESIG=15
 DESIG=16
 DESIG=17
 DESIG=18
 DESIG=19

 $h_b(2P)$

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

$$\text{Mass } m = 10259.8 \pm 1.2 \text{ MeV}$$

NODE=M205

NODE=M205M;DTYPE=M

$h_b(2P)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
hadrons	not seen		—
$\eta_b(1S)\gamma$	$(22 \pm 5) \%$		825
$\eta_b(2S)\gamma$	$(48 \pm 13) \%$		257
$\Upsilon(1S)\eta$	$(7.1^{+4.0}_{-3.3}) \times 10^{-3}$		559
$\Upsilon(1S)\pi^0$	$< 1.8 \times 10^{-3}$	90%	757
$\gamma\chi_{b0}(1P)$	$< 27 \%$	90%	393
$\gamma\chi_{b1}(1P)$	$< 5.4 \times 10^{-3}$	90%	360
$\gamma\chi_{b2}(1P)$	$< 1.3 \%$	90%	342

NODE=M205215;DESIG=1
DESIG=2
DESIG=3
DESIG=4
DESIG=5
DESIG=6
DESIG=7
DESIG=8

$\chi_{b2}(2P)$

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

J needs confirmation.

NODE=M081

$$\text{Mass } m = 10268.65 \pm 0.22 \pm 0.50 \text{ MeV}$$

$$m_{\chi_{b2}(2P)} - m_{\chi_{b1}(2P)} = 13.2 \pm 0.4 \text{ MeV} \quad (S = 1.8)$$

NODE=M081M;DTYPE=M;OUR EVAL;
→ UNCHECKED ←
NODE=M081M2;DTYPE=D

$\chi_{b2}(2P)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$\omega \Upsilon(1S)$	$(1.10^{+0.34}_{-0.30}) \%$		194
$\gamma \Upsilon(2S)$	$(8.9 \pm 1.2) \%$		242
$\gamma \Upsilon(1S)$	$(6.6 \pm 0.8) \%$		776
$\pi\pi\chi_{b2}(1P)$	$(5.1 \pm 0.9) \times 10^{-3}$		229
$D^0 X$	$< 2.4 \%$	90%	—
$\pi^+\pi^-K^+K^-\pi^0$	$< 1.1 \times 10^{-4}$	90%	5082
$2\pi^+\pi^-K^-K_S^0$	$< 9 \times 10^{-5}$	90%	5082
$2\pi^+\pi^-K^-K_S^0 2\pi^0$	$< 7 \times 10^{-4}$	90%	5054
$2\pi^+2\pi^-2\pi^0$	$(3.9 \pm 1.6) \times 10^{-4}$		5110
$2\pi^+2\pi^-K^+K^-$	$(9 \pm 4) \times 10^{-5}$		5068
$2\pi^+2\pi^-K^+K^-\pi^0$	$(2.4 \pm 1.1) \times 10^{-4}$		5054
$2\pi^+2\pi^-K^+K^-2\pi^0$	$(4.7 \pm 2.3) \times 10^{-4}$		5037
$3\pi^+2\pi^-K^-K_S^0\pi^0$	$< 4 \times 10^{-4}$	90%	5036
$3\pi^+3\pi^-$	$(9 \pm 4) \times 10^{-5}$		5110
$3\pi^+3\pi^-2\pi^0$	$(1.2 \pm 0.4) \times 10^{-3}$		5088
$3\pi^+3\pi^-K^+K^-$	$(1.4 \pm 0.7) \times 10^{-4}$		5036
$3\pi^+3\pi^-K^+K^-\pi^0$	$(4.2 \pm 1.7) \times 10^{-4}$		5017
$4\pi^+4\pi^-$	$(9 \pm 5) \times 10^{-5}$		5087
$4\pi^+4\pi^-2\pi^0$	$(1.3 \pm 0.5) \times 10^{-3}$		5058

NODE=M081215;DESIG=3
DESIG=2
DESIG=1
DESIG=4
DESIG=5
DESIG=6
DESIG=7
DESIG=8
DESIG=9
DESIG=10
DESIG=11
DESIG=12
DESIG=13
DESIG=14
DESIG=15
DESIG=16
DESIG=17
DESIG=18
DESIG=19

