

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 $I = 0$ ($\eta, \eta', h, h', \omega, \phi, f, f'$): $c_1(u\bar{u} + d\bar{d}) + c_2(s\bar{s})$

NODE=MXXX005

 $f_0(500)$

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

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

NODE=M014

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

$f_0(500)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\pi\pi$	seen	–
$\gamma\gamma$	seen	–

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

 $\rho(770)$

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

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

T-Matrix Pole $\sqrt{s} = (761-765) - i(71-74)$ MeVMass (Breit-Wigner) = 775.26 ± 0.23 MeVFull width (Breit-Wigner) = 149.1 ± 0.8 MeV

NODE=M009

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

$\rho(770)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
$\pi\pi$	~ 100	%	363
$\rho(770)^\pm$ decays			
$\pi^\pm\gamma$	(4.5 ± 0.5)	$\times 10^{-4}$	S=2.2 375
$\pi^\pm\eta$	< 6	$\times 10^{-3}$	CL=84% 152
$\pi^\pm\pi^+\pi^-\pi^0$	< 2.0	$\times 10^{-3}$	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
$\mu^+\mu^-$	[a] (4.55 ± 0.28)	$\times 10^{-5}$	373
e^+e^-	[a] (4.72 ± 0.05)	$\times 10^{-5}$	388
$\pi^+\pi^-\pi^0$	($1.01^{+0.54}_{-0.36} \pm 0.34$)	$\times 10^{-4}$	323
$\pi^+\pi^-\pi^+\pi^-$	(1.8 ± 0.9)	$\times 10^{-5}$	251
$\pi^+\pi^-\pi^0\pi^0$	(1.6 ± 0.8)	$\times 10^{-5}$	257
$\pi^0e^+e^-$	< 1.2	$\times 10^{-5}$	CL=90% 376

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;OUR EVAL;→ UNCHECKED ←

DESIG=22

DESIG=30

DESIG=9

 $\omega(782)$

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

Mass $m = 782.66 \pm 0.13$ MeV ($S = 2.0$)Full width $\Gamma = 8.68 \pm 0.13$ MeV

NODE=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
$\pi^0\gamma$	(8.35 \pm 0.27) %	S=2.2	380	DESIG=3
$\pi^+\pi^-$	(1.53 \pm 0.12) %	S=1.2	366	DESIG=2
neutrals (excluding $\pi^0\gamma$)	(7 $\begin{smallmatrix} +8 \\ -4 \end{smallmatrix}$) $\times 10^{-3}$	S=1.1	–	DESIG=13
$\eta\gamma$	(4.5 \pm 0.4) $\times 10^{-4}$	S=1.1	200	DESIG=6
$\pi^0e^+e^-$	(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^-	(7.38 \pm 0.22) $\times 10^{-5}$	S=1.9	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 DESIG=9
$2\pi^0$	C < 2.2 $\times 10^{-4}$	CL=90%	367	DESIG=193
$3\pi^0$	C < 2.3 $\times 10^{-4}$	CL=90%	330	DESIG=16
invisible	< 7 $\times 10^{-5}$	CL=90%	–	DESIG=194

 $\eta'(958)$

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

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 $\pi^+\pi^-\gamma$)	(29.5 \pm 0.4) %		165	DESIG=9
$\pi^0\pi^0\eta$	(22.4 \pm 0.5) %		239	DESIG=2
$\omega\gamma$	(2.52 \pm 0.07) %		159	DESIG=7
ωe^+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
$\pi^+\pi^-\mu^+\mu^-$	(1.9 \pm 0.4) $\times 10^{-5}$		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
$2(\pi^+\pi^-)$	(8.3 \pm 0.9) $\times 10^{-5}$		372	DESIG=131
$\pi^+\pi^-2\pi^0$	(1.8 \pm 0.4) $\times 10^{-4}$		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
$\pi^+\pi^-e^+e^-$	(2.42 \pm 0.10) $\times 10^{-3}$		458	DESIG=10
$\pi^+e^-\nu_e + c.c.$	< 2.1 $\times 10^{-4}$	90%	469	DESIG=204
γe^+e^-	(4.91 \pm 0.27) $\times 10^{-4}$		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
$4\pi^0$	< 4.94 $\times 10^{-5}$	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
invisible	< 6 $\times 10^{-4}$	90%	–	DESIG=200

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

$\pi^+ \pi^-$	P, CP	< 1.8	$\times 10^{-5}$	90%	458
$\pi^0 \pi^0$	P, CP	< 4	$\times 10^{-4}$	90%	459
$\pi^0 e^+ e^-$	C	$[b] < 1.4$	$\times 10^{-3}$	90%	469
$\pi^0 \rho^0$	C	< 4	%	90%	111
$\eta e^+ e^-$	C	$[b] < 2.4$	$\times 10^{-3}$	90%	322
3γ	C	< 1.0	$\times 10^{-4}$	90%	479
$\mu^+ \mu^- \pi^0$	C	$[b] < 6.0$	$\times 10^{-5}$	90%	445
$\mu^+ \mu^- \eta$	C	$[b] < 1.5$	$\times 10^{-5}$	90%	273
$e\mu$	LF	< 4.7	$\times 10^{-4}$	90%	473

NODE=M002;CLUMP=B

DESIG=111
DESIG=25
DESIG=16
DESIG=18
DESIG=17
DESIG=23
DESIG=22
DESIG=21
DESIG=27

 $f_0(980)$

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

NODE=M003

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

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

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

NODE=M003PP;DTYPE=p;OUR EST;
→ UNCHECKED ←
NODE=M003M1;DTYPE=M;OUR EST;
→ UNCHECKED ←
NODE=M003W1;DTYPE=G;OUR EST;
→ UNCHECKED ←

$f_0(980)$ 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;
→ UNCHECKED ←
DESIG=1;OUR EVAL;→ UNCHECKED ←
DESIG=5;OUR EVAL;→ UNCHECKED ←

 $a_0(980)$

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

NODE=M036

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

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

NODE=M036PP;DTYPE=p;OUR EST;
→ UNCHECKED ←
NODE=M036M1;DTYPE=M;OUR EST;
→ UNCHECKED ←
NODE=M036W1;DTYPE=G;OUR EST;
→ UNCHECKED ←

$a_0(980)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\eta\pi$	seen	319
$K\bar{K}$	seen	†
$\eta'\pi$	seen	†
$\rho\pi$	not seen	137
$\gamma\gamma$	seen	490

NODE=M036215;DESIG=1;OUR EST;
→ UNCHECKED ←
DESIG=3;OUR EST;→ UNCHECKED ←
DESIG=8
DESIG=2;OUR EST;→ UNCHECKED ←
DESIG=5;OUR EST;→ UNCHECKED ←

 $\phi(1020)$

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

NODE=M004

Mass $m = 1019.461 \pm 0.016$ MeVFull width $\Gamma = 4.249 \pm 0.013$ 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)	
$K^+ K^-$	(49.1 \pm 0.5)%	S=1.3	127	NODE=M004215;DESIG=1
$K_L^0 K_S^0$	(33.9 \pm 0.4)%	S=1.2	110	DESIG=2
$\rho\pi + \pi^+\pi^-\pi^0$	(15.4 \pm 0.4)%	S=1.2	–	DESIG=24
$\eta\gamma$	(1.301 \pm 0.024)%	S=1.2	363	DESIG=4
$\pi^0\gamma$	(1.32 \pm 0.05) $\times 10^{-3}$		501	DESIG=7
$\ell^+\ell^-$	–		510	DESIG=256;OUR EVAL; \rightarrow UNCHECKED \leftarrow
e^+e^-	(2.979 \pm 0.033) $\times 10^{-4}$	S=1.2	510	DESIG=5
$\mu^+\mu^-$	(2.85 \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
$\pi^+\pi^-$	(7.3 \pm 1.3) $\times 10^{-5}$		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
$\pi^0\pi^0\gamma$	(1.12 \pm 0.06) $\times 10^{-4}$		492	DESIG=19
$\pi^+\pi^-\pi^+\pi^-$	(3.9 \pm 2.8) $\times 10^{-6}$		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) $\times 10^{-5}$		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
$\eta'(958)\gamma$	(6.21 \pm 0.20) $\times 10^{-5}$		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 DESIG=258

 $h_1(1170)$

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

Mass $m = 1166 \pm 6$ MeVFull 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	ρ (MeV/c)
$\omega\pi$	seen		348
$[D/S \text{ amplitude ratio} = 0.277 \pm 0.027]$			
$\pi^\pm\gamma$	$(1.6 \pm 0.4) \times 10^{-3}$		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
$K_S^0 K_S^0 \pi^\pm$	< 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 ←

 $a_1(1260)$ [d]

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

T-Matrix Pole $\sqrt{s} = (1209 \pm 4_{-9}^{+12}) - i(288 \pm 6_{-10}^{+45})$ MeV

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

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

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)	ρ (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) = $186.6_{-2.2}^{+2.8}$ 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	ρ (MeV/c)
$\pi\pi$	$(84.3_{-1.0}^{+2.8})\%$	$S=1.2$	623
$\pi^+\pi^-2\pi^0$	$(7.7_{-3.1}^{+1.2})\%$	$S=1.2$	563
$K\bar{K}$	$(4.6 \pm 0.4)\%$	$S=2.7$	404
$2\pi^+2\pi^-$	$(2.8 \pm 0.4)\%$	$S=1.2$	559
$\eta\eta$	$(4.0 \pm 0.8) \times 10^{-3}$	$S=2.1$	326
$4\pi^0$	$(3.0 \pm 1.0) \times 10^{-3}$		565
$\gamma\gamma$	$(1.42 \pm 0.24) \times 10^{-5}$	$S=1.4$	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	406	DESIG=13
$\phi \gamma$	$(7.4 \pm 2.6) \times 10^{-4}$		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	NODE=M037215;DESIG=2;OUR EST;
$a_0(980)\pi$	seen	248	→ UNCHECKED ← DESIG=1;OUR EST;→ UNCHECKED ←
$\eta \pi^0 \pi^0$	seen	490	DESIG=4;OUR EST;→ UNCHECKED ←
$\eta(\pi\pi)$ S-wave	seen	—	DESIG=5;OUR EST;→ UNCHECKED ←
$\sigma \eta$	seen	—	DESIG=6;OUR EST;→ UNCHECKED ←
$K\bar{K}\pi$	seen	320	DESIG=7;OUR EST;→ UNCHECKED ←

 $\pi(1300)$

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

NODE=M058

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

NODE=M058M;DTYPE=M;OUR EST;

→ UNCHECKED ←

NODE=M058W;DTYPE=G;OUR EST;

→ UNCHECKED ←

$\pi(1300)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)	
$\rho \pi$	seen	404	NODE=M058215;DESIG=1;OUR EST;
$\pi(\pi\pi)$ S-wave	seen	—	→ UNCHECKED ← DESIG=3;OUR EST;→ UNCHECKED ←

 $a_2(1320)$

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

NODE=M012

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

NODE=M012PP;DTYPE=p;OUR EST;

→ UNCHECKED ←

NODE=M012M0;DTYPE=M

NODE=M012W0;DTYPE=G;OUR EST;

→ UNCHECKED ←

$a_2(1320)$ 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-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;
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 $m = 1408.7^{+2.0}_{-1.2}$ MeV (S = 2.2)Full width $\Gamma = 50.3 \pm 2.5$ 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		424
$\eta\pi\pi$	seen		562
$a_0(980)\pi$	seen		344
$\eta(\pi\pi)$ S-wave	seen		—
$f_0(980)\pi^0 \rightarrow \pi^+\pi^-\pi^0$	not seen		—
$f_0(980)\eta$	seen		†
4π	seen		638
$\rho\rho$	<58 %	99.85%	†
$\rho^0\gamma$	seen		491
$K^*(892)K$	seen		122

NODE=M027215;DESIG=2;OUR EST;
→ UNCHECKED ←
DESIG=5;OUR EST;→ UNCHECKED ←
DESIG=4;OUR EST;→ UNCHECKED ←
DESIG=9;OUR EST;→ UNCHECKED ←
DESIG=15
DESIG=10;OUR EST;→ UNCHECKED ←
DESIG=6;OUR EVAL;→ UNCHECKED ←
DESIG=12
DESIG=8;OUR EST;→ UNCHECKED ←
DESIG=11;OUR EST;→ UNCHECKED ←

 $h_1(1415)$

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

NODE=M109

was $h_1(1380)$ Mass $m = 1409^{+9}_{-8}$ MeV (S = 1.9)Full width $\Gamma = 78 \pm 11$ MeV

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

$f_1(1420)$

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

NODE=M006

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

Mass $m = 1428.4^{+1.5}_{-1.3}$ MeV ($S = 1.8$)

Full width $\Gamma = 56.7 \pm 3.3$ MeV ($S = 1.3$)

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	440
$K\bar{K}^*(892) + \text{c.c.}$	seen	167
$\eta\pi\pi$	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 ← **$\omega(1420)$ [e]**

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

NODE=M125

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

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

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
$\omega\pi\pi$	seen	437
$b_1(1235)\pi$	seen	112
e^+e^-	seen	705

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

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

NODE=M149

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

NODE=M149PP;DTYPE=p;OUR EST;
→ UNCHECKED ←
NODE=M149M;DTYPE=M
NODE=M149W;DTYPE=GBranching fractions are given relative to the one **DEFINED AS 1**.

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 **$\rho(1450)$**

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

NODE=M105

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

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

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

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

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 ←

 $\eta(1475)$

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

NODE=M175

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=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

 $f_0(1500)$

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

NODE=M152

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

$$\text{T-Matrix Pole } \sqrt{s} = (1430-1530) - i(40-90) \text{ MeV}$$

$$\text{Mass (Breit-Wigner)} = 1522 \pm 25 \text{ MeV}$$

$$\text{Full width (Breit-Wigner)} = 108 \pm 33 \text{ MeV}$$

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±2.2) %	1.2	749
$\pi^+\pi^-$	seen		748
$2\pi^0$	seen		749
4π	(48.9±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±0.9) %	1.1	528
$\eta\eta'(958)$	(2.2±0.8) %	1.4	107
$K\bar{K}$	(8.5±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 ←

 $f_2'(1525)$

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

NODE=M013

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

$$\text{Full width } \Gamma = 86 \pm 5 \text{ MeV } (S = 2.2)$$

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

$f_2'(1525)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor	p (MeV/c)
$K\bar{K}$	$(87.6 \pm 2.2) \%$	1.1	576
$\eta\eta$	$(11.6 \pm 2.2) \%$	1.1	525
$\pi\pi$	$(8.3 \pm 1.6) \times 10^{-3}$		747
$\gamma\gamma$	$(9.5 \pm 1.1) \times 10^{-7}$	1.1	759

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

 $\pi_1(1600)$

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

NODE=M164

See the review on "Spectroscopy of Light Meson Resonances" and a note in PDG 06, Journal of Physics **G33** 1 (2006). See also $\pi_1(1400)$.

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

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

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

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

Full width (Breit-Wigner, non- $\eta\pi$ mode) = 370_{-60}^{+50} 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;
→ UNCHECKED ←
DESIG=1;OUR EST;→ UNCHECKED ←
DESIG=2;OUR EST;→ UNCHECKED ←
DESIG=7;OUR EST;→ UNCHECKED ←
DESIG=4;OUR EST;→ UNCHECKED ←
DESIG=5;OUR EST;→ UNCHECKED ←
DESIG=6;OUR EST;→ UNCHECKED ←
DESIG=8

 $\eta_2(1645)$

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

NODE=M154

Mass $m = 1617 \pm 5$ MeV

Full width $\Gamma = 181 \pm 11$ MeV

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

$\omega(1650)$ [f]

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

Mass $m = 1670 \pm 30$ MeV [c]
 Full width $\Gamma = 315 \pm 35$ MeV [c]

NODE=M126

NODE=M126M;DTYPE=M;OUR EST;
 UNCHECKED ←
 NODE=M126W;DTYPE=G;OUR EST;
 UNCHECKED ←

$\omega(1650)$ 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;
 UNCHECKED ←
 DESIG=6
 DESIG=2;OUR EST;→ UNCHECKED ←
 DESIG=4;OUR EST;→ UNCHECKED ←
 DESIG=3;OUR EST;→ UNCHECKED ←
 DESIG=5

$\omega_3(1670)$

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

Mass $m = 1667 \pm 4$ MeV
 Full 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;
 UNCHECKED ←
 DESIG=2;OUR EST;→ UNCHECKED ←
 DESIG=3;OUR EST;→ UNCHECKED ←

$\pi_2(1670)$

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

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±1.4) %		808
$f_2(1270)\pi$	(56.3±3.2) %		327
$\rho\pi$	(31 ±4) %		647
$\sigma\pi$	(10 ±4) %		–
$\pi(\pi\pi)$ s-wave	(8.7±3.4) %		–
$\pi^\pm\pi^+\pi^-$	(53 ±4) %		806
$K\bar{K}^*(892) + \text{c.c.}$	(4.2±1.4) %		453
$\omega\rho$	(2.7±1.1) %		302
$\pi^\pm\gamma$	(7.0±1.2) × 10 ⁻⁴		829
$\gamma\gamma$	< 2.8 × 10 ⁻⁷	90%	835
$\eta\pi$	< 5 %		739
$\pi^\pm 2\pi^+ 2\pi^-$	< 5 %		735
$\rho(1450)\pi$	< 3.6 × 10 ⁻³	97.7%	145
$b_1(1235)\pi$	< 1.9 × 10 ⁻³	97.7%	364
$f_1(1285)\pi$	possibly seen		322
$a_2(1320)\pi$	not seen		291

NODE=M034215;DESIG=20
 DESIG=8
 DESIG=2
 DESIG=13
 DESIG=11
 DESIG=10
 DESIG=5
 DESIG=14
 DESIG=27
 DESIG=12
 DESIG=3
 DESIG=4
 DESIG=15
 DESIG=16
 DESIG=25
 DESIG=26

$\phi(1680)$

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

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

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
$f_2'(1525)\gamma$	not seen	155

NODE=M067215;DESIG=4;OUR EST;
 \rightarrow UNCHECKED \leftarrow
 DESIG=5;OUR EST; \rightarrow UNCHECKED \leftarrow
 DESIG=3;OUR EST; \rightarrow UNCHECKED \leftarrow
 DESIG=6;OUR EST; \rightarrow UNCHECKED \leftarrow
 DESIG=1;OUR EST; \rightarrow UNCHECKED \leftarrow
 DESIG=12;OUR EVAL; \rightarrow UNCHECKED \leftarrow
 DESIG=10
 DESIG=13
 DESIG=15

 $\rho_3(1690)$

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

Mass $m = 1688.8 \pm 2.1$ MeV
 Full 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; \rightarrow UNCHECKED \leftarrow
 DESIG=5;OUR EST; \rightarrow UNCHECKED \leftarrow
 DESIG=6;OUR EST; \rightarrow UNCHECKED \leftarrow
 DESIG=8;OUR EST; \rightarrow UNCHECKED \leftarrow

 $\rho(1700)$

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

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

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

NODE=M065

NODE=M065M0;DTYPE=M;OUR EST;
 \rightarrow UNCHECKED \leftarrow
 NODE=M065W0;DTYPE=G;OUR EST;
 \rightarrow UNCHECKED \leftarrow

 $\rho(1700)$ 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	372
$\pi^+ \pi^-$	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 $\Gamma = 380_{-50}^{+60}$ 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;→ UNCHECKED ←
DESIG=1
DESIG=2;OUR EVAL;→ UNCHECKED ←
DESIG=3;OUR EVAL;→ UNCHECKED ←
DESIG=5
DESIG=6;OUR EVAL;→ UNCHECKED ←
DESIG=7;OUR EVAL;→ UNCHECKED ←

 $f_0(1710)$

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

NODE=M068

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

T-matrix pole $\sqrt{s} = (1680-1820) - i(50-180)$ MeVMass (Breit-Wigner) = 1733_{-7}^{+8} MeV ($S = 1.5$)Full width (Breit-Wigner) = 150_{-10}^{+12} MeV ($S = 1.3$)

NODE=M068PP;DTYPE=p;OUR EST;
→ UNCHECKED ←
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
$\pi\pi$	seen	856
$\gamma\gamma$	seen	866
$\omega\omega$	seen	372

NODE=M068215;DESIG=2;OUR EST;
→ UNCHECKED ←
DESIG=1;OUR EST;→ UNCHECKED ←
DESIG=5;OUR EST;→ UNCHECKED ←
DESIG=6;OUR EST;→ UNCHECKED ←
DESIG=4

 $\pi(1800)$

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

NODE=M075

Mass $m = 1810_{-11}^{+9}$ MeV ($S = 2.2$)Full width $\Gamma = 215_{-8}^{+7}$ MeV

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;
→ UNCHECKED ←
DESIG=11;OUR EST;→ UNCHECKED ←
DESIG=3;OUR EST;→ UNCHECKED ←
DESIG=1
DESIG=12
DESIG=2
DESIG=7;OUR EST;→ UNCHECKED ←
DESIG=5;OUR EST;→ UNCHECKED ←
DESIG=13
DESIG=14
DESIG=15
DESIG=6;OUR EST;→ UNCHECKED ←
DESIG=8;OUR EST;→ UNCHECKED ←
DESIG=4
DESIG=9

 $\phi_3(1850)$

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

NODE=M054

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

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 $m = 1842 \pm 8$ MeV
Full 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 $\sqrt{s} = (1830-2020) - i(110-220)$ MeV
Mass (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
$p\bar{p}$	seen	238

NODE=M135215;DESIG=1
DESIG=2;OUR EST; \rightarrow UNCHECKED \leftarrow
DESIG=10;OUR EST; \rightarrow UNCHECKED \leftarrow
DESIG=7;OUR EST; \rightarrow UNCHECKED \leftarrow
DESIG=6;OUR EST; \rightarrow UNCHECKED \leftarrow
DESIG=8;OUR EST; \rightarrow UNCHECKED \leftarrow
DESIG=9;OUR EST; \rightarrow UNCHECKED \leftarrow
DESIG=12

 $a_4(1970)$

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

was $a_4(2040)$
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 $m = 2010^{+60}_{-80}$ MeV
Full 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

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

 $f_0(2020)$

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

T-Matrix Pole $\sqrt{s} = (1870-2080) - i(120-240)$ MeV
Mass (Breit-Wigner) = $1982^{+54.1}_{-3.0}$ MeV
Full 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

 $\phi(2170)$

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

Mass $m = 2164 \pm 6$ MeV [c]
Full width $\Gamma = 106^{+24}_{-18}$ MeV [c] ($S = 2.0$)

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
$\omega\eta$	seen	848
$\phi\eta'$	seen	440
$\phi\pi\pi$	seen	815
$\phi f_0(980)$	seen	402
$K^+ K^- f_0(980) \rightarrow$	seen	—
$K^+ K^- \pi^+ \pi^-$	seen	—
$K^+ K^- f_0(980) \rightarrow K^+ K^- \pi^0 \pi^0$	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;
 \rightarrow UNCHECKED \leftarrow
DESIG=5;OUR EVAL; \rightarrow UNCHECKED \leftarrow
DESIG=16;OUR EVAL; \rightarrow UNCHECKED \leftarrow
DESIG=11;OUR EVAL; \rightarrow UNCHECKED \leftarrow
DESIG=9
DESIG=2;OUR EVAL; \rightarrow UNCHECKED \leftarrow
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;
 \rightarrow UNCHECKED \leftarrow
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) MeVMass (Breit-Wigner) = 845 ± 17 MeVFull width (Breit-Wigner) = 468 ± 30 MeV

NODE=M174

NODE=M174TMP;DTYPE=M;OUR EST;
 \rightarrow UNCHECKED \leftarrow
NODE=M174M;DTYPE=M
NODE=M174W;DTYPE=G

$K_0^*(700)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K\pi$	100 %	256

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 $m = 1253 \pm 7$ MeV ($S = 2.2$)

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

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)
$K\rho$	(38 ± 13) %	2.2	†
$K_0^*(1430)\pi$	(28 ± 4) %		†
$K^*(892)\pi$	(21 ± 10) %	2.2	286
$K\omega$	(11.0 ± 2.0) %		†
$Kf_0(1370)$	(3.0 ± 2.0) %		†
γK^0	seen		528

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 ± 6) %	402
$K\rho$	(3.0 ± 3.0) %	293
$Kf_0(1370)$	(2.0 ± 2.0) %	†
$K\omega$	(1.0 ± 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

 $K^*(1410)$

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

Mass $m = 1414 \pm 15$ MeV ($S = 1.3$)

Full width $\Gamma = 232 \pm 21$ MeV ($S = 1.1$)

NODE=M094

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 ± 1.3) %		612
$K\rho$	< 7 %	95%	305
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

 $K_0^*(1430)$

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

Mass $m = 1425 \pm 50$ MeV [c]
Full width $\Gamma = 270 \pm 80$ MeV [c]

NODE=M019
NODE=M019M;DTYPE=M;OUR EST;
→ UNCHECKED ←
NODE=M019W;DTYPE=G;OUR EST;
→ UNCHECKED ←

K₀*(1430) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$K\pi$	(93 ± 10) %	619
$K\eta$	($8.6^{+2.7}_{-3.4}$) %	486
$K\eta'(958)$	seen	†

NODE=M019215;DESIG=1
DESIG=2
DESIG=3

 $K_2^*(1430)$

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

$K_2^*(1430)^\pm$ 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=M022M1;DTYPE=M
NODE=M022M4;DTYPE=M
NODE=M022W1;DTYPE=G
NODE=M022W4;DTYPE=G

K₂*(1430) DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
$K\pi$	(49.9 ± 1.2) %		620
$K^*(892)\pi$	(24.7 ± 1.5) %		420
$K^*(892)\pi\pi$	(13.4 ± 2.2) %		373
$K\rho$	(8.7 ± 0.8) %	S=1.2	320
$K\omega$	(2.9 ± 0.8) %		313
$K^+\gamma$	(2.4 ± 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 ←

 $K(1460)$

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

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=M021

NODE=M021215;DESIG=1;OUR EST;
→ UNCHECKED ←
DESIG=2;OUR EST;→ UNCHECKED ←
DESIG=3;OUR EST;→ UNCHECKED ←
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±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

 $K_2(1770)$ [g]

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

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
$K\phi$	seen	441
$K\omega$	seen	607

NODE=M023215;DESIG=1;OUR EST;
 DESIG=2;OUR EST;→ UNCHECKED ←
 DESIG=4;OUR EST;→ UNCHECKED ←
 DESIG=9;OUR EST;→ UNCHECKED ←
 DESIG=10
 DESIG=8

 $K_3^*(1780)$

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

Mass $m = 1779 \pm 8$ MeV ($S = 1.2$)
 Full width $\Gamma = 161 \pm 17$ MeV ($S = 1.1$)

NODE=M060
 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 ± 9) %		616
$K^*(892)\pi$	(20 ± 5) %		657
$K\pi$	(18.8± 1.0) %		815
$K\eta$	(30 ±13) %		721
$K_2^*(1430)\pi$	< 16 %	95%	292

NODE=M060215;DESIG=3
 DESIG=2
 DESIG=1
 DESIG=6
 DESIG=4

 $K_2(1820)$ [g]

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

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
$Kf_2(1270)$	seen	191
$K\omega$	seen	640
$K\phi$	seen	483

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

 $K_2^*(1980)$

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

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
$Kf_2(1270)$	possibly seen	424
$K\phi$	seen	627
$K\eta$	seen	850

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

 $K_4^*(2045)$

$$I(J^P) = \frac{1}{2}(4^+)$$

$$\text{Mass } m = 2048_{-9}^{+8} \text{ MeV} \quad (S = 1.1)$$

$$\text{Full width } \Gamma = 199_{-19}^{+27} \text{ MeV}$$

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

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

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

CHARMED MESONS ($C = \pm 1$)

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

NODE=MXXX035

 $D^*(2007)^0$

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

$$\text{Mass } m = 2006.85 \pm 0.05 \text{ MeV} \quad (S = 1.1)$$

$$m_{D^{*0}} - m_{D^0} = 142.014 \pm 0.030 \text{ MeV} \quad (S = 1.5)$$

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

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

NODE=M061
NODE=M061M;DTYPE=M
NODE=M061DM;DTYPE=D
NODE=M061W;DTYPE=G
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
$D^0e^+e^-$	$(3.91 \pm 0.33) \times 10^{-3}$		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

 $D^*(2010)^\pm$

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

$$\text{Mass } m = 2010.26 \pm 0.05 \text{ MeV}$$

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

$$m_{D^*(2010)^+} - m_{D^0} = 145.4258 \pm 0.0017 \text{ MeV}$$

$$\text{Full width } \Gamma = 83.4 \pm 1.8 \text{ keV}$$

NODE=M062
NODE=M062M;DTYPE=M
NODE=M062MD;DTYPE=D
NODE=M062DM;DTYPE=D
NODE=M062W;DTYPE=G

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

NODE=M062225;NODE=M062

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

DESIG=1
DESIG=3
DESIG=2

$D_0^*(2300)$

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

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;
 \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

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

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

NODE=MXXX040

$D_s^{*\pm}$

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

Mass $m = 2112.2 \pm 0.4$ MeV

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

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

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

NODE=S074

NODE=S074M;DTYPE=M

NODE=S074DM;DTYPE=D
NODE=S074W;DTYPE=G

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 $\begin{smallmatrix} +1.2 \\ -0.9 \end{smallmatrix}$) $\times 10^{-5}$	-

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^+ .

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

Mass $m = 2317.8 \pm 0.5$ MeV

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

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

NODE=M172

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."

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

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

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

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

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

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

$$\text{Mass } m = 2535.11 \pm 0.06 \text{ MeV}$$

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

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

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

$$\text{Full width } \Gamma = 0.92 \pm 0.05 \text{ MeV}$$

NODE=M121M;DTYPE=M

NODE=M121DM;DTYPE=D

NODE=M121DN;DTYPE=D

NODE=M121DP;DTYPE=D

NODE=M121W;DTYPE=G

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

NODE=M121215;NODE=M121

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

$D_{s1}(2536)^\pm$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$D^*(2010)^+ K^0$	0.85 ± 0.12		149
$(D^*(2010)^+ K^0)_{S\text{-wave}}$	0.61 ± 0.09		149
$K_S^0 D^*(2010)^+$	0.48 ± 0.07		149
$D_s^+ \pi^- K^+$	0.028 ± 0.005		176
$D^*(2007)^0 K^+$	DEFINED AS 1		167
$D^+ K^0$	< 0.34	90%	381
$D^0 K^+$	< 0.12	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

$D_{s2}^*(2573)$

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

NODE=M148

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

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

$$\text{Full width } \Gamma = 16.9 \pm 0.7 \text{ MeV}$$

NODE=M148M;DTYPE=M

NODE=M148DM;DTYPE=D

NODE=M148W;DTYPE=G

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

NODE=M148215;NODE=M148

$D_{s2}^*(2573)^+$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^0 K^+$	seen	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;→ UNCHECKED ←
DESIG=4;OUR EVAL;→ UNCHECKED ←
DESIG=5;OUR EVAL;→ UNCHECKED ←

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

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

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;
→ UNCHECKED ←
DESIG=3;OUR EVAL;→ UNCHECKED ←
DESIG=5;OUR EVAL;→ UNCHECKED ←
DESIG=6;OUR EVAL;→ UNCHECKED ←

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

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

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;
→ UNCHECKED ←
DESIG=3;OUR EVAL;→ UNCHECKED ←
DESIG=5;OUR EVAL;→ UNCHECKED ←
DESIG=6;OUR EVAL;→ UNCHECKED ←

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.

NODE=M244

$B_1(5721)^+$ 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 ± 1.2 MeV ($S = 1.2$)

$m_{B_1^0} - m_{B^{*+}}$ = 401.4 ± 1.2 MeV ($S = 1.2$)

Full width $\Gamma(B_1(5721)^+)$ = 31 ± 6 MeV ($S = 1.1$)

Full width $\Gamma(B_1(5721)^0)$ = 27.5 ± 3.4 MeV ($S = 1.1$)

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.

NODE=M245

$$B_2^*(5747)^+ \text{ mass} = 5737.3 \pm 0.7 \text{ MeV}$$

NODE=M245M+;DTYPE=M

$$m_{B_2^{*+}} - m_{B^0} = 457.5 \pm 0.7 \text{ MeV}$$

NODE=M245DM+;DTYPE=D

$$B_2^*(5747)^0 \text{ mass} = 5739.6 \pm 0.7 \text{ MeV} \quad (S = 1.4)$$

NODE=M245M0;DTYPE=M

$$m_{B_2^{*0}} - m_{B_1^0} = 13.5 \pm 1.4 \text{ MeV} \quad (S = 1.3)$$

NODE=M245DM0;DTYPE=D

$$m_{B_2^{*0}} - m_{B^+} = 460.2 \pm 0.6 \text{ MeV} \quad (S = 1.4)$$

NODE=M245DM2;DTYPE=D

$$\text{Full width } \Gamma(B_2^*(5747)^+) = 20 \pm 5 \text{ MeV} \quad (S = 2.2)$$

NODE=M245W+;DTYPE=G

$$\text{Full width } \Gamma(B_2^*(5747)^0) = 24.2 \pm 1.7 \text{ MeV}$$

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.

NODE=M248

$$B_J(5970)^+ \text{ mass } m = 5965 \pm 5 \text{ MeV}$$

NODE=M248M+;DTYPE=M

$$m_{B_J(5970)^+} - m_{B^0} = 685 \pm 5 \text{ MeV}$$

NODE=M248DM+;DTYPE=D

$$B_J(5970)^0 \text{ mass } m = 5971 \pm 5 \text{ MeV}$$

NODE=M248M0;DTYPE=M

$$m_{B_J(5970)^0} - m_{B^+} = 691 \pm 5 \text{ MeV}$$

NODE=M248DM0;DTYPE=D

$$B_J(5970)^+ \text{ full width } \Gamma = 62 \pm 20 \text{ MeV}$$

NODE=M248W+;DTYPE=G

$$B_J(5970)^0 \text{ full width } \Gamma = 81 \pm 12 \text{ MeV}$$

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

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

$$B_S^0 = s\bar{b}, \bar{B}_S^0 = \bar{s}b, \quad \text{similarly for } B_S^{*'}\text{'s}$$

NODE=MXXX046

 $B_{s1}(5830)^0$

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

I, J, P need confirmation.

NODE=M187

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

NODE=M187M;DTYPE=M

$$m_{B_{s1}^0} - m_{B^{*+}} = 503.98 \pm 0.17 \text{ MeV}$$

NODE=M187DM;DTYPE=D

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

NODE=M187W;DTYPE=G

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

NODE=M187215;DESIG=1

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

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

I, J, P need confirmation.

NODE=M186

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

NODE=M186M;DTYPE=M

$$m_{B_{s2}^{*0}} - m_{B^+} = 560.48 \pm 0.12 \text{ MeV}$$

NODE=M186DM2;DTYPE=D

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

NODE=M186W;DTYPE=G

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

NODE=M186215;NODE=M186

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

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

BOTTOM, CHARMED MESONS ($B = C = \pm 1$)

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

NODE=MXXX049

 $B_c(2S)^\pm$

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

Mass $m = 6871.2 \pm 1.0$ MeVThe following quantities are not pure branching ratios; rather the fractions $\Gamma_i/\Gamma \times B(\bar{b} \rightarrow B_c(2S))$.

NODE=M217

NODE=M217M;DTYPE=M

NODE=M217215;NODE=M217

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

DESIG=1

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

NODE=MXXX025

 $\eta_c(1S)$

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

Mass $m = 2984.1 \pm 0.4$ MeV ($S = 1.2$)Full width $\Gamma = 30.5 \pm 0.5$ MeV ($S = 1.2$)

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)
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Decays involving hadronic resonances

$\eta'(958) \pi \pi$	$(2.0 \pm 0.4) \%$	S=1.4	1323
$\eta'(958) K \bar{K}$	$(1.73 \pm 0.35) \%$		1131
$\eta'(958) \eta \eta$	$(3.4 \pm 0.6) \times 10^{-3}$		1081
$\rho \rho$	$(1.8 \pm 0.4) \%$		1275
$K^*(892)^0 K^- \pi^+ + \text{c.c.}$	$(1.8 \pm 0.5) \%$		1278
$K^*(892) \bar{K}^*(892)$	$(7.0 \pm 1.2) \times 10^{-3}$		1196
$K^*(892)^0 K^*(892)^0 \pi^+ \pi^-$	$(1.4 \pm 0.6) \%$		1074
$\phi K^+ K^-$	$(3.3 \pm_{-1.1}^{+1.2}) \times 10^{-3}$		1104
$\phi \phi$	$(1.8 \pm 0.4) \times 10^{-3}$	S=2.3	1089
$\phi 2(\pi^+ \pi^-)$	$< 4 \times 10^{-3}$	CL=90%	1251
$a_0(980) \pi$	seen		1327
$a_2(1320) \pi$	seen		1196
$K^*(892) \bar{K} + \text{c.c.}$	$< 1.28 \%$	CL=90%	1310
$f_2(1270) \eta$	seen		1145
$f_2(1270) \eta'$	seen		984
$\omega \omega$	$(2.7 \pm 0.9) \times 10^{-3}$	S=2.1	1270
$\omega \phi$	$< 2.5 \times 10^{-4}$	CL=90%	1185
$f_2(1270) f_2(1270)$	$(1.08 \pm 0.27) \%$		774

NODE=M026215;NODE=M026;CLUMP=A

DESIG=24

DESIG=85

DESIG=93

DESIG=19

DESIG=26

DESIG=18

DESIG=57

DESIG=28

DESIG=17

DESIG=58

DESIG=21

DESIG=22

DESIG=40

DESIG=23

DESIG=92

DESIG=20

DESIG=47

DESIG=46

$f_2(1270) f_2'(1525)$	$(9.7 \pm 3.2) \times 10^{-3}$	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	498	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	—	DESIG=76
$K_2^*(1430)\bar{K} + \text{c.c.}$	seen	—	DESIG=77
$K_0^*(1950)\bar{K} + \text{c.c.}$	seen	—	DESIG=78
$K_0^*(2600)\bar{K} + \text{c.c.}$	seen	—	DESIG=95

Decays into stable hadrons

$K\bar{K}\pi$	$(7.1 \pm 0.4) \%$	S=1.1	1381	NODE=M026;CLUMP=B DESIG=14
$K\bar{K}\eta$	$(1.32 \pm 0.15) \%$		1265	DESIG=25
$\eta\pi^+\pi^-$	$(1.6 \pm 0.4) \%$		1428	DESIG=16
$\eta 2(\pi^+\pi^-)$	$(4.3 \pm 1.3) \%$		1386	DESIG=61
$K^+ K^- \pi^+ \pi^-$	$(8.3 \pm 1.8) \times 10^{-3}$	S=1.9	1345	DESIG=15
$K^+ K^- \pi^+ \pi^- \pi^0$	$(3.4 \pm 0.6) \%$		1304	DESIG=60
$K^0 K^- \pi^+ \pi^- \pi^+ + \text{c.c.}$	$(5.4 \pm 1.5) \%$		—	DESIG=62
$K^+ K^- 2(\pi^+\pi^-)$	$(8.4 \pm 2.4) \times 10^{-3}$		1254	DESIG=55
$2(K^+ K^-)$	$(1.4 \pm 0.4) \times 10^{-3}$	S=1.4	1056	DESIG=27
$\pi^+ \pi^- \pi^0$	$< 4 \times 10^{-4}$	CL=90%	1476	DESIG=81
$\pi^+ \pi^- \pi^0 \pi^0$	$(4.6 \pm 1.0) \%$		1461	DESIG=63
$2(\pi^+ \pi^-)$	$(9.6 \pm 1.5) \times 10^{-3}$	S=1.4	1459	DESIG=11
$2(\pi^+ \pi^- \pi^0)$	$(15.9 \pm 2.0) \%$		1409	DESIG=64
$3(\pi^+ \pi^-)$	$(1.89 \pm 0.34) \%$		1407	DESIG=56
$p\bar{p}$	$(1.33 \pm 0.11) \times 10^{-3}$	S=1.1	1160	DESIG=12
$p\bar{p}\pi^0$	$(3.4 \pm 1.3) \times 10^{-3}$		1101	DESIG=65
$p\bar{p}\pi^+\pi^-$	$(3.7 \pm 0.5) \times 10^{-3}$		1027	DESIG=13
$\Lambda\bar{\Lambda}$	$(1.10 \pm 0.28) \times 10^{-3}$	S=1.5	991	DESIG=45
$K^+ \bar{p}\Lambda + \text{c.c.}$	$(2.5 \pm 0.4) \times 10^{-3}$		773	DESIG=82
$\bar{\Lambda}(1520)\Lambda + \text{c.c.}$	$(3.0 \pm 1.3) \times 10^{-3}$		694	DESIG=83
$\Sigma^+ \bar{\Sigma}^-$	$(2.6 \pm 0.5) \times 10^{-3}$		901	DESIG=66
$\Xi^- \bar{\Xi}^+$	$(1.07 \pm 0.24) \times 10^{-3}$		692	DESIG=67