$\Upsilon(3S)$

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

$$\text{Mass } m = 10355.1 \pm 0.5 \text{ MeV}$$

$$m_{\Upsilon(3S)} - m_{\Upsilon(2S)} = 331.82 \pm 0.08 \text{ MeV} \quad (S = 1.9)$$

$$\text{Full width } \Gamma = 20.32 \pm 1.85 \text{ keV}$$

NODE=M048

NODE=M048M;DTYPE=M

NODE=M048DM2;DTYPE=D
NODE=M048W;DTYPE=G;OUR EVAL;
→ UNCHECKED ←

$\Upsilon(3S)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)	
$\Upsilon(2S)$ anything	(10.6 $\pm$ 0.8) %		296	NODE=M048215;DESIG=8
$\Upsilon(2S)\pi^+\pi^-$	(2.82 $\pm$ 0.18) %	S=1.6	176	DESIG=4
$\Upsilon(2S)\pi^0\pi^0$	(1.85 $\pm$ 0.14) %		190	DESIG=10
$\Upsilon(2S)\gamma\gamma$	(5.0 $\pm$ 0.7) %		326	DESIG=12
$\Upsilon(2S)\pi^0$	< 5.1 $\times 10^{-4}$	CL=90%	298	DESIG=107
$\Upsilon(1S)\pi^+\pi^-$	(4.37 $\pm$ 0.08) %		813	DESIG=3
$\Upsilon(1S)\pi^0\pi^0$	(2.20 $\pm$ 0.13) %		816	DESIG=11
$\Upsilon(1S)\eta$	< 1 $\times 10^{-4}$	CL=90%	677	DESIG=9
$\Upsilon(1S)\pi^0$	< 7 $\times 10^{-5}$	CL=90%	846	DESIG=106
$h_b(1P)\pi^0$	< 1.2 $\times 10^{-3}$	CL=90%	426	DESIG=112
$h_b(1P)\pi^0 \rightarrow \gamma\eta_b(1S)\pi^0$	(4.3 $\pm$ 1.4) $\times 10^{-4}$		—	DESIG=113
$h_b(1P)\pi^+\pi^-$	< 1.2 $\times 10^{-4}$	CL=90%	352	DESIG=114
$\tau^+\tau^-$	(2.29 $\pm$ 0.30) %		4863	DESIG=16
$\mu^+\mu^-$	(2.18 $\pm$ 0.21) %	S=2.1	5176	DESIG=1
e^+e^-	(2.18 $\pm$ 0.20) %		5178	DESIG=2
hadrons	(93 $\pm$ 12) %		—	DESIG=101
$g g g$	(35.7 $\pm$ 2.6) %		—	DESIG=109
$\gamma g g$	(9.7 $\pm$ 1.8) $\times 10^{-3}$		—	DESIG=110
2H anything	(2.33 $\pm$ 0.33) $\times 10^{-5}$		—	DESIG=117

Radiative decays

$\gamma\chi_{b2}(2P)$	(13.1 $\pm$ 1.6) %	S=3.4	86	NODE=M048;CLUMP=B DESIG=5
$\gamma\chi_{b1}(2P)$	(12.6 $\pm$ 1.2) %	S=2.4	99	DESIG=6
$\gamma\chi_{b0}(2P)$	(5.9 $\pm$ 0.6) %	S=1.4	122	DESIG=7
$\gamma\chi_{b2}(1P)$	(10.0 $\pm$ 1.0) $\times 10^{-3}$	S=1.7	433	DESIG=103
$\gamma\chi_{b1}(1P)$	(9 $\pm$ 5) $\times 10^{-4}$	S=1.8	452	DESIG=104
$\gamma\chi_{b0}(1P)$	(2.7 $\pm$ 0.4) $\times 10^{-3}$		484	DESIG=13
$\gamma\eta_b(2S)$	< 6.2 $\times 10^{-4}$	CL=90%	350	DESIG=14
$\gamma\eta_b(1S)$	(5.1 $\pm$ 0.7) $\times 10^{-4}$		912	DESIG=15
$\gamma A^0 \rightarrow \gamma$ hadrons	< 8 $\times 10^{-5}$	CL=90%	—	DESIG=115
$\gamma X \rightarrow \gamma + \geq 4$ prongs	[cc] < 2.2 $\times 10^{-4}$	CL=95%	—	DESIG=102
$\gamma A^0 \rightarrow \gamma\mu^+\mu^-$	< 5.5 $\times 10^{-6}$	CL=90%	—	DESIG=116
$\gamma A^0 \rightarrow \gamma\tau^+\tau^-$	[dd] < 1.6 $\times 10^{-4}$	CL=90%	—	DESIG=108