Radiative decays

$\gamma\gamma$	$(1.66 \pm 0.13) \times 10^{-4}$	S=1.2	1492	NODE=M026;CLUMP=C DESIG=31
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**Charge conjugation (C), Parity (P),
Lepton Family number (LF) violating modes**

$\pi^+ \pi^-$	$P, CP < 1.3 \times 10^{-4}$	CL=90%	1485	DESIG=51
$\pi^0 \pi^0$	$P, CP < 4 \times 10^{-5}$	CL=90%	1486	DESIG=52
$K^+ K^-$	$P, CP < 7 \times 10^{-4}$	CL=90%	1408	DESIG=53
$K_S^0 K_S^0$	$P, CP < 4 \times 10^{-4}$	CL=90%	1407	DESIG=54

 $J/\psi(1S)$

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

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/ψ(1S) DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level (MeV/c)	ρ	
hadrons	(87.7 ± 0.5) %	—	—	NODE=M070215;DESIG=3
virtual $\gamma \rightarrow$ hadrons	(13.46 ± 0.07) %	—	—	DESIG=4
ggg	(64.1 ± 1.0) %	—	—	DESIG=249
$\gamma g g$	(8.8 ± 1.1) %	—	—	DESIG=250
e^+e^-	(5.971 ± 0.032) %	1548	—	DESIG=1
$e^+e^- \gamma$	[h] (8.8 ± 1.4) × 10 ⁻³	1548	—	DESIG=5
$\mu^+ \mu^-$	(5.961 ± 0.033) %	1545	—	DESIG=2
Decays involving hadronic resonances				
$\rho\pi$	(1.88 ± 0.12) %	S=2.6	1448	NODE=M070;CLUMP=A DESIG=20
$\rho^0 \pi^0$	(6.2 ± 0.6) × 10 ⁻³	—	1448	DESIG=21
$a_2(1320)^0 \pi^+ \pi^- \rightarrow$ $2(\pi^+ \pi^-) \pi^0$	(2.8 ± 0.6) × 10 ⁻³	—	—	DESIG=442
$a_2(1320)^+ \pi^- \pi^0 + c.c. \rightarrow$ $2(\pi^+ \pi^-) \pi^0$	(3.7 ± 0.7) × 10 ⁻³	—	—	DESIG=443
$a_2(1320) \rho$	(1.09 ± 0.22) %	—	1123	DESIG=43
$\eta \pi^+ \pi^-$	(3.8 ± 0.7) × 10 ⁻⁴	—	1487	DESIG=239
$\eta \pi^+ \pi^- \pi^0$	(1.17 ± 0.20) %	—	1470	DESIG=420
$\eta \pi^+ \pi^- 3\pi^0$	(4.9 ± 1.0) × 10 ⁻³	—	1419	DESIG=422
$\eta \rho$	(1.93 ± 0.23) × 10 ⁻⁴	—	1396	DESIG=22
$\eta \phi(2170) \rightarrow \eta \phi f_0(980) \rightarrow$ $\eta \phi \pi^+ \pi^-$	(1.2 ± 0.4) × 10 ⁻⁴	—	628	DESIG=287
$\eta \phi(2170) \rightarrow$ $\eta K^*(892)^0 \bar{K}^*(892)^0$	< 2.52 × 10 ⁻⁴	CL=90%	—	DESIG=253
$\eta K^+ K^-$	(8.6 ± 3.0) × 10 ⁻⁴	—	1331	DESIG=455
$\eta K^\pm K_S^0 \pi^\mp$	[j] (2.2 ± 0.4) × 10 ⁻³	—	1278	DESIG=230
$\eta K^*(892)^0 \bar{K}^*(892)^0$	(1.15 ± 0.26) × 10 ⁻³	—	1003	DESIG=252
$\rho \eta'(958)$	(8.1 ± 0.8) × 10 ⁻⁵	S=1.6	1281	DESIG=23
$\rho^\pm \pi^\mp \pi^+ \pi^- 2\pi^0$	(2.8 ± 0.8) %	—	1364	DESIG=415
$\rho^+ \rho^- \pi^+ \pi^- \pi^0$	(6 ± 4) × 10 ⁻³	—	1186	DESIG=416
$\rho^+ K^+ K^- \pi^- + c.c. \rightarrow$ $K^+ K^- \pi^+ \pi^- \pi^0$	(3.5 ± 0.8) × 10 ⁻³	—	—	DESIG=444
$\rho^\mp K^\pm K_S^0$	(1.9 ± 0.4) × 10 ⁻³	—	1269	DESIG=342
$\rho(1450) \pi \rightarrow \pi^+ \pi^- \pi^0$	(2.2 ± 1.1) × 10 ⁻⁴	—	—	DESIG=328
$\rho(1450)^\pm \pi^\mp \rightarrow K_S^0 K^\pm \pi^\mp$	(3.3 ± 0.6) × 10 ⁻⁴	—	—	DESIG=329
$\rho(1450)^0 \pi^0 \rightarrow K^+ K^- \pi^0$	(2.7 ± 0.6) × 10 ⁻⁴	—	—	DESIG=312
$\rho(1450) \eta'(958) \rightarrow$ $\pi^+ \pi^- \eta'(958)$	(3.3 ± 0.7) × 10 ⁻⁶	—	—	DESIG=345
$\rho(1700) \pi \rightarrow \pi^+ \pi^- \pi^0$	(1.6 ± 1.1) × 10 ⁻⁴	—	—	DESIG=313
$\rho(2150) \pi \rightarrow \pi^+ \pi^- \pi^0$	(10 ± 40) × 10 ⁻⁶	—	—	DESIG=314
$\omega \pi^0$	(4.5 ± 0.5) × 10 ⁻⁴	S=1.4	1446	DESIG=32
$\omega \pi^0 \rightarrow \pi^+ \pi^- \pi^0$	(1.6 ± 0.7) × 10 ⁻⁵	—	—	DESIG=327
$\omega \pi^+ \pi^-$	(8.5 ± 1.0) × 10 ⁻³	S=1.3	1435	DESIG=24
$\omega \pi^0 \pi^0$	(3.4 ± 0.8) × 10 ⁻³	—	1436	DESIG=140
$\omega 3\pi^0$	(1.9 ± 0.6) × 10 ⁻³	—	1419	DESIG=421
$\omega f_2(1270)$	(4.3 ± 0.6) × 10 ⁻³	—	1142	DESIG=28
$\omega \eta$	(1.74 ± 0.20) × 10 ⁻³	S=1.6	1394	DESIG=30
$\omega \pi^+ \pi^- \pi^0$	(4.0 ± 0.7) × 10 ⁻³	—	1418	DESIG=211
$\omega \pi^0 \eta$	(3.4 ± 1.7) × 10 ⁻⁴	—	1363	DESIG=360
$\omega \pi^+ \pi^+ \pi^- \pi^-$	(8.5 ± 3.4) × 10 ⁻³	—	1392	DESIG=26
$\omega \pi^+ \pi^- 2\pi^0$	(3.3 ± 0.5) %	—	1394	DESIG=412
$\omega \eta' \pi^+ \pi^-$	(1.12 ± 0.13) × 10 ⁻³	—	1173	DESIG=385
$\omega \eta'(958)$	(1.89 ± 0.18) × 10 ⁻⁴	—	1279	DESIG=31
$\omega f_0(980)$	(1.4 ± 0.5) × 10 ⁻⁴	—	1267	DESIG=150
$\omega f_0(1710) \rightarrow \omega K \bar{K}$	(4.8 ± 1.1) × 10 ⁻⁴	—	878	DESIG=130
$\omega f_1(1420)$	(6.8 ± 2.4) × 10 ⁻⁴	—	1060	DESIG=105
$\omega f_2'(1525)$	< 2.2 × 10 ⁻⁴	CL=90%	1007	DESIG=29
$\omega X(1835) \rightarrow \omega p \bar{p}$	< 3.9 × 10 ⁻⁶	CL=95%	—	DESIG=263
$\omega X(1835), X \rightarrow \eta' \pi^+ \pi^-$	< 6.2 × 10 ⁻⁵	—	—	DESIG=386

$\omega K^+ K^-$	$(1.52 \pm 0.31) \times 10^{-3}$		1268	DESIG=441
$\omega K^\pm K_S^0 \pi^\mp$	[$(3.4 \pm 0.5) \times 10^{-3}$]		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
$\bar{K} K^*(892) + \text{c.c.} \rightarrow$ $K_S^0 K^\pm \pi^\mp$	$(4.8 \pm 0.5) \times 10^{-3}$		–	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
$K^*(1410) \bar{K} + \text{c.c.} \rightarrow$ $K^\pm K^\mp \pi^0$	$(7 \pm 4) \times 10^{-5}$		–	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
$K_2^*(1430) \bar{K} + \text{c.c.} \rightarrow$ $K^\pm K^\mp \pi^0$	$(1.0 \pm 0.5) \times 10^{-4}$		–	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
$K_2^*(1430)^+ K^- + \text{c.c.} \rightarrow$ $K^+ K^- \pi^0$	$(2.69 \pm \frac{0.25}{0.19}) \times 10^{-4}$		–	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
$K_2^*(1980)^+ K^- + \text{c.c.} \rightarrow$ $K^+ K^- \pi^0$	$(1.10 \pm \frac{0.60}{0.14}) \times 10^{-5}$		–	DESIG=382

$K_4^*(2045)^+ K^- + c.c. \rightarrow$	(6.2 ± 2.9)	$\times 10^{-6}$	–	DESIG=383
$K_1(1270)^\pm K^\mp$	< 3.0	$\times 10^{-3}$	CL=90%	1240 DESIG=131
$K_1(1270) K_S^0 \rightarrow \gamma K_S^0 K_S^0$	(8.5 ± 2.5)	$\times 10^{-7}$	–	DESIG=377
$a_2(1320)^\pm \pi^\mp$	[l] < 4.3	$\times 10^{-3}$	CL=90%	1263 DESIG=42
$\phi \pi^0$	3×10^{-6} or 1×10^{-7}			1377 DESIG=33;OUR EVAL;→ UNCHECKED ←
$\phi \pi^+ \pi^-$	(9.4 ± 1.5)	$\times 10^{-4}$	S=1.7	1365 DESIG=34
$\phi \pi^0 \pi^0$	(5.0 ± 1.0)	$\times 10^{-4}$		1366 DESIG=76
$\phi 2(\pi^+ \pi^-)$	(1.60 ± 0.32)	$\times 10^{-3}$		1318 DESIG=35
$\phi \eta$	(7.4 ± 0.6)	$\times 10^{-4}$	S=1.2	1320 DESIG=37
$\phi \eta'(958)$	(4.6 ± 0.5)	$\times 10^{-4}$	S=2.2	1192 DESIG=38
$\phi \eta \eta'$	(2.32 ± 0.17)	$\times 10^{-4}$		885 DESIG=387
$\phi f_0(980)$	(3.2 ± 0.9)	$\times 10^{-4}$	S=1.9	1178 DESIG=41
$\phi f_0(980) \rightarrow \phi \pi^+ \pi^-$	(2.60 ± 0.34)	$\times 10^{-4}$		– DESIG=236
$\phi f_0(980) \rightarrow \phi \pi^0 \pi^0$	(1.8 ± 0.5)	$\times 10^{-4}$		– DESIG=237
$\phi \pi^0 f_0(980) \rightarrow \phi \pi^0 \pi^+ \pi^-$	(4.5 ± 1.0)	$\times 10^{-6}$		– DESIG=278
$\phi \pi^0 f_0(980) \rightarrow \phi \pi^0 \rho^0 \pi^0$	(1.7 ± 0.6)	$\times 10^{-6}$		1045 DESIG=279
$\phi f_0(980) \eta \rightarrow \eta \phi \pi^+ \pi^-$	(3.2 ± 1.0)	$\times 10^{-4}$		– DESIG=229
$\phi a_0(980)^0 \rightarrow \phi \eta \pi^0$	(4.4 ± 1.4)	$\times 10^{-6}$		– DESIG=258
$\phi f_2(1270)$	(3.2 ± 0.6)	$\times 10^{-4}$		1036 DESIG=39
$\phi f_1(1285)$	(2.6 ± 0.5)	$\times 10^{-4}$		1032 DESIG=106
$\phi f_1(1285) \rightarrow$	(9.4 ± 2.8)	$\times 10^{-7}$		952 DESIG=280
$\phi \pi^0 f_0(980) \rightarrow$				
$\phi \pi^0 \pi^+ \pi^-$				
$\phi f_1(1285) \rightarrow$	(2.1 ± 2.2)	$\times 10^{-7}$		955 DESIG=281
$\phi \pi^0 f_0(980) \rightarrow \phi 3\pi^0$				
$\phi \eta(1405) \rightarrow \phi \eta \pi^+ \pi^-$	(2.0 ± 1.0)	$\times 10^{-5}$		946 DESIG=128
$\phi f_2'(1525)$	(8 ± 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
$\phi K^+ K^-$	(8.3 ± 1.1)	$\times 10^{-4}$		1179 DESIG=295
$\phi K_S^0 K_S^0$	(5.9 ± 1.5)	$\times 10^{-4}$		1176 DESIG=305
$\phi K^\pm K_S^0 \pi^\mp$	[l] (7.2 ± 0.8)	$\times 10^{-4}$		1114 DESIG=103
$\phi K^*(892) \bar{K} + c.c.$	(2.18 ± 0.23)	$\times 10^{-3}$		969 DESIG=104
$b_1(1235)^\pm \pi^\mp$	[l] (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
$f_2'(1525) K^+ K^-$	(1.06 ± 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
$\bar{\Sigma}(1385)^0 p K^-$	(5.1 ± 3.2)	$\times 10^{-4}$		646 DESIG=74
$\Sigma(1385)^0 \bar{\Lambda} + c.c.$	< 8.2	$\times 10^{-6}$	CL=90%	911 DESIG=111
$\Sigma(1385)^- \bar{\Sigma}^+ + c.c.$	[l] (3.0 ± 0.7)	$\times 10^{-4}$		855 DESIG=68
$\Sigma(1385)^+ \bar{\Sigma}^- + c.c.$	(3.3 ± 0.8)	$\times 10^{-4}$		861 DESIG=450
$\Sigma(1385)^- \bar{\Sigma}(1385)^+ + c.c.$	[l] (1.08 ± 0.06)	$\times 10^{-3}$		697 DESIG=67
$\Sigma(1385)^+ \bar{\Sigma}(1385)^- + c.c.$	(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
$\Lambda(1520) \bar{\Lambda} + c.c. \rightarrow \gamma \Lambda \bar{\Lambda}$	< 4.1	$\times 10^{-6}$	CL=90%	– DESIG=260
$\bar{\Lambda}(1520) \Lambda + c.c.$	< 1.80	$\times 10^{-3}$	CL=90%	807 DESIG=364
$\Xi^0 \Xi^0$	(1.17 ± 0.04)	$\times 10^{-3}$		818 DESIG=248
$\Xi(1530)^- \bar{\Xi}^+ + c.c.$	(3.18 ± 0.08)	$\times 10^{-4}$		600 DESIG=107
$\Xi(1530)^0 \bar{\Xi}^0$	(3.2 ± 1.4)	$\times 10^{-4}$		608 DESIG=108
$\Theta(1540) \bar{\Theta}(1540) \rightarrow$	[l] < 1.1	$\times 10^{-5}$	CL=90%	– DESIG=205
$K_S^0 p K^- \bar{n} + c.c.$				
$\Theta(1540) K^- \bar{n} \rightarrow K_S^0 p K^- \bar{n}$	[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

NODE=M070;CLUMP=B

$2(\pi^+\pi^-\pi^0)$	(4.2 ± 0.4) %	S=2.1	1496	DESIG=9
$3(\pi^+\pi^-\pi^0)$	(2.9 ± 0.6) %		1433	DESIG=11
$\pi^+\pi^-\pi^0$	(1.9 ± 0.9) %		1497	DESIG=358
$\pi^+\pi^-\pi^0$	(6.5 ± 1.3) × 10 ⁻³		1470	DESIG=419
$\rho^\pm\pi^\mp\pi^0\pi^0$	(1.41 ± 0.22) %		1421	DESIG=362
$\rho^+\rho^-\pi^0$	(6.0 ± 1.1) × 10 ⁻³		1298	DESIG=363
$\pi^+\pi^-\pi^0$	(2.00 ± 0.07) %	S=2.0	1533	DESIG=7
$2(\pi^+\pi^-\pi^0)$	(1.61 ± 0.20) %		1468	DESIG=210
$\pi^+\pi^-\pi^0 K^+ K^-$	(1.52 ± 0.27) %	S=1.4	1368	DESIG=18
$\pi^+\pi^-$	(1.47 ± 0.14) × 10 ⁻⁴		1542	DESIG=6
$2(\pi^+\pi^-)$	(3.20 ± 0.25) × 10 ⁻³	S=1.2	1517	DESIG=8
$3(\pi^+\pi^-)$	(4.3 ± 0.4) × 10 ⁻³		1466	DESIG=10
$2(\pi^+\pi^-)3\pi^0$	(6.2 ± 0.9) %		1435	DESIG=411
$4(\pi^+\pi^-)\pi^0$	(9.0 ± 3.0) × 10 ⁻³		1345	DESIG=12
$2(\pi^+\pi^-)\eta$	(2.29 ± 0.28) × 10 ⁻³		1446	DESIG=201
$3(\pi^+\pi^-)\eta$	(7.2 ± 1.5) × 10 ⁻⁴		1379	DESIG=202
$2(\pi^+\pi^-\pi^0)\eta$	(1.6 ± 0.5) × 10 ⁻³		1381	DESIG=418
$\pi^+\pi^-\pi^0\pi^0\eta$	(2.4 ± 0.5) × 10 ⁻³		1448	DESIG=359
$\rho^\pm\pi^\mp\pi^0\eta$	(1.9 ± 0.8) × 10 ⁻³		1326	DESIG=361
$K^+ K^-$	(2.86 ± 0.21) × 10 ⁻⁴		1468	DESIG=13
$K_S^0 K_L^0$	(1.95 ± 0.11) × 10 ⁻⁴	S=2.4	1466	DESIG=75
$K_S^0 K_S^0$	< 1.4 × 10 ⁻⁸	CL=95%	1466	DESIG=14
$K\bar{K}\pi$	(6.1 ± 1.0) × 10 ⁻³		1442	DESIG=15
$K^+ K^- \pi^0$	(2.88 ± 0.12) × 10 ⁻³		1442	DESIG=334
$K_S^0 K^\pm \pi^\mp$	(5.3 ± 0.5) × 10 ⁻³		1440	DESIG=335
$K_S^0 K_L^0 \pi^0$	(2.06 ± 0.26) × 10 ⁻³		1440	DESIG=336
$K^*(892)^0 \bar{K}^0 + c.c. \rightarrow$	(1.21 ± 0.18) × 10 ⁻³		-	DESIG=339
$K_S^0 K_L^0 \pi^0$				
$K_2^*(1430)^0 \bar{K}^0 + c.c. \rightarrow$	(4.3 ± 1.3) × 10 ⁻⁴		-	DESIG=338
$K_S^0 K_L^0 \pi^0$				
$K^+ K^- \pi^+ \pi^-$	(7.0 ± 1.0) × 10 ⁻³		1407	DESIG=16
$K^+ K^- \pi^0 \pi^0$	(2.13 ± 0.22) × 10 ⁻³		1410	DESIG=234
$K^+ K^- \pi^0 \pi^0 \pi^0$	(1.61 ± 0.29) × 10 ⁻³		1371	DESIG=452
$K_S^0 K^\pm \pi^\mp \pi^0 \pi^0$	(5.3 ± 0.7) × 10 ⁻³		1369	DESIG=453
$K_S^0 K^\pm \pi^\mp \pi^+ \pi^-$	(6.3 ± 0.4) × 10 ⁻³		1366	DESIG=454
$K_S^0 K^\pm \rho(770)^\pm \pi^0$	(2.9 ± 0.8) × 10 ⁻³		-	DESIG=463
$K_S^0 K_L^0 \pi^+ \pi^-$	(3.8 ± 0.6) × 10 ⁻³		1406	DESIG=296
$K_S^0 K_L^0 \pi^0 \pi^0$	(1.9 ± 0.4) × 10 ⁻³		1408	DESIG=337
$K_S^0 K_L^0 \eta$	(1.45 ± 0.33) × 10 ⁻³		1328	DESIG=340
$K_S^0 K_S^0 \pi^+ \pi^-$	(1.68 ± 0.19) × 10 ⁻³		1406	DESIG=297
$K^\mp K_S^0 \pi^\pm \pi^0$	(5.7 ± 0.5) × 10 ⁻³		1408	DESIG=341
$K_S^0 K^\pm \pi^\mp \rho(770)^0$	(3.1 ± 0.5) × 10 ⁻³		-	DESIG=456
$K^+ K^- 2(\pi^+ \pi^-)$	(3.1 ± 1.3) × 10 ⁻³		1320	DESIG=17
$K^+ K^- \pi^+ \pi^- \eta$	(4.7 ± 0.7) × 10 ⁻³		1221	DESIG=238
$2(K^+ K^-)$	(7.2 ± 0.8) × 10 ⁻⁴		1131	DESIG=19
$K^+ K^- K_S^0 K_S^0$	(4.2 ± 0.7) × 10 ⁻⁴		1127	DESIG=298
$K_S^0 K^*(892)^0 \pi^+ \pi^-$	(1.7 ± 0.6) × 10 ⁻³		1304	DESIG=457
$K_S^0 K^*(892)^0 \pi^0 \pi^0$	(1.01 ± 0.18) × 10 ⁻³		1306	DESIG=462
$K^\mp K^*(892)^\pm \pi^+ \pi^-$	(3.4 ± 1.2) × 10 ⁻³		1305	DESIG=458
$K^*(892)^\pm K^*(892)^0 \pi^\mp$	(4.8 ± 1.0) × 10 ⁻³		1213	DESIG=459
$K^\mp K^*(892)^\pm \pi^0 \pi^0$	(1.57 ± 0.32) × 10 ⁻³		1308	DESIG=461
$K^*(892)^+ K^*(892)^- \pi^0$	(1.12 ± 0.23) %		1214	DESIG=460
$p\bar{p}$	(2.120 ± 0.029) × 10 ⁻³		1232	DESIG=50
$p\bar{p}\pi^0$	(1.19 ± 0.08) × 10 ⁻³	S=1.1	1176	DESIG=52
$p\bar{p}\pi^+ \pi^-$	(6.0 ± 0.5) × 10 ⁻³	S=1.3	1107	DESIG=54
$p\bar{p}\pi^+ \pi^- \pi^0$	(2.3 ± 0.9) × 10 ⁻³	S=1.9	1033	DESIG=55