Lepton Family number (LF) violating modes

$e^\pm\tau^\mp$	LF	< 4.2 $\times 10^{-6}$	CL=90%	5025	NODE=M048;CLUMP=C DESIG=111
$e^\pm\mu^\mp$	LF	< 3.6 $\times 10^{-7}$	CL=90%	5177	DESIG=119
$\mu^\pm\tau^\mp$	LF	< 3.1 $\times 10^{-6}$	CL=90%	5025	DESIG=105

 $\chi_{b1}(3P)$

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

 J needs confirmation.

NODE=M206

Mass $m = 10513.4 \pm 0.7$ MeV

NODE=M206M;DTYPE=M

$\chi_{b1}(3P)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Upsilon(1S)\gamma$	seen	1000
$\Upsilon(2S)\gamma$	seen	479
$\Upsilon(3S)\gamma$	seen	157

NODE=M206215;DESIG=1

DESIG=2

DESIG=3

 $\chi_{b2}(3P)$

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

 J needs confirmation.

NODE=M238

Mass $m = 10524.0 \pm 0.8$ MeV

NODE=M238M;DTYPE=M

$\chi_{b2}(3P)$ DECAY MODESFraction (Γ_i/Γ) p (MeV/c) $\Upsilon(3S)\gamma$

seen

168

NODE=M238215;DESIG=1

 $\Upsilon(4S)$

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

NODE=M047

also known as $\Upsilon(10580)$ Mass $m = 10579.4 \pm 1.2$ MeVFull width $\Gamma = 20.5 \pm 2.5$ MeV

NODE=M047M;DTYPE=M

NODE=M047W;DTYPE=G

 $\Upsilon(4S)$ DECAY MODESFraction (Γ_i/Γ)

Confidence level

 p
(MeV/c) $B\bar{B}$

> 96

%

95%

326

NODE=M047215;DESIG=8;OUR EST;

 B^+B^- (51.4 $\pm$ 0.6) %

331

DESIG=10

 D_s^+ anything + c.c.(17.8 $\pm$ 2.6) %

—

DESIG=12

 $B^0\bar{B}^0$ (48.6 $\pm$ 0.6) %

326

DESIG=11

 $J/\psi K_S^0 + (J/\psi, \eta_c) K_S^0$

< 4

 $\times 10^{-7}$

90%

—

DESIG=15

non- $B\bar{B}$

< 4

%

95%

—

DESIG=6

 e^+e^- (1.57 $\pm$ 0.08) $\times 10^{-5}$

5290

DESIG=1

 $\rho^+\rho^-$

< 5.7

 $\times 10^{-6}$

90%

5233

DESIG=16

 $K^*(892)^0\bar{K}^0$

< 2.0

 $\times 10^{-6}$

90%

5240

DESIG=22

 $J/\psi(1S)$ anything

< 1.9

 $\times 10^{-4}$

95%

—

DESIG=2

 D^{*+} anything + c.c.

< 7.4

%

90%

5099

DESIG=3

 ϕ anything(7.1 $\pm$ 0.6) %

5240

DESIG=4

 $\phi\eta$

< 1.8

 $\times 10^{-6}$

90%

5226

DESIG=13

 $\phi\eta'$

< 4.3

 $\times 10^{-6}$

90%

5196

DESIG=18

 $\rho\eta$

< 1.3

 $\times 10^{-6}$

90%

5247

DESIG=19

 $\rho\eta'$

< 2.5

 $\times 10^{-6}$

90%

5217

DESIG=20

 $\Upsilon(1S)$ anything

< 4

 $\times 10^{-3}$

90%

1053

DESIG=5

 $\Upsilon(1S)\pi^+\pi^-$ (8.2 $\pm$ 0.4) $\times 10^{-5}$

1026

DESIG=7

 $\Upsilon(1S)\eta$ (1.81 $\pm$ 0.18) $\times 10^{-4}$

924

DESIG=17

 $\Upsilon(1S)\eta'$ (3.4 $\pm$ 0.9) $\times 10^{-5}$

—

DESIG=26

 $\Upsilon(2S)\pi^+\pi^-$ (8.2 $\pm$ 0.8) $\times 10^{-5}$

468

DESIG=9

 $h_b(1P)\pi^+\pi^-$

not seen

600

DESIG=21

 $h_b(1P)\eta$ (2.18 $\pm$ 0.21) $\times 10^{-3}$

390

DESIG=23

 $\eta_b(1S)\omega$

< 1.8

 $\times 10^{-4}$

90%

—

DESIG=27

 2H anything

< 1.3

 $\times 10^{-5}$

90%

—

DESIG=14

Double Radiative Decays $\gamma\gamma \Upsilon(D) \rightarrow \gamma\gamma\eta \Upsilon(1S)$