[k]

$p\bar{p}\eta$	$(2.00 \pm 0.12) \times 10^{-3}$		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
$\Lambda\bar{\Sigma}^-\pi^+ + c.c.$	[i] $(1.26 \pm 0.05) \times 10^{-3}$	S=1.2	950	DESIG=71
$\Lambda\bar{\Sigma}^+\pi^- + c.c.$	$(1.21 \pm 0.07) \times 10^{-3}$	S=1.8	945	DESIG=449
$pK^-\bar{\Lambda} + c.c.$	$(8.6 \pm 1.1) \times 10^{-4}$		876	DESIG=72
$pK^-\Sigma^0$	$(2.9 \pm 0.8) \times 10^{-4}$		819	DESIG=73
$\Lambda nK_S^0 + c.c.$	$(6.5 \pm 1.1) \times 10^{-4}$		872	DESIG=225
$\Lambda\bar{\Sigma} + c.c.$	$(2.83 \pm 0.23) \times 10^{-5}$		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

				NODE=M070;CLUMP=C
$\gamma\eta_c(1S)$	$(1.41 \pm 0.14) \%$	S=1.3	111	DESIG=85
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
$\gamma\eta(1405/1475) \rightarrow \gamma\gamma\phi$	$< 8.2 \times 10^{-5}$	CL=95%	–	DESIG=212
$\gamma\eta(1405) \rightarrow \gamma\gamma\gamma$	$< 2.63 \times 10^{-6}$	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
$\gamma\eta(2225)$	$(3.14 \pm_{-0.19}^{0.50}) \times 10^{-4}$		752	DESIG=126
$\gamma f_2(1270)$	$(1.63 \pm 0.12) \times 10^{-3}$	S=1.3	1286	DESIG=86
$\gamma f_2(1270) \rightarrow \gamma K_S^0 K_S^0$	$(2.58 \pm_{-0.22}^{0.60}) \times 10^{-5}$		-	DESIG=373
$\gamma f_1(1285)$	$(6.1 \pm 0.8) \times 10^{-4}$		1283	DESIG=88
$\gamma f_0(1370) \rightarrow \gamma K \bar{K}$	$(4.2 \pm 1.5) \times 10^{-4}$		-	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
$\gamma f_0(1500) \rightarrow \gamma \pi \pi$	$(1.09 \pm 0.24) \times 10^{-4}$		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
$\gamma f_2'(1525)$	$(5.7 \pm_{-0.5}^{0.8}) \times 10^{-4}$	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
$\gamma f_2(1640) \rightarrow \gamma \omega \omega$	$(2.8 \pm 1.8) \times 10^{-4}$		-	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
$\gamma f_2(1950) \rightarrow$	$(7.0 \pm 2.2) \times 10^{-4}$		-	DESIG=144
$\gamma K^*(892) \bar{K}^*(892)$				
$\gamma f_0(2020) \rightarrow \gamma \eta' \eta'$	$(2.63 \pm_{-0.50}^{0.32}) \times 10^{-4}$		-	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
$\gamma f_0(2200) \rightarrow \gamma K \bar{K}$	$(5.9 \pm 1.3) \times 10^{-4}$		-	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
$\gamma f_J(2220) \rightarrow \gamma \pi \pi$	$< 3.9 \times 10^{-5}$	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

$\gamma X(1835) \rightarrow \gamma p \bar{p}$		$(7.7 \pm \frac{1.5}{0.9}) \times 10^{-5}$	–		DESIG=254
$\gamma X(1835) \rightarrow \gamma K_S^0 K_S^0 \eta$		$(3.3 \pm \frac{2.0}{1.3}) \times 10^{-5}$	–		DESIG=282
$\gamma X(1835) \rightarrow \gamma \gamma \gamma$		$< 3.56 \times 10^{-6}$	CL=90%	–	DESIG=350
$\gamma X(1835) \rightarrow \gamma 3(\pi^+ \pi^-)$		$(2.4 \pm \frac{0.7}{0.8}) \times 10^{-5}$	–		DESIG=264
$\gamma X(2370) \rightarrow \gamma K^+ K^- \eta'$		$(1.8 \pm 0.7) \times 10^{-5}$	–		DESIG=388
$\gamma X(2370) \rightarrow \gamma K_S^0 K_S^0 \eta'$		$(1.2 \pm 0.5) \times 10^{-5}$	–		DESIG=389
$\gamma X(2370) \rightarrow \gamma \eta \eta \eta'$		$< 9.2 \times 10^{-6}$	CL=90%	–	DESIG=390
$\gamma p \bar{p}$		$(3.8 \pm 1.0) \times 10^{-4}$		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
$\gamma A^0 \rightarrow \gamma \text{invisible}$	[l]	$< 1.7 \times 10^{-6}$	CL=90%	–	DESIG=251
$\gamma A^0 \rightarrow \gamma \mu^+ \mu^-$	[n]	$< 7.8 \times 10^{-7}$	CL=90%	–	DESIG=259
Dalitz decays					
$\pi^0 e^+ e^-$		$(7.6 \pm 1.4) \times 10^{-7}$		1546	NODE=M070;CLUMP=G DESIG=271
$\eta e^+ e^-$		$(1.42 \pm 0.08) \times 10^{-5}$		1500	DESIG=272
$\eta'(958) e^+ e^-$		$(6.59 \pm 0.18) \times 10^{-5}$		1400	DESIG=273
$X(1835) e^+ e^-, X \rightarrow \pi^+ \pi^- \eta'$		$(3.58 \pm 0.25) \times 10^{-6}$		–	DESIG=423
$X(2120) e^+ e^-, X \rightarrow \pi^+ \pi^- \eta'$		$(8.2 \pm 1.3) \times 10^{-7}$		–	DESIG=425
$X(2370) e^+ e^-, X \rightarrow \pi^+ \pi^- \eta'$		$(1.08 \pm 0.17) \times 10^{-6}$		–	DESIG=424
$\eta U \rightarrow \eta e^+ e^-$	[o]	$< 9.11 \times 10^{-7}$	CL=90%	–	DESIG=352
$\eta'(958) U \rightarrow \eta'(958) e^+ e^-$	[o]	$< 2.0 \times 10^{-7}$	CL=90%	–	DESIG=366
$\phi e^+ e^-$		$< 1.2 \times 10^{-7}$	CL=90%	1381	DESIG=384
Weak decays					
$D^- e^+ \nu_e + \text{c.c.}$		$< 7.1 \times 10^{-8}$	CL=90%	984	NODE=M070;CLUMP=E DESIG=218
$\bar{D}^0 e^+ e^- + \text{c.c.}$		$< 8.5 \times 10^{-8}$	CL=90%	987	DESIG=219
$D_s^- e^+ \nu_e + \text{c.c.}$		$< 1.3 \times 10^{-6}$	CL=90%	923	DESIG=220
$D_s^{*-} e^+ \nu_e + \text{c.c.}$		$< 1.8 \times 10^{-6}$	CL=90%	828	DESIG=290
$D^- \pi^+ + \text{c.c.}$		$< 7.5 \times 10^{-5}$	CL=90%	977	DESIG=241
$\bar{D}^0 \bar{K}^0 + \text{c.c.}$		$< 1.7 \times 10^{-4}$	CL=90%	898	DESIG=242
$\bar{D}^0 \bar{K}^{*0} + \text{c.c.}$		$< 2.5 \times 10^{-6}$	CL=90%	670	DESIG=275
$D_s^- \pi^+ + \text{c.c.}$		$< 1.3 \times 10^{-4}$	CL=90%	915	DESIG=243
$D_s^- \rho^+ + \text{c.c.}$		$< 1.3 \times 10^{-5}$	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	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
$\Lambda_c^+ e^- + \text{c.c.}$		$< 6.9 \times 10^{-8}$	CL=90%	–	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 $\Gamma = 10.7 \pm 0.6$ MeV ($S = 1.1$)

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				
$2(\pi^+\pi^-)$	(2.3 \pm 0.4) %	S=2.0	1679	NODE=M056215;NODE=M056;CLUMP=A
$\rho^0\pi^+\pi^-$	(9.1 \pm 3.1) $\times 10^{-3}$	S=1.1	1607	DESIG=3
$f_0(980)f_0(980)$	(6.7 \pm 2.1) $\times 10^{-4}$		1391	DESIG=9
$\pi^+\pi^-\pi^0\pi^0$	(3.3 \pm 0.4) %		1680	DESIG=20
$\rho^+\pi^-\pi^0 + c.c.$	(2.9 \pm 0.4) %		1607	DESIG=61
$4\pi^0$	(3.3 \pm 0.4) $\times 10^{-3}$		1681	DESIG=62
$\pi^+\pi^-K^+K^-$	(1.82 \pm 0.16) %	S=1.2	1580	DESIG=70
$K_0^*(1430)^0\bar{K}_0^*(1430)^0 \rightarrow$ $\pi^+\pi^-K^+K^-$	(9.9 $\begin{smallmatrix} +4.0 \\ -2.8 \end{smallmatrix}$) $\times 10^{-4}$		–	DESIG=5
$K_0^*(1430)^0\bar{K}_2^*(1430)^0 + c.c. \rightarrow$ $\pi^+\pi^-K^+K^-$	(8.0 $\begin{smallmatrix} +2.0 \\ -2.4 \end{smallmatrix}$) $\times 10^{-4}$		–	DESIG=31
$K_1(1270)^+K^- + c.c. \rightarrow$ $\pi^+\pi^-K^+K^-$	(6.3 \pm 1.9) $\times 10^{-3}$		–	DESIG=32
$K_1(1400)^+K^- + c.c. \rightarrow$ $\pi^+\pi^-K^+K^-$	< 2.7 $\times 10^{-3}$	CL=90%	–	DESIG=33
$f_0(980)f_0(980)$	(1.6 $\begin{smallmatrix} +1.0 \\ -0.9 \end{smallmatrix}$) $\times 10^{-4}$		1391	DESIG=34
$f_0(980)f_0(2200)$	(7.9 $\begin{smallmatrix} +2.0 \\ -2.5 \end{smallmatrix}$) $\times 10^{-4}$		586	DESIG=23
$f_0(1370)f_0(1370)$	< 2.7 $\times 10^{-4}$	CL=90%	1019	DESIG=24
$f_0(1370)f_0(1500)$	< 1.7 $\times 10^{-4}$	CL=90%	907	DESIG=25
$f_0(1370)f_0(1710)$	(6.7 $\begin{smallmatrix} +3.5 \\ -2.3 \end{smallmatrix}$) $\times 10^{-4}$		709	DESIG=26
$f_0(1500)f_0(1370)$	< 1.3 $\times 10^{-4}$	CL=90%	907	DESIG=27
$f_0(1500)f_0(1500)$	< 5 $\times 10^{-5}$	CL=90%	774	DESIG=28
$f_0(1500)f_0(1710)$	< 7 $\times 10^{-5}$	CL=90%	515	DESIG=29
$K^+K^-\pi^+\pi^-\pi^0$	(8.6 \pm 0.9) $\times 10^{-3}$		1545	DESIG=30
$K_S^0 K^\pm \pi^\mp \pi^+ \pi^-$	(4.2 \pm 0.4) $\times 10^{-3}$		1543	DESIG=75
$K^+K^-\pi^0\pi^0$	(5.6 \pm 0.9) $\times 10^{-3}$		1582	DESIG=87
$K^+\pi^-\bar{K}^0\pi^0 + c.c.$	(2.49 \pm 0.33) %		1581	DESIG=63
$\rho^+K^-K^0 + c.c.$	(1.21 \pm 0.21) %		1458	DESIG=65
$K^*(892)^-K^+\pi^0 \rightarrow$ $K^+\pi^-\bar{K}^0\pi^0 + c.c.$	(4.6 \pm 1.2) $\times 10^{-3}$		–	DESIG=66
$K_S^0 K_S^0 \pi^+ \pi^-$	(5.7 \pm 1.1) $\times 10^{-3}$		1579	DESIG=67
$K^+K^-\eta\pi^0$	(3.0 \pm 0.7) $\times 10^{-3}$		1468	DESIG=41
$3(\pi^+\pi^-)$	(1.95 \pm 0.22) %	S=3.3	1633	DESIG=68
$K^+\bar{K}^*(892)^0\pi^- + c.c.$	(7.5 \pm 1.6) $\times 10^{-3}$		1523	DESIG=4
$K^*(892)^0\bar{K}^*(892)^0$	(1.7 \pm 0.6) $\times 10^{-3}$		1456	DESIG=10
$\pi\pi$	(8.5 \pm 0.4) $\times 10^{-3}$	S=1.2	1702	DESIG=21
$\pi^0\eta$	< 1.8 $\times 10^{-4}$		1661	DESIG=18
$\pi^0\eta'$	< 1.1 $\times 10^{-3}$		1570	DESIG=35
$\pi^0\eta_c$	< 1.6 $\times 10^{-3}$	CL=90%	383	DESIG=36
$\eta\eta$	(3.01 \pm 0.25) $\times 10^{-3}$	S=1.3	1617	DESIG=86
$\eta\eta'$	(9.1 \pm 1.1) $\times 10^{-5}$		1521	DESIG=13
$\eta'\eta'$	(2.17 \pm 0.12) $\times 10^{-3}$		1413	DESIG=37
$\omega\omega$	(9.7 \pm 1.1) $\times 10^{-4}$		1517	DESIG=46
$\omega\phi$	(1.42 \pm 0.13) $\times 10^{-4}$		1447	DESIG=44
ωK^+K^-	(1.94 \pm 0.21) $\times 10^{-3}$		1457	DESIG=22
K^+K^-	(6.07 \pm 0.33) $\times 10^{-3}$	S=1.1	1634	DESIG=88
$K_S^0 K_S^0$	(3.17 \pm 0.19) $\times 10^{-3}$	S=1.1	1633	DESIG=2
$\pi^+\pi^-\eta$	< 2.0 $\times 10^{-4}$	CL=90%	1651	DESIG=15
$\pi^+\pi^-\eta'$	< 4 $\times 10^{-4}$	CL=90%	1560	DESIG=50
$\bar{K}^0 K^+\pi^- + c.c.$	< 9 $\times 10^{-5}$	CL=90%	1610	DESIG=53
$K^+K^-\pi^0$	< 6 $\times 10^{-5}$	CL=90%	1611	DESIG=17
$K^+K^-\eta$	< 2.3 $\times 10^{-4}$	CL=90%	1512	DESIG=47
$K^+K^-K_S^0 K_S^0$	(1.4 \pm 0.5) $\times 10^{-3}$		1331	DESIG=51
				DESIG=42

$K_S^0 K_S^0 K_S^0 K_S^0$	$(5.8 \pm 0.5) \times 10^{-4}$		1327	DESIG=94
$K^+ K^- K^+ K^-$	$(2.8 \pm 0.4) \times 10^{-3}$	S=1.5	1333	DESIG=14
$K^+ K^- \phi$	$(9.7 \pm 2.5) \times 10^{-4}$		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
$\phi \pi^+ \pi^- \pi^0$	$(1.18 \pm 0.15) \times 10^{-3}$		1525	DESIG=89
$\phi \phi$	$(8.48 \pm 0.31) \times 10^{-4}$		1370	DESIG=16
$\phi \phi \eta$	$(8.4 \pm 1.0) \times 10^{-4}$		1100	DESIG=96
$p \bar{p}$	$(2.21 \pm 0.14) \times 10^{-4}$	S=1.6	1426	DESIG=11
$p \bar{p} \pi^0$	$(7.0 \pm 0.7) \times 10^{-4}$	S=1.3	1379	DESIG=48
$p \bar{p} \eta$	$(3.5 \pm 0.4) \times 10^{-4}$		1187	DESIG=52
$p \bar{p} \omega$	$(5.3 \pm 0.6) \times 10^{-4}$		1043	DESIG=69
$p \bar{p} \phi$	$(6.0 \pm 1.4) \times 10^{-5}$		876	DESIG=74
$p \bar{p} \pi^+ \pi^-$	$(2.1 \pm 0.7) \times 10^{-3}$	S=1.4	1320	DESIG=8
$p \bar{p} \pi^0 \pi^0$	$(1.04 \pm 0.28) \times 10^{-3}$		1324	DESIG=64
$p \bar{p} K^+ K^- (\text{non-resonant})$	$(1.22 \pm 0.26) \times 10^{-4}$		890	DESIG=71
$p \bar{p} K_S^0 K_S^0$	$< 8.8 \times 10^{-4}$	CL=90%	884	DESIG=40
$p \bar{n} \pi^-$	$(1.27 \pm 0.11) \times 10^{-3}$		1376	DESIG=43
$\bar{p} n \pi^+$	$(1.37 \pm 0.12) \times 10^{-3}$		1376	DESIG=82
$p \bar{n} \pi^- \pi^0$	$(2.34 \pm 0.21) \times 10^{-3}$		1321	DESIG=83
$\bar{p} n \pi^+ \pi^0$	$(2.21 \pm 0.19) \times 10^{-3}$		1321	DESIG=84
$\Lambda \bar{\Lambda}$	$(3.60 \pm 0.17) \times 10^{-4}$	S=1.1	1292	DESIG=19
$\Lambda \bar{\Lambda} \pi^+ \pi^-$	$(1.18 \pm 0.13) \times 10^{-3}$		1153	DESIG=38
$\Lambda \bar{\Lambda} \pi^+ \pi^- (\text{non-resonant})$	$< 5 \times 10^{-4}$	CL=90%	1153	DESIG=77
$\Lambda \bar{\Lambda} \eta$	$(2.3 \pm 0.4) \times 10^{-4}$		979	DESIG=102
$\Sigma(1385)^+ \bar{\Lambda} \pi^- + \text{c.c.}$	$< 5 \times 10^{-4}$	CL=90%	1083	DESIG=78
$\Sigma(1385)^- \bar{\Lambda} \pi^+ + \text{c.c.}$	$< 5 \times 10^{-4}$	CL=90%	1083	DESIG=79
$K^+ \bar{p} \Lambda + \text{c.c.}$	$(1.25 \pm 0.12) \times 10^{-3}$	S=1.3	1132	DESIG=49
$n K_S^0 \bar{\Lambda} + \text{c.c.}$	$(6.7 \pm 0.5) \times 10^{-4}$		1129	DESIG=101
$K^*(892)^+ \bar{p} \Lambda + \text{c.c.}$	$(4.8 \pm 0.9) \times 10^{-4}$		845	DESIG=98
$K^+ \bar{p} \Lambda(1520) + \text{c.c.}$	$(3.0 \pm 0.8) \times 10^{-4}$		859	DESIG=72
$\Lambda(1520) \bar{\Lambda}(1520)$	$(3.1 \pm 1.2) \times 10^{-4}$		780	DESIG=73
$\Sigma^0 \bar{\Sigma}^0$	$(4.69 \pm 0.32) \times 10^{-4}$		1222	DESIG=58
$\Sigma^+ \bar{p} K_S^0 + \text{c.c.}$	$(3.53 \pm 0.27) \times 10^{-4}$		1089	DESIG=97
$\Sigma^0 \bar{p} K^+ + \text{c.c.}$	$(3.04 \pm 0.20) \times 10^{-4}$		1090	DESIG=100
$\Sigma^+ \bar{\Sigma}^-$	$(4.7 \pm 0.8) \times 10^{-4}$	S=2.6	1225	DESIG=59
$\Sigma^- \bar{\Sigma}^+$	$(5.1 \pm 0.5) \times 10^{-4}$		1217	DESIG=99
$\Sigma(1385)^+ \bar{\Sigma}(1385)^-$	$(1.6 \pm 0.6) \times 10^{-4}$		1001	DESIG=80
$\Sigma(1385)^- \bar{\Sigma}(1385)^+$	$(2.3 \pm 0.7) \times 10^{-4}$		1001	DESIG=81
$K^- \bar{\Lambda} \Xi^+ + \text{c.c.}$	$(1.95 \pm 0.35) \times 10^{-4}$		873	DESIG=85
$\Xi^0 \bar{\Xi}^0$	$(4.5 \pm 0.5) \times 10^{-4}$	S=1.7	1089	DESIG=60
$\Xi^- \bar{\Xi}^+$	$(4.47 \pm 0.20) \times 10^{-4}$		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