< 2.3

 $\times 10^{-5}$

90%

—

NODE=M047;CLUMP=B

DESIG=24

 $\Upsilon(10860)$

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

NODE=M092

Mass $m = 10885.2^{+2.6}_{-1.6}$ MeVFull width $\Gamma = 37 \pm 4$ MeV

NODE=M092M;DTYPE=M

NODE=M092W;DTYPE=G

$\Upsilon(10860)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	P (MeV/c)	
$B\bar{B}X$	(76.2 $^{+2.7}_{-4.0}$) %	—	—	NODE=M092215;DESIG=9
$B\bar{B}$	(5.5 ± 1.0) %	—	1322	DESIG=2
$B\bar{B}^* + \text{c.c.}$	(13.7 ± 1.6) %	—	—	DESIG=3
$B^*\bar{B}^*$	(38.1 ± 3.4) %	—	1127	DESIG=4
$B\bar{B}^{(*)}\pi$	< 19.7 %	90%	1015	DESIG=10
$B\bar{B}\pi$	(0.0 ± 1.2) %	—	1015	DESIG=23
$B^*\bar{B}\pi + B\bar{B}^*\pi$	(7.3 ± 2.3) %	—	—	DESIG=24
$B^*\bar{B}^*\pi$	(1.0 ± 1.4) %	—	739	DESIG=25
$B\bar{B}\pi\pi$	< 8.9 %	90%	550	DESIG=11
$B_s^{(*)}\bar{B}_s^{(*)}$	(20.1 ± 3.1) %	—	904	DESIG=16
$B_s\bar{B}_s$	(5 ± 5) $\times 10^{-3}$	—	904	DESIG=5
$B_s\bar{B}_s^* + \text{c.c.}$	(1.35 ± 0.32) %	—	—	DESIG=7
$B_s^*\bar{B}_s^*$	(17.6 ± 2.7) %	—	543	DESIG=8
no open-bottom	(3.8 $^{+5.0}_{-0.5}$) %	—	—	DESIG=28
e^+e^-	(8.3 ± 2.1) $\times 10^{-6}$	—	5443	DESIG=1
$K^*(892)^0\bar{K}^0$	< 1.0 $\times 10^{-5}$	90%	5395	DESIG=29
$\Upsilon(1S)\pi^+\pi^-$	(5.3 ± 0.6) $\times 10^{-3}$	—	1306	DESIG=17
$\Upsilon(1S)\eta$	(8.5 ± 1.7) $\times 10^{-4}$	—	1229	DESIG=44
$\Upsilon(1S)\eta'$	< 6.9 $\times 10^{-5}$	90%	985	DESIG=45
$\Upsilon(2S)\pi^+\pi^-$	(7.8 ± 1.3) $\times 10^{-3}$	—	783	DESIG=18
$\Upsilon(2S)\eta$	(4.1 ± 0.6) $\times 10^{-3}$	—	639	DESIG=46
$\Upsilon(3S)\pi^+\pi^-$	(4.8 $^{+1.9}_{-1.7}$) $\times 10^{-3}$	—	440	DESIG=19
$\Upsilon(1S)K^+K^-$	(6.1 ± 1.8) $\times 10^{-4}$	—	959	DESIG=20
$\eta\Upsilon_J(1D)$	(4.8 ± 1.1) $\times 10^{-3}$	—	—	DESIG=40
$h_b(1P)\pi^+\pi^-$	(3.5 $^{+1.0}_{-1.3}$) $\times 10^{-3}$	—	903	DESIG=26
$h_b(2P)\pi^+\pi^-$	(5.7 $^{+1.7}_{-2.1}$) $\times 10^{-3}$	—	544	DESIG=27
$\chi_{bJ}(1P)\pi^+\pi^-\pi^0$	(2.5 ± 2.3) $\times 10^{-3}$	—	894	DESIG=41
$\chi_{b0}(1P)\pi^+\pi^-\pi^0$	< 6.3 $\times 10^{-3}$	90%	894	DESIG=30
$\chi_{b0}(1P)\omega$	< 3.9 $\times 10^{-3}$	90%	631	DESIG=31
$\chi_{b0}(1P)(\pi^+\pi^-\pi^0)_{\text{non-}\omega}$	< 4.8 $\times 10^{-3}$	90%	—	DESIG=32
$\chi_{b1}(1P)\pi^+\pi^-\pi^0$	(1.85 ± 0.33) $\times 10^{-3}$	—	861	DESIG=33
$\chi_{b1}(1P)\omega$	(1.57 ± 0.30) $\times 10^{-3}$	—	582	DESIG=34
$\chi_{b1}(1P)(\pi^+\pi^-\pi^0)_{\text{non-}\omega}$	(5.2 ± 1.9) $\times 10^{-4}$	—	—	DESIG=35
$\chi_{b2}(1P)\pi^+\pi^-\pi^0$	(1.17 ± 0.30) $\times 10^{-3}$	—	841	DESIG=36
$\chi_{b2}(1P)\omega$	(6.0 ± 2.7) $\times 10^{-4}$	—	552	DESIG=37
$\chi_{b2}(1P)(\pi^+\pi^-\pi^0)_{\text{non-}\omega}$	(6 ± 4) $\times 10^{-4}$	—	—	DESIG=38
$\gamma\chi_b \rightarrow \gamma\Upsilon(1S)\omega$	< 3.8 $\times 10^{-5}$	90%	—	DESIG=39
$\eta_b(1S)\omega$	< 1.3 $\times 10^{-3}$	90%	1177	DESIG=42
$\eta_b(2S)\omega$	< 5.6 $\times 10^{-3}$	90%	399	DESIG=43

Inclusive Decays.

NODE=M092;CLUMP=I

These decay modes are submodes of one or more of the decay modes above.

NODE=M092

ϕ anything	(13.8 $^{+2.4}_{-1.7}$) %	—	—	DESIG=12
D^0 anything + c.c.	(112 ± 6) %	—	—	DESIG=13
D_s anything + c.c.	(44.7 ± 2.6) %	—	—	DESIG=6
J/ψ anything	(2.06 ± 0.21) %	—	—	DESIG=14
B^0 anything + c.c.	(77 ± 8) %	—	—	DESIG=21
B^+ anything + c.c.	(72 ± 6) %	—	—	DESIG=22

 $\Upsilon(11020)$

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

NODE=M093

Mass $m = 11000 \pm 4$ MeV

NODE=M093M;DTYPE=M

Full width $\Gamma = 24^{+8}_{-6}$ MeV

NODE=M093W;DTYPE=G

$T(11020)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$e^+ e^-$	$(5.4^{+1.9}_{-2.1}) \times 10^{-6}$	5500
$\chi_{bJ}(1P)\pi^+\pi^-\pi^0$	$(9^{+9}_{-8}) \times 10^{-3}$	1007
$\chi_{b1}(1P)\pi^+\pi^-\pi^0$	seen	975
$\chi_{b2}(1P)\pi^+\pi^-\pi^0$	seen	956

NODE=M093215;DESIG=1

DESIG=2

DESIG=3

DESIG=4

OTHER MESONS

NODE=MXXX050

 $T_{c\bar{c}1}(3900)$

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

NODE=M210

was $Z_c(3900)$, $X(3900)$ Mass $m = 3887.1 \pm 2.6$ MeV ($S = 1.7$)Full width $\Gamma = 28.4 \pm 2.6$ MeV

NODE=M210M;DTYPE=M

NODE=M210W;DTYPE=G

$T_{c\bar{c}1}(3900)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$J/\psi\pi$	seen	699
$h_c\pi^\pm$	not seen	318
$\eta_c\pi^+\pi^-$	not seen	758
$\eta_c(1S)\rho(770)^\pm$	seen	—
$(D\bar{D}^*)^\pm$	seen	—
$D^0 D^{*-} + \text{c.c.}$	seen	152
$D^- D^{*0} + \text{c.c.}$	seen	143
$\omega\pi^\pm$	not seen	1862
$J/\psi\eta$	not seen	510
$D^+ D^{*-} + \text{c.c.}$	seen	—
$D^0 \bar{D}^{*0} + \text{c.c.}$	seen	—