$\gamma J/\psi(1S)$	$(1.41 \pm 0.09) \%$	S=1.7	303	NODE=M056;CLUMP=B DESIG=6
$\gamma \rho^0$	$< 9 \times 10^{-6}$	CL=90%	1619	DESIG=55
$\gamma \omega$	$< 8 \times 10^{-6}$	CL=90%	1618	DESIG=56
$\gamma \phi$	$< 6 \times 10^{-6}$	CL=90%	1555	DESIG=57
$\gamma \gamma$	$(2.04 \pm 0.10) \times 10^{-4}$	S=1.1	1707	DESIG=7
$e^+ e^- J/\psi(1S)$	$(1.34 \pm 0.30) \times 10^{-4}$		303	DESIG=93
$\mu^+ \mu^- J/\psi(1S)$	$< 1.9 \times 10^{-5}$	CL=90%	226	DESIG=95

 $\chi_{c1}(1P)$

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

NODE=M055

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

NODE=M055M;DTYPE=M

Full width $\Gamma = 0.84 \pm 0.04$ 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^-	$(1.4^{+1.5}_{-1.0}) \times 10^{-7}$		1755	NODE=M055215;DESIG=110
Hadronic decays				
$3(\pi^+\pi^-)$	$(1.04 \pm 0.16) \%$	S=4.6	1683	NODE=M055;CLUMP=A DESIG=6
$2(\pi^+\pi^-)$	$(7.6 \pm 2.6) \times 10^{-3}$		1728	DESIG=5
$\pi^+\pi^-\pi^0\pi^0$	$(1.19 \pm 0.15) \%$		1729	DESIG=51
$\rho^+\pi^-\pi^0 + \text{c.c.}$	$(1.45 \pm 0.24) \%$		1658	DESIG=52
$\rho^0\pi^+\pi^-$	$(3.9 \pm 3.5) \times 10^{-3}$		1657	DESIG=9
$4\pi^0$	$(5.4 \pm 0.8) \times 10^{-4}$		1729	DESIG=60
$\pi^+\pi^-K^+K^-$	$(4.5 \pm 1.0) \times 10^{-3}$		1632	DESIG=7
$K^+K^-\pi^0\pi^0$	$(1.12 \pm 0.27) \times 10^{-3}$		1634	DESIG=53
$K^+K^-\pi^+\pi^-\pi^0$	$(1.15 \pm 0.13) \%$		1598	DESIG=79
$K_S^0 K^\pm \pi^\mp \pi^+ \pi^-$	$(7.5 \pm 0.8) \times 10^{-3}$		1596	DESIG=84
$K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$	$(8.6 \pm 1.4) \times 10^{-3}$		1632	DESIG=55
$\rho^-K^+\bar{K}^0 + \text{c.c.}$	$(5.0 \pm 1.2) \times 10^{-3}$		1514	DESIG=56
$K^*(892)^0\bar{K}^0\pi^0 \rightarrow$ $K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$	$(2.3 \pm 0.6) \times 10^{-3}$		—	DESIG=57
$K^+K^-\eta\pi^0$	$(1.12 \pm 0.34) \times 10^{-3}$		1523	DESIG=58
$\pi^+\pi^-K_S^0K_S^0$	$(6.9 \pm 2.9) \times 10^{-4}$		1630	DESIG=28
$K^+K^-\eta$	$(3.2 \pm 1.0) \times 10^{-4}$		1566	DESIG=42
$\bar{K}^0K^+\pi^- + \text{c.c.}$	$(7.0 \pm 0.6) \times 10^{-3}$	S=1.1	1661	DESIG=17
$K^*(892)^0\bar{K}^0 + \text{c.c.}$	$(1.03 \pm 0.15) \times 10^{-3}$		1602	DESIG=32
$K^*(892)^+K^- + \text{c.c.}$	$(1.21 \pm 0.23) \times 10^{-3}$		1602	DESIG=33
$K_J^*(1430)^0\bar{K}^0 + \text{c.c.} \rightarrow$ $K_S^0K^+\pi^- + \text{c.c.}$	$< 8 \times 10^{-4}$	CL=90%	—	DESIG=34
$K_J^*(1430)^+K^- + \text{c.c.} \rightarrow$ $K_S^0K^+\pi^- + \text{c.c.}$	$< 2.1 \times 10^{-3}$	CL=90%	—	DESIG=35
$K^+K^-\pi^0$	$(1.81 \pm 0.24) \times 10^{-3}$		1662	DESIG=38
$\eta\pi^+\pi^-$	$(4.62 \pm 0.24) \times 10^{-3}$		1701	DESIG=31
$a_0(980)^+\pi^- + \text{c.c.} \rightarrow \eta\pi^+\pi^-$	$(3.2 \pm 0.4) \times 10^{-3}$	S=2.1	—	DESIG=36
$a_2(1320)^+\pi^- + \text{c.c.} \rightarrow \eta\pi^+\pi^-$	$(1.76 \pm 0.24) \times 10^{-4}$		—	DESIG=93
$a_2(1700)^+\pi^- + \text{c.c.} \rightarrow \eta\pi^+\pi^-$	$(4.6 \pm 0.7) \times 10^{-5}$		—	DESIG=96
$f_2(1270)\eta \rightarrow \eta\pi^+\pi^-$	$(3.5 \pm 0.6) \times 10^{-4}$		—	DESIG=94
$f_4(2050)\eta \rightarrow \eta\pi^+\pi^-$	$(2.5 \pm 0.9) \times 10^{-5}$		—	DESIG=95
$\pi_1(1400)^+\pi^- + \text{c.c.} \rightarrow$ $\eta\pi^+\pi^-$	$< 5 \times 10^{-5}$	CL=90%	—	DESIG=97
$\pi_1(1600)^+\pi^- + \text{c.c.} \rightarrow$ $\eta\pi^+\pi^-$	$< 1.5 \times 10^{-5}$	CL=90%	—	DESIG=98
$\pi_1(2015)^+\pi^- + \text{c.c.} \rightarrow$ $\eta\pi^+\pi^-$	$< 8 \times 10^{-6}$	CL=90%	—	DESIG=99
$f_2(1270)\eta$	$(6.7 \pm 1.1) \times 10^{-4}$		1467	DESIG=37
$\pi^+\pi^-\eta'$	$(2.2 \pm 0.4) \times 10^{-3}$		1612	DESIG=44
$K^+K^-\eta'(958)$	$(8.8 \pm 0.9) \times 10^{-4}$		1461	DESIG=85
$K_0^*(1430)^+K^- + \text{c.c.}$	$(6.4^{+2.2}_{-2.8}) \times 10^{-4}$		—	DESIG=86
$K_2^*(1430)^+K^- + \text{c.c.}$	$(1.61 \pm 0.31) \times 10^{-3}$		1416	DESIG=115
$K_2^*(1430)\bar{K}^0 + \text{c.c.}$	$(1.17 \pm 0.20) \times 10^{-3}$		1416	DESIG=116
$f_0(980)\eta'(958)$	$(1.6^{+1.4}_{-0.7}) \times 10^{-4}$		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
$\pi^0 f_0(980) \rightarrow \pi^0\pi^+\pi^-$	$(3.5 \pm 0.9) \times 10^{-7}$		—	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
$K^+K^-K_S^0K_S^0$	$< 4 \times 10^{-4}$	CL=90%	1390	DESIG=29
$K_S^0K_S^0K_S^0K_S^0$	$(3.5 \pm 1.0) \times 10^{-5}$		1387	DESIG=102
$K^+K^-K^+K^-$	$(5.4 \pm 1.1) \times 10^{-4}$		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
$\phi \pi^+ \pi^- \pi^0$	$(7.5 \pm 1.0) \times 10^{-4}$		1578	DESIG=82
$\omega \omega$	$(5.7 \pm 0.7) \times 10^{-4}$		1571	DESIG=66
$\omega K^+ K^-$	$(7.8 \pm 0.9) \times 10^{-4}$		1513	DESIG=81
$\omega \phi$	$(2.7 \pm 0.4) \times 10^{-5}$		1503	DESIG=67
$\phi \phi$	$(4.26 \pm 0.21) \times 10^{-4}$		1429	DESIG=68
$\phi \phi \eta$	$(3.0 \pm 0.5) \times 10^{-4}$		1172	DESIG=104
$p \bar{p}$	$(7.6 \pm 0.4) \times 10^{-5}$	S=1.2	1484	DESIG=11
$p \bar{p} \pi^0$	$(1.55 \pm 0.18) \times 10^{-4}$		1438	DESIG=39
$p \bar{p} \eta$	$(1.45 \pm 0.25) \times 10^{-4}$		1254	DESIG=43
$p \bar{p} \omega$	$(2.12 \pm 0.31) \times 10^{-4}$		1117	DESIG=59
$p \bar{p} \phi$	$< 1.7 \times 10^{-5}$	CL=90%	962	DESIG=65
$p \bar{p} \pi^+ \pi^-$	$(5.0 \pm 1.9) \times 10^{-4}$		1381	DESIG=8
$p \bar{p} \pi^0 \pi^0$	$< 5 \times 10^{-4}$	CL=90%	1385	DESIG=54
$p \bar{p} K^+ K^-$ (non-resonant)	$(1.27 \pm 0.22) \times 10^{-4}$		974	DESIG=62
$p \bar{p} K_S^0 K_S^0$	$< 4.5 \times 10^{-4}$	CL=90%	968	DESIG=25
$p \bar{n} \pi^-$	$(3.8 \pm 0.5) \times 10^{-4}$		1435	DESIG=74
$\bar{p} n \pi^+$	$(3.9 \pm 0.5) \times 10^{-4}$		1435	DESIG=75
$p \bar{n} \pi^- \pi^0$	$(1.03 \pm 0.12) \times 10^{-3}$		1383	DESIG=76
$\bar{p} n \pi^+ \pi^0$	$(1.01 \pm 0.12) \times 10^{-3}$		1383	DESIG=77
$\Lambda \bar{\Lambda}$	$(1.27 \pm 0.09) \times 10^{-4}$	S=1.1	1355	DESIG=19
$\Lambda \bar{\Lambda} \pi^+ \pi^-$	$(2.9 \pm 0.5) \times 10^{-4}$		1223	DESIG=24
$\Lambda \bar{\Lambda} \pi^+ \pi^-$ (non-resonant)	$(2.5 \pm 0.6) \times 10^{-4}$		1223	DESIG=69
$\Lambda \bar{\Lambda} \eta$	$(5.9 \pm 1.5) \times 10^{-5}$		1059	DESIG=111
$\Sigma(1385)^+ \bar{\Lambda} \pi^- + \text{c.c.}$	$< 1.3 \times 10^{-4}$	CL=90%	1157	DESIG=70
$\Sigma(1385)^- \bar{\Lambda} \pi^+ + \text{c.c.}$	$< 1.3 \times 10^{-4}$	CL=90%	1157	DESIG=71
$K^+ \bar{p} \Lambda + \text{c.c.}$	$(4.2 \pm 0.4) \times 10^{-4}$	S=1.2	1203	DESIG=40
$n K_S^0 \bar{\Lambda} + \text{c.c.}$	$(1.66 \pm 0.17) \times 10^{-4}$		1200	DESIG=109
$K^*(892)^+ \bar{p} \Lambda + \text{c.c.}$	$(4.9 \pm 0.7) \times 10^{-4}$		935	DESIG=106
$K^+ \bar{p} \Lambda(1520) + \text{c.c.}$	$(1.7 \pm 0.4) \times 10^{-4}$		951	DESIG=63
$\Lambda(1520) \bar{\Lambda}(1520)$	$< 9 \times 10^{-5}$	CL=90%	880	DESIG=64
$\Sigma^0 \bar{\Sigma}^0$	$(4.2 \pm 0.6) \times 10^{-5}$		1288	DESIG=48
$\Sigma^+ \bar{p} K_S^0 + \text{c.c.}$	$(1.53 \pm 0.12) \times 10^{-4}$		1163	DESIG=105
$\Sigma^0 \bar{p} K^+ + \text{c.c.}$	$(1.46 \pm 0.10) \times 10^{-4}$		1163	DESIG=108
$\Sigma^+ \bar{\Sigma}^-$	$(3.6 \pm 0.7) \times 10^{-5}$		1291	DESIG=49
$\Sigma^- \bar{\Sigma}^+$	$(5.7 \pm 1.5) \times 10^{-5}$		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
$K^- \bar{\Lambda} \Xi^+ + \text{c.c.}$	$(1.35 \pm 0.24) \times 10^{-4}$		963	DESIG=92
$\Xi^0 \bar{\Xi}^0$	$(7.5 \pm 1.3) \times 10^{-5}$		1163	DESIG=50
$\Xi^- \bar{\Xi}^+$	$(6.0 \pm 0.6) \times 10^{-5}$		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

$\gamma J/\psi(1S)$	$(34.3 \pm 1.3) \%$	S=1.3	389	NODE=M055;CLUMP=B DESIG=1
$\gamma \rho^0$	$(2.16 \pm 0.17) \times 10^{-4}$		1670	DESIG=45
$\gamma \omega$	$(6.8 \pm 0.8) \times 10^{-5}$		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
$e^+ e^- J/\psi(1S)$	$(3.46 \pm 0.24) \times 10^{-3}$		389	DESIG=100
$\mu^+ \mu^- J/\psi(1S)$	$(2.33 \pm 0.29) \times 10^{-4}$		335	DESIG=103

 $h_c(1P)$

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

NODE=M144

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

NODE=M144M;DTYPE=M
NODE=M144W;DTYPE=G

$h_c(1P)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	P (MeV/c)	
$J/\psi(1S)\pi^0$	$< 5 \times 10^{-4}$	90%	382	NODE=M144215;DESIG=1
$J/\psi(1S)\pi^+\pi^-$	not seen		312	DESIG=2;OUR EST;→ UNCHECKED ←
$J/\psi(1S)\pi^+\pi^-$	$< 2.7 \times 10^{-3}$	90%	305	DESIG=10
$p\bar{p}$	$< 1.7 \times 10^{-4}$	90%	1492	DESIG=3
$p\bar{p}\pi^0$	$< 8 \times 10^{-4}$	90%	1447	DESIG=24
$p\bar{p}\pi^+\pi^-$	$(3.3\pm 0.6) \times 10^{-3}$		1390	DESIG=11
$p\bar{p}\pi^0\pi^0$	$< 6 \times 10^{-4}$	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
$\pi^+\pi^-\pi^0$	$(1.9\pm 0.5) \times 10^{-3}$		1749	DESIG=5
$\pi^+\pi^-\pi^0\eta$	$(8.3\pm 2.4) \times 10^{-3}$		1695	DESIG=14
$2\pi^+2\pi^-\pi^0$	$(9.4\pm 1.7) \times 10^{-3}$		1716	DESIG=6
$3\pi^+3\pi^-\pi^0$	< 1.0 %	90%	1661	DESIG=7
$K^+K^-\pi^+\pi^-$	$< 7 \times 10^{-4}$	90%	1640	DESIG=12
$K^+K^-\pi^+\pi^-\pi^0$	$(3.8\pm 0.8) \times 10^{-3}$		1606	DESIG=15
$K^+K^-\pi^+\pi^-\eta$	$< 2.7 \times 10^{-3}$	90%	1480	DESIG=16
$K^+K^-\pi^0$	$< 6 \times 10^{-4}$	90%	1670	DESIG=17
$K^+K^-\pi^0\eta$	$< 2.4 \times 10^{-3}$	90%	1532	DESIG=18
$K^+K^-\eta$	$< 1.0 \times 10^{-3}$	90%	1574	DESIG=19
$2K^+2K^-\pi^0$	$< 2.8 \times 10^{-4}$	90%	1339	DESIG=20
$K_S^0 K^\pm \pi^\mp$	$< 6 \times 10^{-4}$	90%	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				
$\gamma\eta$	$(4.7\pm 2.1) \times 10^{-4}$		1720	NODE=M144;CLUMP=R DESIG=9
$\gamma\eta'(958)$	$(1.5\pm 0.4) \times 10^{-3}$		1633	DESIG=8
$\gamma\eta_c(1S)$	(60 ± 4) %		500	DESIG=4