NODE=M210215;DESIG=1

DESIG=2

DESIG=10

DESIG=11;OUR EVAL;→ UNCHECKED ←

DESIG=3;OUR EVAL;→ UNCHECKED ←

DESIG=8

DESIG=9

DESIG=4

DESIG=5

DESIG=6

DESIG=7

 $T_{c\bar{c}}(4020)$

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

NODE=M213

was $X(4020)$ Mass $m = 4024.1 \pm 1.9$ MeVFull width $\Gamma = 13 \pm 5$ MeV ($S = 1.7$)

NODE=M213M;DTYPE=M

NODE=M213W;DTYPE=G

$T_{c\bar{c}}(4020)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$h_c(1P)\pi$	seen	450
$D^* \bar{D}^*$	seen	85
$D\bar{D}^* + \text{c.c.}$	not seen	542
$\eta_c\pi^+\pi^-$	not seen	872
$\eta_c(1S)\rho(770)^\pm$	not seen	—
$J/\psi(1S)\pi^\pm$	not seen	811

NODE=M213215;DESIG=1

DESIG=2

DESIG=4

DESIG=3

DESIG=6;OUR EVAL;→ UNCHECKED ←

DESIG=5

 $T_{c\bar{c}1}(4430)^+$

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

 G, C need confirmation.

NODE=M195

was $Z_c(4430)$, $X(4430)^\pm$ Mass $m = 4478^{+15}_{-18}$ MeVFull width $\Gamma = 181 \pm 31$ MeV

NODE=M195M;DTYPE=M

NODE=M195W;DTYPE=G

$T_{cc\bar{1}}(4430)^+$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\pi^+\psi(2S)$	seen	711
π^+J/ψ	seen	1162

NODE=M195215;DESIG=1
DESIG=2

$T_{cc\bar{c}\bar{c}}(6900)^0$

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

NODE=M268

was $X(6900)$

Mass $m = 6914 \pm 11$ MeV ($S = 1.6$)
Full width $\Gamma = 137 \pm 21$ MeV

NODE=M268M;DTYPE=M
NODE=M268W;DTYPE=G

$T_{cc\bar{c}\bar{c}}(6900)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$J/\psi J/\psi$	seen	1504

NODE=M268215;DESIG=1

$T_{b\bar{b}1}(10610)$

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

NODE=M207

was $Z_b(10610)$, $X(10610)$

Mass $m = 10607.2 \pm 2.0$ MeV
Mass $m = 10609 \pm 6$ MeV
Full width $\Gamma = 18.4 \pm 2.4$ MeV

NODE=M207M;DTYPE=M
NODE=M207M0;DTYPE=M
NODE=M207W;DTYPE=G

$T_{b\bar{b}1}(10610)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Upsilon(1S)\pi^+$	$(5.4^{+1.9}_{-1.5}) \times 10^{-3}$	1077
$\Upsilon(1S)\pi^0$	not seen	1077
$\Upsilon(2S)\pi^+$	$(3.6^{+1.1}_{-0.8}) \%$	551
$\Upsilon(2S)\pi^0$	seen	552
$\Upsilon(3S)\pi^+$	$(2.1^{+0.8}_{-0.6}) \%$	207
$\Upsilon(3S)\pi^0$	seen	210
$h_b(1P)\pi^+$	$(3.5^{+1.2}_{-0.9}) \%$	671
$h_b(2P)\pi^+$	$(4.7^{+1.7}_{-1.3}) \%$	313
$B^+\bar{B}^0$	not seen	504
$B^+\bar{B}^{*0} + B^{*+}\bar{B}^0$	$(85.6^{+2.1}_{-2.9}) \%$	—

NODE=M207215;DESIG=1

DESIG=9

DESIG=2

DESIG=10

DESIG=3

DESIG=11

DESIG=4

DESIG=5

DESIG=8

DESIG=6

$T_{b\bar{b}1}(10650)$

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

I, G, C need confirmation.