 $\chi_{c2}(1P)$

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

Mass $m = 3556.17 \pm 0.07$ MeV
 Full width $\Gamma = 1.98 \pm 0.09$ 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				
$2(\pi^+\pi^-)$	(1.00±0.13) %	S=1.4	1751	NODE=M057215;NODE=M057;CLUMP=A
$\pi^+\pi^-\pi^0\pi^0$	(1.86±0.24) %		1752	DESIG=3
$\rho^+\pi^-\pi^0 + \text{c.c.}$	(2.22±0.35) %		1682	DESIG=50
$4\pi^0$	(1.13±0.15) × 10 ⁻³		1752	DESIG=51
$K^+K^-\pi^0\pi^0$	(2.1 ±0.4) × 10 ⁻³		1658	DESIG=62
$K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$	(1.41±0.20) %		1657	DESIG=52
$\rho^-K^+\bar{K}^0 + \text{c.c.}$	(4.2 ±1.3) × 10 ⁻³		1540	DESIG=54
$K^*(892)^0K^-\pi^+ \rightarrow$	(3.0 ±0.8) × 10 ⁻³		–	DESIG=55
$K^-\pi^+K^0\pi^0 + \text{c.c.}$				DESIG=60
$K^*(892)^0\bar{K}^0\pi^0 \rightarrow$	(3.9 ±0.9) × 10 ⁻³		–	DESIG=56
$K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$				
$K^*(892)^-K^+\pi^0 \rightarrow$	(3.8 ±0.8) × 10 ⁻³		–	DESIG=57
$K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$				
$K^*(892)^+\bar{K}^0\pi^- \rightarrow$	(3.0 ±0.8) × 10 ⁻³		–	DESIG=58
$K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$				
$K^+K^-\eta\pi^0$	(1.3 ±0.4) × 10 ⁻³		1549	DESIG=59
$K^+K^-\pi^+\pi^-$	(8.3 ±1.1) × 10 ⁻³	S=1.2	1656	DESIG=5
$K^+K^-\pi^+\pi^-\pi^0$	(1.17±0.13) %		1623	DESIG=67
$K_S^0K^\pm\pi^\mp\pi^+\pi^-$	(7.3 ±0.8) × 10 ⁻³		1621	DESIG=78
$K^+\bar{K}^*(892)^0\pi^- + \text{c.c.}$	(2.1 ±1.0) × 10 ⁻³		1602	DESIG=10
$K^*(892)^0\bar{K}^*(892)^0$	(2.2 ±0.9) × 10 ⁻³	S=2.3	1538	DESIG=21
$3(\pi^+\pi^-)$	(1.53±0.19) %	S=3.8	1707	DESIG=4
$\phi\phi$	(1.23±0.07) × 10 ⁻³	S=1.9	1457	DESIG=16
$\phi\phi\eta$	(5.4 ±0.7) × 10 ⁻⁴		1206	DESIG=99
$\omega\omega$	(8.6 ±1.0) × 10 ⁻⁴		1597	DESIG=25
ωK^+K^-	(7.3 ±0.9) × 10 ⁻⁴		1540	DESIG=79
$\omega\phi$	(9.7 ±2.8) × 10 ⁻⁶		1529	DESIG=68
$\pi\pi$	(2.27±0.10) × 10 ⁻³		1773	DESIG=22
$\rho^0\pi^+\pi^-$	(3.6 ±1.5) × 10 ⁻³		1682	DESIG=9
$\pi^+\pi^-\pi^0$ (non-resonant)	(2.0 ±0.4) × 10 ⁻⁵		1765	DESIG=95
$\rho(770)^\pm\pi^\mp$	(6 ±4) × 10 ⁻⁶		–	DESIG=96
$\pi^+\pi^-\eta$	(4.9 ±1.3) × 10 ⁻⁴		1724	DESIG=39
$\pi^+\pi^-\eta'$	(5.1 ±1.9) × 10 ⁻⁴		1636	DESIG=42
$\eta\eta$	(5.5 ±0.5) × 10 ⁻⁴		1692	DESIG=14
K^+K^-	(1.02±0.15) × 10 ⁻³	S=2.3	1708	DESIG=2
$K_S^0K_S^0$	(5.3 ±0.4) × 10 ⁻⁴		1707	DESIG=15
$K^*(892)^\pm K^\mp$	(1.46±0.21) × 10 ⁻⁴		1627	DESIG=87
$K^*(892)^0\bar{K}^0 + \text{c.c.}$	(1.27±0.27) × 10 ⁻⁴		1627	DESIG=88
$K_2^*(1430)^\pm K^\mp$	(1.51±0.13) × 10 ⁻³		–	DESIG=89
$K_2^*(1430)^0\bar{K}^0 + \text{c.c.}$	(1.27±0.17) × 10 ⁻³		1443	DESIG=90
$K_3^*(1780)^\pm K^\mp$	(5.3 ±0.8) × 10 ⁻⁴		–	DESIG=91
$K_3^*(1780)^0\bar{K}^0 + \text{c.c.}$	(5.7 ±2.1) × 10 ⁻⁴		1274	DESIG=92
$a_2(1320)^0\pi^0$	(1.31±0.35) × 10 ⁻³		–	DESIG=93
$a_2(1320)^\pm\pi^\mp$	(1.8 ±0.6) × 10 ⁻³		1530	DESIG=94
$\bar{K}^0K^+\pi^- + \text{c.c.}$	(1.30±0.19) × 10 ⁻³		1685	DESIG=17
$K^+K^-\pi^0$	(3.1 ±0.8) × 10 ⁻⁴		1686	DESIG=36
$K^+K^-\eta$	< 3.3 × 10 ⁻⁴	CL=90%	1592	DESIG=40
$K^+K^-\eta'(958)$	(1.94±0.34) × 10 ⁻⁴		1488	DESIG=82
$\eta\eta'$	(2.2 ±0.5) × 10 ⁻⁵		1600	DESIG=34
$\eta'\eta'$	(4.6 ±0.6) × 10 ⁻⁵		1498	DESIG=35
$\pi^+\pi^-K_S^0K_S^0$	(2.2 ±0.5) × 10 ⁻³		1655	DESIG=29
$K^+K^-K_S^0K_S^0$	< 4 × 10 ⁻⁴	CL=90%	1418	DESIG=30
$K_S^0K_S^0K_S^0K_S^0$	(1.15±0.18) × 10 ⁻⁴		1415	DESIG=97
$K^+K^-K^+K^-$	(1.67±0.22) × 10 ⁻³	S=1.1	1421	DESIG=24
$K^+K^-\phi$	(1.45±0.30) × 10 ⁻³		1468	DESIG=32
$\bar{K}^0K^+\pi^-\phi + \text{c.c.}$	(4.8 ±0.7) × 10 ⁻³		1416	DESIG=83

$K^+ K^- \pi^0 \phi$	$(2.7 \pm 0.5) \times 10^{-3}$		1419	DESIG=84
$\phi \pi^+ \pi^- \pi^0$	$(9.3 \pm 1.2) \times 10^{-4}$		1603	DESIG=80
$p \bar{p}$	$(7.3 \pm 0.4) \times 10^{-5}$	S=1.1	1510	DESIG=11
$p \bar{p} \pi^0$	$(4.7 \pm 0.4) \times 10^{-4}$		1465	DESIG=37
$p \bar{p} \eta$	$(1.77 \pm 0.25) \times 10^{-4}$		1285	DESIG=41
$p \bar{p} \omega$	$(3.7 \pm 0.4) \times 10^{-4}$		1152	DESIG=61
$p \bar{p} \phi$	$(2.8 \pm 0.9) \times 10^{-5}$		1002	DESIG=66
$p \bar{p} \pi^+ \pi^-$	$(1.32 \pm 0.34) \times 10^{-3}$		1410	DESIG=8
$p \bar{p} \pi^0 \pi^0$	$(8.0 \pm 2.4) \times 10^{-4}$		1414	DESIG=53
$p \bar{p} K^+ K^-$ (non-resonant)	$(1.94 \pm 0.33) \times 10^{-4}$		1013	DESIG=63
$p \bar{p} K_S^0 K_S^0$	$< 7.9 \times 10^{-4}$	CL=90%	1007	DESIG=28
$p \bar{n} \pi^-$	$(8.7 \pm 1.0) \times 10^{-4}$		1463	DESIG=31
$\bar{p} n \pi^+$	$(9.1 \pm 0.8) \times 10^{-4}$		1463	DESIG=75
$p \bar{n} \pi^- \pi^0$	$(2.21 \pm 0.18) \times 10^{-3}$		1411	DESIG=76
$\bar{p} n \pi^+ \pi^0$	$(2.15 \pm 0.19) \times 10^{-3}$		1411	DESIG=77
$\Lambda \bar{\Lambda}$	$(1.86 \pm 0.16) \times 10^{-4}$		1384	DESIG=19
$\Lambda \bar{\Lambda} \pi^+ \pi^-$	$(1.28 \pm 0.16) \times 10^{-3}$		1255	DESIG=27
$\Lambda \bar{\Lambda} \pi^+ \pi^-$ (non-resonant)	$(6.7 \pm 1.5) \times 10^{-4}$		1255	DESIG=70
$\Lambda \bar{\Lambda} \eta$	$(1.07 \pm 0.26) \times 10^{-4}$		1096	DESIG=105
$\Sigma(1385)^+ \bar{\Lambda} \pi^- + c.c.$	$< 4 \times 10^{-4}$	CL=90%	1192	DESIG=71
$\Sigma(1385)^- \bar{\Lambda} \pi^+ + c.c.$	$< 6 \times 10^{-4}$	CL=90%	1192	DESIG=72
$K^+ \bar{p} \Lambda + c.c.$	$(7.9 \pm 0.6) \times 10^{-4}$		1236	DESIG=38
$n K_S^0 \bar{\Lambda} + c.c.$	$(3.64 \pm 0.29) \times 10^{-4}$		1233	DESIG=104
$K^*(892)^+ \bar{p} \Lambda + c.c.$	$(8.3 \pm 1.2) \times 10^{-4}$		976	DESIG=101
$K^+ \bar{p} \Lambda(1520) + c.c.$	$(2.9 \pm 0.7) \times 10^{-4}$		992	DESIG=64
$\Lambda(1520) \bar{\Lambda}(1520)$	$(4.7 \pm 1.5) \times 10^{-4}$		924	DESIG=65
$\Sigma^0 \bar{\Sigma}^0$	$(3.7 \pm 0.6) \times 10^{-5}$		1319	DESIG=47
$\Sigma^+ \bar{p} K_S^0 + c.c.$	$(8.4 \pm 1.0) \times 10^{-5}$		1197	DESIG=100
$\Sigma^0 \bar{p} K^+ + c.c.$	$(9.3 \pm 0.8) \times 10^{-5}$		1197	DESIG=103
$\Sigma^+ \bar{\Sigma}^-$	$(3.4 \pm 0.7) \times 10^{-5}$		1322	DESIG=48
$\Sigma^- \bar{\Sigma}^+$	$(4.5 \pm 1.8) \times 10^{-5}$		1314	DESIG=102
$\Sigma(1385)^+ \bar{\Sigma}(1385)^-$	$< 1.6 \times 10^{-4}$	CL=90%	1118	DESIG=73
$\Sigma(1385)^- \bar{\Sigma}(1385)^+$	$< 8 \times 10^{-5}$	CL=90%	1118	DESIG=74
$K^- \Lambda \bar{\Xi}^+ + c.c.$	$(1.80 \pm 0.32) \times 10^{-4}$		1004	DESIG=85
$\Xi^0 \bar{\Xi}^0$	$(1.86 \pm 0.22) \times 10^{-4}$		1197	DESIG=49
$\Xi^- \bar{\Xi}^+$	$(1.46 \pm 0.12) \times 10^{-4}$		1189	DESIG=26
$\Omega^- \bar{\Omega}^+$	$(4.52 \pm 0.30) \times 10^{-5}$		604	DESIG=106
$J/\psi(1S) \pi^+ \pi^- \pi^0$	$< 1.5 \%$	CL=90%	185	DESIG=12
$\pi^0 \eta_c$	$< 3.2 \times 10^{-3}$	CL=90%	511	DESIG=81
$\eta_c(1S) \pi^+ \pi^-$	$< 5.4 \times 10^{-3}$	CL=90%	459	DESIG=69

Radiative decays

$\gamma J/\psi(1S)$	$(19.5 \pm 0.8) \%$	S=1.5	430	NODE=M057;CLUMP=B DESIG=6
$\gamma \rho^0$	$< 1.9 \times 10^{-5}$	CL=90%	1694	DESIG=44
$\gamma \omega$	$< 6 \times 10^{-6}$	CL=90%	1692	DESIG=45
$\gamma \phi$	$< 8 \times 10^{-6}$	CL=90%	1632	DESIG=46
$\gamma \gamma$	$(2.92 \pm 0.12) \times 10^{-4}$	S=1.3	1778	DESIG=7
$e^+ e^- J/\psi(1S)$	$(2.20 \pm 0.15) \times 10^{-3}$		430	DESIG=86
$\mu^+ \mu^- J/\psi(1S)$	$(2.07 \pm 0.34) \times 10^{-4}$		381	DESIG=98

$\eta_c(2S)$

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

NODE=M059

Quantum numbers are quark model predictions.

Mass $m = 3637.7 \pm 0.9$ MeV (S = 1.2)

Full width $\Gamma = 11.8 \pm 1.6$ MeV

NODE=M059M;DTYPE=M

NODE=M059W;DTYPE=G

$\eta_c(2S)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)	
hadrons	not seen		—	NODE=M059215;DESIG=1
$K\bar{K}\pi$	(1.9±1.2) %		1729	DESIG=4
$K\bar{K}\eta$	(5 ±4) × 10 ⁻³		1637	DESIG=20
$2\pi^+2\pi^-$	< 2.1 %	90%	1792	DESIG=5
$\rho^0\rho^0$	< 1.9 × 10 ⁻³	90%	1645	DESIG=16
$3\pi^+3\pi^-$	(1.3±0.9) %		1749	DESIG=8
$K^+K^-\pi^+\pi^-$	< 1.4 %	90%	1700	DESIG=6
$K^{*0}\bar{K}^{*0}$	< 2.9 × 10 ⁻³	90%	1585	DESIG=17
$K^+K^-\pi^+\pi^-\pi^0$	(1.4±1.0) %		1668	DESIG=9
$K^+K^-2\pi^+2\pi^-$	< 1.4 %	90%	1627	DESIG=10
$K_S^0K^-2\pi^+\pi^- + c.c.$	(1.0±0.8) %		1666	DESIG=11
$2K^+2K^-$	< 1.3 × 10 ⁻³	90%	1470	DESIG=7
$\phi\phi$	< 1.1 × 10 ⁻³	90%	1506	DESIG=18
$p\bar{p}$	< 2.0 × 10 ⁻³	90%	1558	DESIG=3
$p\bar{p}\pi^+\pi^-$	seen		1461	DESIG=22
$\gamma\gamma$	(1.8±1.2) × 10 ⁻⁴		1819	DESIG=2
$\gamma J/\psi(1S)$	< 1.4 %	90%	501	DESIG=21
$\pi^+\pi^-\eta$	(4.3±3.2) × 10 ⁻³		1766	DESIG=12
$\pi^+\pi^-\eta'$	(2.6±1.9) × 10 ⁻³		1680	DESIG=13
$K_2^*(1430)\bar{K} + c.c.$	seen		1493	DESIG=24
$K_0^*(1950)\bar{K} + c.c.$	seen		1231	DESIG=25
$a_0(1710)\pi$	seen		1412	DESIG=26
$a_0(1450)\pi$	seen		1531	DESIG=27
$a_2(1700)\pi$	seen		1415	DESIG=28
$K_0^*(2600)\bar{K} + c.c.$	seen		—	DESIG=29
$\pi^+\pi^-\eta_c(1S)$	< 25 %	90%	537	DESIG=15

 $\psi(2S)$

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

NODE=M071

Mass $m = 3686.10 \pm 0.06$ MeV (S = 5.9)

NODE=M071M;DTYPE=M

Full width $\Gamma = 293 \pm 9$ keV (S = 1.2)

NODE=M071W;DTYPE=G

$\psi(2S)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)	
hadrons	(97.85 ±0.13) %		—	NODE=M071220;DESIG=3
virtual $\gamma \rightarrow$ hadrons	(1.79 ±0.04) %		—	DESIG=4
ggg	(10.6 ±1.6) %		—	DESIG=255
γgg	(1.03 ±0.29) %		—	DESIG=256
light hadrons	(15.4 ±1.5) %		—	DESIG=226
K_S^0 anything	(16.0 ±1.1) %		—	DESIG=325
e^+e^-	(7.94 ±0.22) × 10 ⁻³	S=1.3	1843	DESIG=1
$\mu^+\mu^-$	(8.0 ±0.6) × 10 ⁻³		1840	DESIG=2
$\tau^+\tau^-$	(3.1 ±0.4) × 10 ⁻³		489	DESIG=68
Decays into $J/\psi(1S)$ and anything				
$J/\psi(1S)$ anything	(61.5 ±0.7) %	S=1.3	—	NODE=M071;CLUMP=A DESIG=11
$J/\psi(1S)$ neutrals	(25.4 ±0.5) %	S=1.6	—	DESIG=12
$J/\psi(1S)\pi^+\pi^-$	(34.69 ±0.34) %	S=1.1	477	DESIG=13
$J/\psi(1S)\pi^0\pi^0$	(18.2 ±0.5) %	S=1.6	481	DESIG=14
$J/\psi(1S)\eta$	(3.37 ±0.06) %	S=1.2	199	DESIG=15
$J/\psi(1S)\pi^0$	(1.268±0.032) × 10 ⁻³		528	DESIG=18

Hadronic decays

NODE=M071;CLUMP=B

$\pi^+\pi^-$	(7.8 ±2.6) × 10 ⁻⁶		1838	DESIG=21
$\pi^+\pi^-\pi^0$	(2.01 ±0.17) × 10 ⁻⁴	S=1.7	1830	DESIG=36
$\rho(770)\pi \rightarrow \pi^+\pi^-\pi^0$	(3.2 ±1.2) × 10 ⁻⁵	S=1.8	-	DESIG=22
$\rho(2150)\pi \rightarrow \pi^+\pi^-\pi^0$	(1.9 ^{+1.2} _{-0.4}) × 10 ⁻⁴		-	DESIG=201
$2(\pi^+\pi^-)$	(2.4 ±0.6) × 10 ⁻⁴	S=2.2	1817	DESIG=24
$\rho^0\pi^+\pi^-$	(2.2 ±0.6) × 10 ⁻⁴	S=1.4	1750	DESIG=33
$2(\pi^+\pi^-)\pi^0$	(2.9 ±1.0) × 10 ⁻³	S=4.7	1799	DESIG=25
$\rho a_2(1320)$	(2.6 ±0.9) × 10 ⁻⁴		1500	DESIG=65
$\pi^+\pi^-\pi^0\pi^0\pi^0$	(5.3 ±1.0) × 10 ⁻³		1800	DESIG=312
$\pi^+\pi^-4\pi^0$	(1.4 ±1.0) × 10 ⁻³		1778	DESIG=332
$\rho^\pm\pi^\mp\pi^0\pi^0$	< 2.7 × 10 ⁻³	CL=90%	1737	DESIG=315
$3(\pi^+\pi^-)$	(3.5 ±2.0) × 10 ⁻⁴	S=2.8	1774	DESIG=32
$2(\pi^+\pi^-\pi^0)$	(4.8 ±1.5) × 10 ⁻³		1776	DESIG=221
$3(\pi^+\pi^-)\pi^0$	(3.5 ±1.6) × 10 ⁻³		1746	DESIG=37
$2(\pi^+\pi^-)3\pi^0$	(1.42 ±0.31) %		1748	DESIG=329
$\eta\pi^+\pi^-$	< 1.6 × 10 ⁻⁴	CL=90%	1791	DESIG=202
$\eta\pi^+\pi^-\pi^0$	(9.5 ±1.7) × 10 ⁻⁴		1778	DESIG=203
$\eta 2(\pi^+\pi^-)$	(1.2 ±0.6) × 10 ⁻³		1758	DESIG=251
$\eta\pi^+\pi^-\pi^0\pi^0$	< 4 × 10 ⁻⁴	CL=90%	1760	DESIG=313
$\eta\pi^+\pi^-3\pi^0$	< 2.1 × 10 ⁻³	CL=90%	1736	DESIG=334
$\eta 2(\pi^+\pi^-\pi^0)$	< 2.1 × 10 ⁻³	CL=90%	1705	DESIG=328
$\rho\eta$	(2.2 ±0.6) × 10 ⁻⁵	S=1.1	1717	DESIG=94
$\eta'\pi^+\pi^-\pi^0$	(4.5 ±2.1) × 10 ⁻⁴		1692	DESIG=204
$\eta'\rho$	(1.9 ^{+1.7} _{-1.2}) × 10 ⁻⁵		1625	DESIG=93
$\omega\pi^0$	(2.1 ±0.6) × 10 ⁻⁵		1757	DESIG=92
$\omega\pi^+\pi^-$	(7.3 ±1.2) × 10 ⁻⁴	S=2.1	1748	DESIG=75
$\omega\pi^+\pi^-2\pi^0$	(8.7 ±2.4) × 10 ⁻³		1715	DESIG=327
$b_1^\pm\pi^\mp$	(4.0 ±0.6) × 10 ⁻⁴	S=1.1	1635	DESIG=40
$\omega f_2(1270)$	(2.2 ±0.4) × 10 ⁻⁴		1515	DESIG=64
$\omega\pi^0\pi^0$	(1.11 ±0.35) × 10 ⁻³		1749	DESIG=314
$\omega 3\pi^0$	< 8 × 10 ⁻⁴	CL=90%	1736	DESIG=333
$b_1^0\pi^0$	(2.4 ±0.6) × 10 ⁻⁴		-	DESIG=193
$\omega\eta$	< 1.1 × 10 ⁻⁵	CL=90%	1715	DESIG=95
$\omega\eta'$	(3.2 ^{+2.5} _{-2.1}) × 10 ⁻⁵		1623	DESIG=91
$\phi\pi^0$	< 4 × 10 ⁻⁷	CL=90%	1699	DESIG=96
$\phi\pi^+\pi^-$	(1.18 ±0.26) × 10 ⁻⁴	S=1.5	1690	DESIG=78
$\phi f_0(980) \rightarrow \pi^+\pi^-$	(7.5 ±3.3) × 10 ⁻⁵	S=1.6	-	DESIG=81
$\phi\eta$	(3.10 ±0.31) × 10 ⁻⁵		1654	DESIG=89
$\eta\phi(2170), \phi(2170) \rightarrow$ $\phi f_0(980), f_0 \rightarrow \pi^+\pi^-$	< 2.2 × 10 ⁻⁶	CL=90%	-	DESIG=316
$\phi\eta'$	(1.54 ±0.20) × 10 ⁻⁵		1555	DESIG=90
$\phi f_1(1285)$	(3.0 ±1.3) × 10 ⁻⁵		1436	DESIG=319
$\phi\eta(1405) \rightarrow \phi\pi^+\pi^-\eta$	(8.5 ±1.7) × 10 ⁻⁶		-	DESIG=320
$\phi f_2'(1525)$	(4.4 ±1.6) × 10 ⁻⁵		1325	DESIG=67
K^+K^-	(7.5 ±0.5) × 10 ⁻⁵		1776	DESIG=23
$K^+K^-\pi^+$	(7.3 ±0.5) × 10 ⁻⁴		1754	DESIG=26
$K^+K^-\pi^0$	(4.07 ±0.31) × 10 ⁻⁵		1754	DESIG=38
$K_S^0 K_S^0$	< 4.6 × 10 ⁻⁶		1775	DESIG=86
$K_S^0 K_L^0$	(5.34 ±0.33) × 10 ⁻⁵		1775	DESIG=85
$K_S^0 K_L^0\pi^0$	< 3.0 × 10 ⁻⁴	CL=90%	1753	DESIG=303
$K^+K^-\pi^0\pi^0$	(2.6 ±1.3) × 10 ⁻⁴		1728	DESIG=298
$K^+K^-\pi^0\pi^0\pi^0$	(6.6 ±2.8) × 10 ⁻⁴		1696	DESIG=341
$K_S^0 K^\pm\pi^\mp\pi^0\pi^0$	(1.7 ±0.6) × 10 ⁻³		1694	DESIG=342
$K_S^0 K^\pm\pi^\mp\pi^+\pi^-$	(2.2 ±0.4) × 10 ⁻³		1692	DESIG=343
$K^+K^-\pi^+\pi^-\pi^0$	(1.26 ±0.09) × 10 ⁻³		1694	DESIG=206
$\omega f_0(1710) \rightarrow \omega K^+K^-$	(5.9 ±2.2) × 10 ⁻⁵		-	DESIG=216
$K^*(892)^0 K^-\pi^+\pi^0 + \text{c.c.}$	(8.6 ±2.2) × 10 ⁻⁴		-	DESIG=217
$K^*(892)^+ K^-\pi^+\pi^- + \text{c.c.}$	(9.6 ±2.8) × 10 ⁻⁴		-	DESIG=218