NODE=M208

was $Z_b(10650)$, $X(10650)^\pm$

Mass $m = 10652.2 \pm 1.5$ MeV
Full width $\Gamma = 11.5 \pm 2.2$ MeV

NODE=M208M;DTYPE=M
NODE=M208W;DTYPE=G

$T_{b\bar{b}1}(10650)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Upsilon(1S)\pi^+$	$(1.7^{+0.8}_{-0.6}) \times 10^{-3}$	1117
$\Upsilon(2S)\pi^+$	$(1.4^{+0.6}_{-0.4}) \%$	595
$\Upsilon(3S)\pi^+$	$(1.6^{+0.7}_{-0.5}) \%$	259
$h_b(1P)\pi^+$	$(8.4^{+2.9}_{-2.4}) \%$	714
$h_b(2P)\pi^+$	$(15 \pm 4) \%$	360
$B^+\bar{B}^0$	not seen	703
$B^+\bar{B}^{*0} + B^{*+}\bar{B}^0$	not seen	—
$B^{*+}\bar{B}^{*0}$	$(74^{+4}_{-6}) \%$	120

NODE=M208215;DESIG=1

DESIG=2

DESIG=3

DESIG=4

DESIG=5

DESIG=8

DESIG=6

DESIG=7

NOTES

[a] As measured in $e^+e^- \rightarrow \rho^0$.	LINKAGE=EEN
[b] As measured in $e^+e^- \rightarrow \pi^+\pi^-\pi^0$ and τ decays.	LINKAGE=EER
[c] The $\omega\rho$ interference is then due to $\omega\rho$ mixing only, and is expected to be small. If $e\mu$ universality holds, $\Gamma(\rho^0 \rightarrow \mu^+\mu^-) = \Gamma(\rho^0 \rightarrow e^+e^-) \times 0.99785$.	LINKAGE=MD2
[d] C parity forbids this to occur as a single-photon process.	LINKAGE=CS
[e] Our estimate. See the Particle Listings for details.	LINKAGE=BH
[f] See the "Note on $a_1(1260)$ " in the $a_1(1260)$ Particle Listings in PDG 06, Journal of Physics G33 1 (2006).	LINKAGE=NA1
[g] See also the $\omega(1650)$.	LINKAGE=MDE
[h] See also the $\omega(1420)$.	LINKAGE=MDF
[i] See our minireview under the $K_2(1770)$ in the 2004 edition of this <i>Review</i> .	LINKAGE=MBD
[j] For $E_\gamma > 100$ MeV.	LINKAGE=EGM
[k] The value is for the sum of the charge states or particle/antiparticle states indicated.	LINKAGE=SG
[l] $\Theta(1540)$ is a hypothetical pentaquark state of $1.54 \text{ GeV}/c^2$ mass and a width of less than $25 \text{ MeV}/c^2$.	LINKAGE=THT
[n] Includes $\rho\bar{\rho}\pi^+\pi^-\gamma$ and excludes $\rho\bar{\rho}\eta$, $\rho\bar{\rho}\omega$, $\rho\bar{\rho}\eta'$.	LINKAGE=MF
[o] For a narrow state A with mass less than 960 MeV.	LINKAGE=NSA
[p] For a narrow scalar or pseudoscalar A^0 with mass 0.21–3.0 GeV.	LINKAGE=NA0
[q] For a dark photon U with mass between 100 and 2100 MeV.	LINKAGE=DPH
[r] For a narrow resonance in the range $2.2 < M(X) < 2.8$ GeV.	LINKAGE=NMR
[s] 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.	LINKAGE=MPD
[t] $2m_\tau < M(\tau^+\tau^-) < 9.2 \text{ GeV}$	LINKAGE=E49
[u] $2 \text{ GeV} < m_{K^+K^-} < 3 \text{ GeV}$	LINKAGE=G49
[v] $X\bar{X}$ = vectors with $m < 3.1 \text{ GeV}$	LINKAGE=B49
[x] X and $\bar{X}$ = zero spin with $m < 4.5 \text{ GeV}$	LINKAGE=F49
[y] $1.5 \text{ GeV} < m_X < 5.0 \text{ GeV}$	LINKAGE=C49
[z] $201 \text{ MeV} < M(\mu^+\mu^-) < 3565 \text{ MeV}$	LINKAGE=D49
[aa] $0.5 \text{ GeV} < m_X < 9.0 \text{ GeV}$, where m_X is the invariant mass of the hadronic final state.	LINKAGE=I49
[bb] $1.5 \text{ GeV} < m_X < 5.0 \text{ GeV}$	LINKAGE=C52
[cc] $1.5 \text{ GeV} < m_X < 5.0 \text{ GeV}$	LINKAGE=C48
[dd] For $m_{\tau^+\tau^-}$ in the ranges 4.03–9.52 and 9.61–10.10 GeV.	LINKAGE=MRG