$K^*(892)^+ K^- \rho^0 + \text{c.c.}$	$(7.3 \pm 2.6) \times 10^{-4}$	—	DESIG=219
$K^*(892)^0 K^- \rho^+ + \text{c.c.}$	$(6.1 \pm 1.8) \times 10^{-4}$	—	DESIG=220
$K_S^0 K_S^0 \pi^+ \pi^-$	$(2.2 \pm 0.4) \times 10^{-4}$	1724	DESIG=225
$K_S^0 K_L^0 \pi^0 \pi^0$	$(1.3 \pm 0.6) \times 10^{-3}$	1726	DESIG=304
$K_S^0 K^*(892)^0 \pi^0 \pi^0$	$(3.0 \pm 1.3) \times 10^{-4}$	1645	DESIG=348
$K_S^0 K^\pm \rho(770)^\mp \pi^0$	$< 7 \times 10^{-4}$	CL=90%	—
$K_S^0 K^\pm \pi^\mp \rho(770)^0$	$< 7 \times 10^{-4}$	CL=90%	—
$K^\mp K^*(892)^\pm \pi^0 \pi^0$	$(7.0 \pm 2.9) \times 10^{-4}$	1646	DESIG=349
$K^*(892)^+ K^*(892)^- \pi^0$	$(3.6 \pm 1.8) \times 10^{-3}$	1573	DESIG=350
$K_S^0 K_L^0 \eta$	$(1.3 \pm 0.5) \times 10^{-3}$	1661	DESIG=305
$K^+ K^- \rho^0$	$(2.2 \pm 0.4) \times 10^{-4}$	1616	DESIG=205
$K^*(892)^0 \bar{K}_2^*(1430)^0$	$(1.9 \pm 0.5) \times 10^{-4}$	1417	DESIG=66
$K^+ K^- \pi^+ \pi^- \eta$	$(1.3 \pm 0.7) \times 10^{-3}$	1574	DESIG=252
$K^+ K^- 2(\pi^+ \pi^-)$	$(1.9 \pm 0.9) \times 10^{-3}$	1654	DESIG=222
$K^+ K^- 2(\pi^+ \pi^-) \pi^0$	$(1.00 \pm 0.31) \times 10^{-3}$	1611	DESIG=240
$K^+ K^*(892)^- + \text{c.c.}$	$(2.9 \pm 0.4) \times 10^{-5}$	S=1.2	1698
$2(K^+ K^-)$	$(6.3 \pm 1.3) \times 10^{-5}$	1499	DESIG=208
$2(K^+ K^-) \pi^0$	$(1.10 \pm 0.28) \times 10^{-4}$	1440	DESIG=209
$K^+ K^- \phi$	$(7.0 \pm 1.6) \times 10^{-5}$	1546	DESIG=79
$K_S^0 K_S^0 \phi$	$(3.53 \pm 0.29) \times 10^{-5}$	1543	DESIG=347
$K_1(1270)^\pm K^\mp$	$(1.00 \pm 0.28) \times 10^{-3}$	1588	DESIG=41
$K^+ \bar{K}^*(892)^0 \pi^- + \text{c.c.}$	$(6.7 \pm 2.5) \times 10^{-4}$	1674	DESIG=34
$\eta K^+ K^-$, no $\eta \phi$	$(3.49 \pm 0.17) \times 10^{-5}$	1664	DESIG=207
$\eta K^+ K^-$	$< 2.6 \times 10^{-4}$	CL=90%	1664
$X(1750) \eta \rightarrow K^+ K^- \eta$	$(4.8 \pm 2.8) \times 10^{-6}$	—	DESIG=324
$K_1(1400)^\pm K^\mp$	$< 3.1 \times 10^{-4}$	CL=90%	1532
$K_2^*(1430)^\pm K^\mp$	$(7.1 \pm_{-0.9}^{+1.3}) \times 10^{-5}$	—	DESIG=265
$K^*(892)^0 \bar{K}^0 + \text{c.c.}$	$(1.09 \pm 0.20) \times 10^{-4}$	1697	DESIG=194
$\omega K^+ K^-$	$(1.62 \pm 0.11) \times 10^{-4}$	S=1.1	1614
$\omega K_S^0 K_S^0$	$(7.0 \pm 0.5) \times 10^{-5}$	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
$n \bar{n}$	$(3.06 \pm 0.15) \times 10^{-4}$	1586	DESIG=309
$p \bar{p} \pi^0$	$(1.53 \pm 0.07) \times 10^{-4}$	1543	DESIG=35
$N(940) \bar{p} + \text{c.c.} \rightarrow p \bar{p} \pi^0$	$(6.4 \pm_{-1.3}^{+1.8}) \times 10^{-5}$	—	DESIG=267
$N(1440) \bar{p} + \text{c.c.} \rightarrow p \bar{p} \pi^0$	$(7.3 \pm_{-1.5}^{+1.7}) \times 10^{-5}$	S=2.5	—
$N(1520) \bar{p} + \text{c.c.} \rightarrow p \bar{p} \pi^0$	$(6.4 \pm_{-1.8}^{+2.3}) \times 10^{-6}$	—	DESIG=268
$N(1535) \bar{p} + \text{c.c.} \rightarrow p \bar{p} \pi^0$	$(2.5 \pm 1.0) \times 10^{-5}$	—	DESIG=269
$N(1650) \bar{p} + \text{c.c.} \rightarrow p \bar{p} \pi^0$	$(3.8 \pm_{-1.7}^{+1.4}) \times 10^{-5}$	—	DESIG=270
$N(1720) \bar{p} + \text{c.c.} \rightarrow p \bar{p} \pi^0$	$(1.79 \pm_{-0.70}^{+0.26}) \times 10^{-5}$	—	DESIG=271
$N(2300) \bar{p} + \text{c.c.} \rightarrow p \bar{p} \pi^0$	$(2.6 \pm_{-0.7}^{+1.2}) \times 10^{-5}$	—	DESIG=272
$N(2570) \bar{p} + \text{c.c.} \rightarrow p \bar{p} \pi^0$	$(2.13 \pm_{-0.31}^{+0.40}) \times 10^{-5}$	—	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
$p \bar{p} \eta$	$(6.0 \pm 0.4) \times 10^{-5}$	1373	DESIG=200

$N(1535)\bar{p} + \text{c.c.} \rightarrow \rho\bar{p}\eta$	$(4.5 \pm_{-0.6}^{+0.7}) \times 10^{-5}$	—	DESIG=264
$\rho\bar{p}\pi^+\pi^-\pi^0$	$(7.3 \pm 0.7) \times 10^{-4}$	1435	DESIG=211
$\rho\bar{p}\rho^0$	$(5.0 \pm 2.2) \times 10^{-5}$	1252	DESIG=210
$\rho\bar{p}\omega$	$(6.9 \pm 2.1) \times 10^{-5}$	1247	DESIG=77
$\rho\bar{p}\eta'$	$(1.10 \pm 0.13) \times 10^{-5}$	1141	DESIG=317
$\rho\bar{p}\phi$	$(6.1 \pm 0.6) \times 10^{-6}$	1109	DESIG=80
$\phi X(1835) \rightarrow \rho\bar{p}\phi$	$< 1.82 \times 10^{-7}$	CL=90%	—
$\rho\bar{n}\pi^- \text{ or c.c.}$	$(2.48 \pm 0.17) \times 10^{-4}$	—	DESIG=227
$\rho\bar{n}\pi^-\pi^0$	$(3.2 \pm 0.7) \times 10^{-4}$	1492	DESIG=228
$\Lambda\bar{\Lambda}$	$(3.81 \pm 0.13) \times 10^{-4}$	S=1.4	1467
$\Lambda\bar{\Lambda}\pi^0$	$(1.4 \pm 0.7) \times 10^{-6}$	1412	DESIG=238
$\Lambda\bar{\Lambda}\eta$	$(2.43 \pm 0.32) \times 10^{-5}$	1197	DESIG=239
$\Lambda\bar{\Lambda}\eta'$	$(7.3 \pm 1.0) \times 10^{-6}$	892	DESIG=346
$\Lambda(1670)\bar{\Lambda} \rightarrow \Lambda\bar{\Lambda}\eta$	$(1.3 \pm 0.7) \times 10^{-5}$	—	DESIG=336
$\Lambda\bar{\Lambda}\omega(782)$	$(3.3 \pm 0.4) \times 10^{-5}$	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
$\Lambda\bar{n}K_S^0 + \text{c.c.}$	$(8.1 \pm 1.8) \times 10^{-5}$	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
$\Sigma^0\bar{p}K^+ + \text{c.c.}$	$(1.67 \pm 0.18) \times 10^{-5}$	1291	DESIG=274
$\Sigma^+\bar{\Sigma}^-$	$(2.43 \pm 0.10) \times 10^{-4}$	S=1.4	1408
$\Sigma^0\bar{\Sigma}^0$	$(2.35 \pm 0.09) \times 10^{-4}$	S=1.1	1405
$\Sigma^-\bar{\Sigma}^+$	$(2.82 \pm 0.09) \times 10^{-4}$	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
$\Sigma^+\bar{\Sigma}^-\phi$	$(3.0 \pm 0.7) \times 10^{-6}$	686	DESIG=345
$\Sigma(1385)^+\bar{\Sigma}(1385)^-$	$(8.5 \pm 0.7) \times 10^{-5}$	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
$\Xi^0\bar{\Xi}^0$	$(2.3 \pm 0.4) \times 10^{-4}$	S=4.2	1291
$\Xi(1530)^0\bar{\Xi}(1530)^0$	$(6.8 \pm 0.4) \times 10^{-5}$	1025	DESIG=73
$\Lambda\bar{\Xi}^+K^- + \text{c.c.}$	$(3.9 \pm 0.4) \times 10^{-5}$	1114	DESIG=293
$\Xi(1530)^-\bar{\Xi}(1530)^+$	$(1.15 \pm 0.07) \times 10^{-4}$	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
$\Xi(1690)^-\bar{\Xi}^+ \rightarrow K^-\Lambda\bar{\Xi}^+ + \text{c.c.}$	$(5.2 \pm 1.6) \times 10^{-6}$	—	DESIG=294
$\Xi(1820)^-\bar{\Xi}^+ \rightarrow K^-\Lambda\bar{\Xi}^+ + \text{c.c.}$	$(1.20 \pm 0.32) \times 10^{-5}$	—	DESIG=295
$\Sigma^0\bar{\Xi}^+K^- + \text{c.c.}$	$(3.7 \pm 0.4) \times 10^{-5}$	1060	DESIG=296
$\Omega^-\bar{\Omega}^+$	$(5.66 \pm 0.30) \times 10^{-5}$	S=1.3	774
$\eta_c\pi^+\pi^-\pi^0$	$< 1.0 \times 10^{-3}$	CL=90%	512
$h_c(1P)\pi^0$	$(7.4 \pm 0.5) \times 10^{-4}$	85	DESIG=254
$\Lambda_c^+\bar{p}e^+e^- + \text{c.c.}$	$< 1.7 \times 10^{-6}$	CL=90%	830
$\Theta(1540)\bar{\Theta}(1540) \rightarrow K_S^0 p K^- \bar{n} + \text{c.c.}$	$[j] < 8.8 \times 10^{-6}$	CL=90%	—
$\Theta(1540)K^-\bar{n} \rightarrow K_S^0 p K^- \bar{n}$	$[j] < 1.0 \times 10^{-5}$	CL=90%	—
$\Theta(1540)K_S^0\bar{p} \rightarrow K_S^0\bar{p}K^+n$	$[j] < 7.0 \times 10^{-6}$	CL=90%	—
$\bar{\Theta}(1540)K^+n \rightarrow K_S^0\bar{p}K^+n$	$[j] < 2.6 \times 10^{-5}$	CL=90%	—
$\bar{\Theta}(1540)K_S^0 p \rightarrow K_S^0 p K^- \bar{n}$	$[j] < 6.0 \times 10^{-6}$	CL=90%	—

Radiative decays					NODE=M071;CLUMP=C
$\gamma\chi_{c0}(1P)$	(9.77 ± 0.23) %	S=1.1	261		DESIG=56
$\gamma\chi_{c1}(1P)$	(9.75 ± 0.27) %	S=1.1	171		DESIG=58
$\gamma\chi_{c2}(1P)$	(9.36 ± 0.23) %	S=1.2	128		DESIG=59
$\gamma\eta_c(1S)$	(3.6 ± 0.5) × 10 ⁻³	S=1.3	635		DESIG=61
$\gamma\eta_c(2S)$	(7 ± 5) × 10 ⁻⁴		48		DESIG=63
$\gamma\pi_0$	(1.04 ± 0.22) × 10 ⁻⁶	S=1.4	1841		DESIG=52
$\gamma 2(\pi^+\pi^-)$	(4.0 ± 0.6) × 10 ⁻⁴		1817		DESIG=241
$\gamma 3(\pi^+\pi^-)$	< 1.7 × 10 ⁻⁴	CL=90%	1774		DESIG=249
$\gamma\eta'(958)$	(1.24 ± 0.04) × 10 ⁻⁴		1719		DESIG=54
$\gamma f_2(1270)$	(2.73 ^{+0.29} _{-0.25}) × 10 ⁻⁴	S=1.8	1622		DESIG=82
$\gamma f_0(1370) \rightarrow \gamma K\bar{K}$	(3.1 ± 1.7) × 10 ⁻⁵		1588		DESIG=286
$\gamma f_0(1500)$	(9.3 ± 1.9) × 10 ⁻⁵		1529		DESIG=287
$\gamma f_2'(1525)$	(3.3 ± 0.8) × 10 ⁻⁵		1531		DESIG=288
$\gamma f_0(1710) \rightarrow \gamma\pi\pi$	(3.5 ± 0.6) × 10 ⁻⁵		—		DESIG=83
$\gamma f_0(1710) \rightarrow \gamma K\bar{K}$	(6.6 ± 0.7) × 10 ⁻⁵		—		DESIG=84
$\gamma f_0(2100) \rightarrow \gamma\pi\pi$	(4.8 ± 1.0) × 10 ⁻⁶		1244		DESIG=289
$\gamma f_0(2200) \rightarrow \gamma K\bar{K}$	(3.2 ± 1.0) × 10 ⁻⁶		1193		DESIG=290
$\gamma f_J(2220) \rightarrow \gamma\pi\pi$	< 5.8 × 10 ⁻⁶	CL=90%	1168		DESIG=291
$\gamma f_J(2220) \rightarrow \gamma K\bar{K}$	< 9.5 × 10 ⁻⁶	CL=90%	1168		DESIG=292
$\gamma\eta$	(9.2 ± 1.8) × 10 ⁻⁷		1802		DESIG=53
$\gamma\eta\pi^+\pi^-$	(8.7 ± 2.1) × 10 ⁻⁴		1791		DESIG=230
$\gamma\eta(1405) \rightarrow \gamma K\bar{K}\pi$	< 9 × 10 ⁻⁵	CL=90%	1569		DESIG=62
$\gamma\eta(1405) \rightarrow \gamma\eta\pi^+\pi^-$	(3.6 ± 2.5) × 10 ⁻⁵		—		DESIG=232
$\gamma\eta(1405) \rightarrow \gamma f_0(980)\pi^0 \rightarrow \gamma\pi^+\pi^-\pi^0$	< 5.0 × 10 ⁻⁷	CL=90%	—		DESIG=308
$\gamma\eta(1475) \rightarrow \gamma K\bar{K}\pi$	< 1.4 × 10 ⁻⁴	CL=90%	—		DESIG=234
$\gamma\eta(1475) \rightarrow \gamma\eta\pi^+\pi^-$	< 8.8 × 10 ⁻⁵	CL=90%	—		DESIG=235
$\gamma K^{*0}K^+\pi^- + c.c.$	(3.7 ± 0.9) × 10 ⁻⁴		1674		DESIG=242
$\gamma K^{*0}\bar{K}^{*0}$	(2.4 ± 0.7) × 10 ⁻⁴		1613		DESIG=243
$\gamma K_S^0K^+\pi^- + c.c.$	(2.6 ± 0.5) × 10 ⁻⁴		1753		DESIG=244
$\gamma K^+K^-\pi^+\pi^-$	(1.9 ± 0.5) × 10 ⁻⁴		1726		DESIG=245
$\gamma K^+K^-2(\pi^+\pi^-)$	< 2.2 × 10 ⁻⁴	CL=90%	1654		DESIG=248
$\gamma 2(K^+K^-)$	< 4 × 10 ⁻⁵	CL=90%	1499		DESIG=250
$\gamma p\bar{p}$	(3.9 ± 0.5) × 10 ⁻⁵	S=2.0	1586		DESIG=246
$\gamma f_2(1950) \rightarrow \gamma p\bar{p}$	(1.20 ± 0.22) × 10 ⁻⁵		—		DESIG=257
$\gamma f_2(2150) \rightarrow \gamma p\bar{p}$	(7.2 ± 1.8) × 10 ⁻⁶		—		DESIG=258
$\gamma X(1835) \rightarrow \gamma p\bar{p}$	(4.6 ^{+1.8} _{-4.0}) × 10 ⁻⁶		—		DESIG=259
$\gamma X \rightarrow \gamma p\bar{p}$	[ρ] < 2 × 10 ⁻⁶	CL=90%	—		DESIG=260
$\gamma p\bar{p}\pi^+\pi^-$	(2.8 ± 1.4) × 10 ⁻⁵		1491		DESIG=247
$\gamma\gamma$	< 1.5 × 10 ⁻⁴	CL=90%	1843		DESIG=51
$\gamma\gamma J/\psi$	(3.1 ^{+1.0} _{-1.2}) × 10 ⁻⁴		542		DESIG=266
$e^+e^-\eta'$	(1.90 ± 0.26) × 10 ⁻⁶		1719		DESIG=311
$e^+e^-\eta_c(1S)$	(3.8 ± 0.4) × 10 ⁻⁵		635		DESIG=338
$e^+e^-\chi_{c0}(1P)$	(1.06 ± 0.25) × 10 ⁻³		261		DESIG=300
$e^+e^-\chi_{c1}(1P)$	(8.5 ± 0.7) × 10 ⁻⁴		171		DESIG=301
$e^+e^-\chi_{c2}(1P)$	(6.8 ± 0.8) × 10 ⁻⁴		128		DESIG=302
Weak decays					NODE=M071;CLUMP=E
$D^0 e^+e^- + c.c.$	< 1.4 × 10 ⁻⁷	CL=90%	1371		DESIG=306
$\Lambda_c^+ \bar{\Sigma}^- + c.c.$	< 1.4 × 10 ⁻⁵	CL=90%	586		DESIG=337
Other decays					NODE=M071;CLUMP=D
invisible	< 1.6 %	CL=90%	—		DESIG=275

 $\psi(3770)$

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

Mass $m = 3773.7 \pm 0.7$ MeV (S = 2.5)
 Full width $\Gamma = 27.2 \pm 1.0$ MeV

NODE=M053

NODE=M053M;DTYPE=M
 NODE=M053W;DTYPE=G

$\psi(3770)$ DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	ρ (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

	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	ρ (MeV/c)	
$b_1(1235)\pi$	< 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
$K^*(892)^+K^- + c.c.$	< 1.4 $\times 10^{-5}$	CL=90%	1745	DESIG=19
$K^*(892)^0\bar{K}^0 + c.c.$	< 1.2 $\times 10^{-3}$	CL=90%	1745	DESIG=18
$K_S^0 K_L^0$	< 1.2 $\times 10^{-5}$	CL=90%	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
$K^{*0}K^-\pi^+\pi^0 + c.c.$	< 1.62 %	CL=90%	1694	DESIG=70
$K^{*+}K^-\pi^+\pi^- + c.c.$	< 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
$K^{*0} K^- \pi^+ + c.c.$	< 9.7	$\times 10^{-3}$	CL=90%	1722	DESIG=60
$p\bar{p}\pi^0$	< 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
$\Xi^+ \bar{\Xi}^-$	< 1.5	$\times 10^{-4}$	CL=90%	1347	DESIG=229
$\Xi^0 \bar{\Xi}^0$	< 1.4	$\times 10^{-4}$	CL=90%	1353	DESIG=230
$\Xi^- \bar{\Xi}^+$	(1.4 \pm 0.4)	$\times 10^{-4}$		1347	DESIG=236

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
$\gamma\chi_{c0}$	(6.9 \pm 0.6)	$\times 10^{-3}$		342	DESIG=49
$\gamma\eta_c$	< 7	$\times 10^{-4}$	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

 $\psi_2(3823)$ was $\psi(3823)$, $X(3823)$

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

 I, J, P need confirmation.

NODE=M212

Mass $m = 3823.51 \pm 0.34$ MeVFull 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.

NODE=M241

Seen by a single experiment only.

Mass $m = 3842.71 \pm 0.20$ MeV

Full width $\Gamma = 2.8 \pm 0.6$ MeV

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

 $\chi_{c1}(3872)$

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

NODE=M176

also known as X(3872)

Mass $m = 3871.64 \pm 0.06$ MeV

$m_{\chi_{c1}(3872)} - m_{J/\psi} = 775 \pm 4$ MeV

Full width $\Gamma = 1.19 \pm 0.21$ MeV ($S = 1.1$)

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
$\pi^+\pi^-\pi^0$	< 8 $\times 10^{-3}$	90%	1924
$\pi^+\pi^-J/\psi(1S)$	(3.5 \pm 0.9) %		650
$\pi^+\pi^-\pi^0J/\psi(1S)$	not seen		588
$\omega\eta_c(1S)$	< 30 %	90%	368
$\rho(770)^0J/\psi(1S)$	(2.8 \pm 0.7) %		—
$\omega J/\psi(1S)$	(4.1 \pm 1.4) %		†
$\phi\phi$	not seen		1646
$D^0\bar{D}^0\pi^0$	(45 \pm 21) %		116
$\bar{D}^{*0}D^0$	(34 \pm 12) %		†
$\gamma\gamma$	< 11 %	90%	1936
$D^0\bar{D}^0$	< 26 %	90%	519
D^+D^-	< 18 %	90%	502
$\pi^0\chi_{c2}$	< 4 %	90%	273
$\pi^0\chi_{c1}$	(3.1 $^{+1.5}_{-1.3}$) %		319
$\pi^0\chi_{c0}$	< 13 %	90%	411
$\pi^+\pi^-\eta_c(1S)$	< 13 %	90%	745
$\pi^0\pi^0\chi_{c0}$	< 6 %	90%	347
$\pi^+\pi^-\chi_{c0}$	< 2.0 %	90%	340
$\pi^+\pi^-\chi_{c1}$	< 7 $\times 10^{-3}$	90%	218
$p\bar{p}$	< 2.2 $\times 10^{-5}$	95%	1693

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=27
DESIG=17
DESIG=16

Radiative decays					
$\gamma D^+ D^-$	< 3.5	%	90%	502	NODE=M176;CLUMP=B
$\gamma \bar{D}^0 D^0$	< 6	%	90%	519	DESIG=21
$\gamma J/\psi$	$(7.8 \pm 2.9) \times 10^{-3}$			697	DESIG=23
$\gamma \chi_{c1}$	< 8	$\times 10^{-3}$	90%	344	DESIG=9
$\gamma \chi_{c2}$	< 2.9	%	90%	303	DESIG=3
$\gamma \psi(2S)$	$(4.2 \pm 1.6) \%$			181	DESIG=15
					DESIG=11
C-violating decays					
$\eta J/\psi$	< 1.7	%	90%	491	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
$\pi^+ \pi^- \eta_c(1S)$	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
$\pi^0 \chi_{c1}$	not seen	368

NODE=M159215;DESIG=1;OUR EST;

→ UNCHECKED ←

DESIG=3;OUR EVAL;→ UNCHECKED ←

DESIG=9

DESIG=4;OUR EVAL;→ UNCHECKED ←

DESIG=6

DESIG=7

DESIG=5;OUR EVAL;→ UNCHECKED ←

DESIG=2

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
$D \bar{D}$	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=2;OUR EVAL;→ UNCHECKED ←

DESIG=3;OUR EVAL;→ UNCHECKED ←

DESIG=4;OUR EVAL;→ UNCHECKED ←

DESIG=7;OUR EVAL;→ UNCHECKED ←

DESIG=8;OUR EVAL;→ UNCHECKED ←

 $\psi(4040)$ [q]

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

Mass $m = 4039 \pm 1$ MeV

Full width $\Gamma = 80 \pm 10$ MeV

NODE=M072

NODE=M072M;DTYPE=M;OUR EST;

→ UNCHECKED ←

NODE=M072W;DTYPE=G;OUR EST;

→ UNCHECKED ←

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^-	$(1.07 \pm 0.16) \times 10^{-5}$		2019	DESIG=5
$D\bar{D}$	seen		775	DESIG=17;OUR EST;→ UNCHECKED ←
$D^0\bar{D}^0$	seen		775	DESIG=1
D^+D^-	seen		763	DESIG=18
$D^*\bar{D} + c.c.$	seen		569	DESIG=19;OUR EST;→ UNCHECKED ←
$D^*(2007)^0\bar{D}^0 + c.c.$	seen		575	DESIG=2
$D^*(2010)^+D^- + c.c.$	seen		561	DESIG=20
$D^*\bar{D}^*$	seen		193	DESIG=21;OUR EST;→ UNCHECKED ←
$D^*(2007)^0\bar{D}^*(2007)^0$	seen		226	DESIG=3
$D^*(2010)^+D^*(2010)^-$	seen		193	DESIG=22
$D^0D^-\pi^+ + c.c. (excl. D^*(2007)^0\bar{D}^0 + c.c., D^*(2010)^+D^- + c.c.)$	not seen		—	DESIG=24
$D\bar{D}^*\pi (excl. D^*\bar{D}^*)$	not seen		—	DESIG=25
$D^0\bar{D}^*\pi^+ + c.c. (excl. D^*(2010)^+D^*(2010)^-)$	seen		—	DESIG=26
$D_s^+D_s^-$	seen		452	DESIG=27
$J/\psi\pi^+\pi^-$	$< 4 \times 10^{-3}$	90%	794	DESIG=7
$J/\psi\pi^0\pi^0$	$< 2 \times 10^{-3}$	90%	797	DESIG=8
$J/\psi\eta$	$(5.2 \pm 0.7) \times 10^{-3}$		675	DESIG=9
$J/\psi\pi^0$	$< 2.8 \times 10^{-4}$	90%	823	DESIG=10
$J/\psi\pi^+\pi^-\pi^0$	$< 2 \times 10^{-3}$	90%	746	DESIG=11
$\chi_{c1}\gamma$	$< 3.4 \times 10^{-3}$	90%	494	DESIG=12
$\chi_{c2}\gamma$	$< 5 \times 10^{-3}$	90%	454	DESIG=13
$\chi_{c1}\pi^+\pi^-\pi^0$	$< 1.1 \%$	90%	306	DESIG=14
$\chi_{c2}\pi^+\pi^-\pi^0$	$< 3.2 \%$	90%	233	DESIG=15
$h_c(1P)\pi^+\pi^-$	$< 3 \times 10^{-3}$	90%	403	DESIG=28
$\phi\pi^+\pi^-$	$< 3 \times 10^{-3}$	90%	1880	DESIG=16
$\Lambda\bar{\Lambda}\pi^+\pi^-$	$< 2.9 \times 10^{-4}$	90%	1578	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%	1683	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
$\mu^+\mu^-$	$(9 \pm 6) \times 10^{-6}$		2017	DESIG=6

 $\chi_{c1}(4140)$

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

NODE=M193

was X(4140)

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

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

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

 $\psi(4160)$ [q]

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

NODE=M025

$$\text{Mass } m = 4191 \pm 5 \text{ MeV}$$

$$\text{Full width } \Gamma = 69 \pm 10 \text{ MeV}$$

NODE=M025M;DTYPE=M

NODE=M025W;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=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	DESIG=1
$\mu^+ \mu^-$	seen		2093	DESIG=33
$D\bar{D}$	seen		956	DESIG=15;OUR EVAL;→ UNCHECKED ←
$D^0\bar{D}^0$	seen		956	DESIG=16
D^+D^-	seen		947	DESIG=17
$D^*\bar{D} + c.c.$	seen		798	DESIG=18;OUR EVAL;→ UNCHECKED ←
$D^*(2007)^0\bar{D}^0 + c.c.$	seen		802	DESIG=19
$D^*(2010)^+D^- + c.c.$	seen		792	DESIG=20
$D^*\bar{D}^*$	seen		592	DESIG=21;OUR EVAL;→ UNCHECKED ←
$D^*(2007)^0\bar{D}^*(2007)^0$	seen		604	DESIG=22
$D^*(2010)^+D^*(2010)^-$	seen		592	DESIG=23
$D^0D^-\pi^+ + c.c. (excl. D^*(2007)^0\bar{D}^0 + c.c., D^*(2010)^+D^- + c.c.)$	not seen		—	DESIG=24
$D\bar{D}^*\pi + c.c. (excl. D^*\bar{D}^*)$	seen		—	DESIG=25
$D^0D^{*-}\pi^+ + c.c. (excl. D^*(2010)^+D^*(2010)^-)$	not seen		—	DESIG=26
$D_s^+D_s^-$	not seen		719	DESIG=27
$D_s^{*+}\bar{D}_s^- + c.c.$	seen		385	DESIG=28
$J/\psi\pi^+\pi^-$	$< 3 \times 10^{-3}$	90%	919	DESIG=2
$J/\psi\pi^0\pi^0$	$< 3 \times 10^{-3}$	90%	921	DESIG=3
$J/\psi K^+K^-$	$< 2 \times 10^{-3}$	90%	407	DESIG=4
$J/\psi\eta$	$< 8 \times 10^{-3}$	90%	821	DESIG=5
$J/\psi\pi^0$	$< 1 \times 10^{-3}$	90%	944	DESIG=6
$J/\psi\eta'$	$< 5 \times 10^{-3}$	90%	456	DESIG=7
$J/\psi\pi^+\pi^-\pi^0$	$< 1 \times 10^{-3}$	90%	879	DESIG=8
$\psi(2S)\pi^+\pi^-$	$< 4 \times 10^{-3}$	90%	395	DESIG=9
$\chi_{c1}\gamma$	$< 5 \times 10^{-3}$	90%	625	DESIG=10
$\chi_{c2}\gamma$	$< 1.3 \%$	90%	587	DESIG=11
$\chi_{c1}\pi^+\pi^-\pi^0$	$< 2 \times 10^{-3}$	90%	496	DESIG=12
$\chi_{c2}\pi^+\pi^-\pi^0$	$< 8 \times 10^{-3}$	90%	444	DESIG=13
$h_c(1P)\pi^+\pi^-$	$< 5 \times 10^{-3}$	90%	556	DESIG=29
$h_c(1P)\pi^0\pi^0$	$< 2 \times 10^{-3}$	90%	560	DESIG=30
$h_c(1P)\eta$	$< 2 \times 10^{-3}$	90%	348	DESIG=31
$h_c(1P)\pi^0$	$< 4 \times 10^{-4}$	90%	600	DESIG=32
$\phi\pi^+\pi^-$	$< 2 \times 10^{-3}$	90%	1961	DESIG=14
$\gamma\chi_{c1}(3872)$	$< 1.9 \times 10^{-3}$	90%	307	DESIG=44
$\gamma\chi_{c0}(3915) \rightarrow \gamma J/\psi\pi^+\pi^-$	$< 1.36 \times 10^{-4}$	90%	—	DESIG=35
$\gamma X(3930) \rightarrow \gamma J/\psi\pi^+\pi^-$	$< 1.18 \times 10^{-4}$	90%	—	DESIG=36
$\gamma X(3940) \rightarrow \gamma J/\psi\pi^+\pi^-$	$< 1.47 \times 10^{-4}$	90%	—	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
$p\bar{p}p\bar{p}$	not seen		834	DESIG=45
$\Lambda\bar{\Lambda}$	$< 1.5 \times 10^{-6}$	90%	1774	DESIG=46
$\Xi^-\Xi^+$	$< 8 \times 10^{-5}$	90%	1626	DESIG=50
$pK^-\bar{\Lambda} + c.c.$	$< 6 \times 10^{-6}$	90%	1659	DESIG=51

 $\psi(4230)$

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

NODE=M074

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

$$\text{Mass } m = 4222.1 \pm 2.3 \text{ MeV } (S = 1.7)$$

$$\text{Full width } \Gamma = 49 \pm 7 \text{ MeV } (S = 3.4)$$

NODE=M074M;DTYPE=M
NODE=M074W;DTYPE=G

$\psi(4230)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)	
$\mu^+ \mu^-$	$(3.1 \pm 2.8) \times 10^{-5}$	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
$\phi \pi^+ \pi^-$	not seen	1976	DESIG=18;OUR EVAL;→ UNCHECKED ←
$\phi f_0(980) \rightarrow \phi \pi^+ \pi^-$	not seen	—	DESIG=22;OUR EVAL;→ UNCHECKED ←
$\phi \eta$	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 ←
$D^0 \bar{D}^0$	not seen	987	DESIG=31
$D^+ D^-$	not seen	978	DESIG=32
$D^* \bar{D} + c.c.$	not seen	887	DESIG=23;OUR EVAL;→ UNCHECKED ←
$D^*(2007)^0 \bar{D}^0 + c.c.$	not seen	—	DESIG=33
$D^*(2010)^+ D^- + c.c.$	not seen	—	DESIG=34
$D^*(2007)^0 \bar{D}^*(2007)^0$	not seen	652	DESIG=35
$D^*(2010)^+ D^*(2010)^-$	not seen	641	DESIG=36
$D^0 D^- \pi^+ + c.c. (excl. D^*(2007)^0 \bar{D}^{*0} + c.c., D^*(2010)^+ D^- + c.c.)$	not seen	—	DESIG=38
$D \bar{D}^* \pi + c.c. (excl. D^* \bar{D}^*)$	not seen	723	DESIG=25
$D^0 D^{*-} \pi^+ + c.c. (excl. D^*(2010)^+ D^*(2010)^-)$	not seen	—	DESIG=39
$D^0 D^*(2010)^- \pi^+ + c.c.$	seen	716	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	615	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
$p \bar{p} \omega$	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 ←

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
$\chi_{c1}\gamma$	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

 $\chi_{c1}(4274)$

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

was X(4274)

$$\text{Mass } m = 4286_{-9}^{+8} \text{ MeV } (S = 1.7)$$

$$\text{Full width } \Gamma = 51 \pm 7 \text{ MeV}$$

NODE=M233

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

$\chi_{c1}(4274)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$J/\psi\phi$	seen	522

NODE=M233215;DESIG=1

 $\psi(4360)$

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

also known as Y(4360); was X(4360)

$$\psi(4360) \text{ MASS} = 4374 \pm 7 \text{ MeV } (S = 2.4)$$

$$\psi(4360) \text{ WIDTH} = 118 \pm 12 \text{ MeV } (S = 2.1)$$

NODE=M181

NODE=M181M;DTYPE=M
NODE=M181W;DTYPE=G

$\psi(4360)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$h_c\pi^+\pi^-$	seen	723
$\psi(2S)\pi^+\pi^-$	seen	579
$\psi(3770)\pi^+\pi^-$	possibly seen	495
$\psi_2(3823)\pi^+\pi^-$	seen	444
$J/\psi\eta$	seen	983
$D^+D^-\pi^+\pi^-$	seen	862
$D_1(2420)\bar{D} + \text{c.c.}$	possibly seen	431
$\phi\eta$	not seen	2030
$\omega\pi^0$	not seen	2115
$\omega\eta$	not seen	2080
$p\bar{p}\eta$	not seen	1806
$p\bar{p}\omega$	not seen	1708

NODE=M181215;DESIG=12

DESIG=2

DESIG=11

DESIG=5

DESIG=4

DESIG=17

DESIG=10

DESIG=20

DESIG=15

DESIG=16

DESIG=13

DESIG=14

 $\psi(4415)$ [q]

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

$$\text{Mass } m = 4421 \pm 4 \text{ MeV}$$

$$\text{Full width } \Gamma = 62 \pm 20 \text{ MeV}$$

NODE=M073

NODE=M073M;DTYPE=M;OUR EST;
→ UNCHECKED ←
NODE=M073W;DTYPE=G;OUR EST;
→ UNCHECKED ←

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		1187	DESIG=7;OUR EVAL;→ UNCHECKED ←
$D^0\bar{D}^0$	seen		1187	DESIG=8
D^+D^-	seen		1179	DESIG=9
$D^*\bar{D} + c.c.$	seen		1063	DESIG=10;OUR EVAL;→ UNCHECKED ←
$D^*(2007)^0\bar{D}^0 + c.c.$	seen		1067	DESIG=11
$D^*(2010)^+D^- + c.c.$	seen		1059	DESIG=12
$D^*\bar{D}^*$	seen		919	DESIG=13;OUR EVAL;→ UNCHECKED ←
$D^*(2007)^0\bar{D}^*(2007)^0 + c.c.$	seen		927	DESIG=14
$D^*(2010)^+D^*(2010)^- + c.c.$	seen		919	DESIG=15
$D^0D^-\pi^+$ (excl. $D^*(2007)^0\bar{D}^0$ +c.c., $D^*(2010)^+D^- + c.c.$)	< 2.3 %	90%	—	DESIG=4
$D\bar{D}_2^*(2460) \rightarrow D^0D^-\pi^+ + c.c.$	(10 ± 4) %		—	DESIG=5
$D^0\bar{D}^{*-}\pi^+ + c.c.$	< 11 %	90%	926	DESIG=6
$D_1(2420)\bar{D} + c.c.$	possibly seen		537	DESIG=25
$D_s^+D_s^-$	not seen		1006	DESIG=16
$\omega\chi_{c2}$	possibly seen		330	DESIG=20
$D_s^{*+}D_s^- + c.c.$	seen		—	DESIG=17
$D_s^{*+}D_s^{*-}$	seen		652	DESIG=18
$\psi_2(3823)\pi^+\pi^-$	possibly seen		492	DESIG=21
$\psi(3770)\pi^+\pi^-$	possibly seen		541	DESIG=24
$J/\psi\eta$	< 6 × 10 ⁻³	90%	1022	DESIG=19
$\chi_{c1}\gamma$	< 8 × 10 ⁻⁴	90%	817	DESIG=22
$\chi_{c2}\gamma$	< 4 × 10 ⁻³	90%	780	DESIG=23
$\Lambda\bar{\Lambda}$	< 3.1 × 10 ⁻⁶	90%	1908	DESIG=27
$\Xi^-\Xi^+$	< 4 × 10 ⁻⁵	90%	1772	DESIG=30
$pK^-\bar{\Lambda} + c.c.$	< 6 × 10 ⁻⁶	90%	1802	DESIG=31
$\omega\pi^0$	not seen		2139	DESIG=28
$\omega\eta$	not seen		2105	DESIG=29
e^+e^-	(9.4±3.2) × 10 ⁻⁶		2210	DESIG=1
$\mu^+\mu^-$	(2.0±1.0) × 10 ⁻⁵		2208	DESIG=26

 $\psi(4660)$

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

NODE=M189

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

$$\psi(4660) \text{ MASS} = 4641 \pm 10 \text{ MeV} \quad (S = 2.7)$$

$$\psi(4660) \text{ WIDTH} = 73^{+13}_{-11} \text{ MeV} \quad (S = 1.7)$$

NODE=M189M;DTYPE=M

NODE=M189W;DTYPE=G

$\psi(4660)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)	
e^+e^-	not seen	2321	NODE=M189215;DESIG=1;OUR EVAL;
$\psi(2S)\pi^+\pi^-$	seen	819	DESIG=2;OUR EVAL;→ UNCHECKED ←
$J/\psi\eta$	not seen	1201	DESIG=4;OUR EVAL;→ UNCHECKED ←
$D^0D^{*-}\pi^+$	not seen	1165	DESIG=3;OUR EVAL;→ UNCHECKED ←
$D^{*0}D^{*-}\pi^+$	seen	1032	DESIG=15;OUR EVAL;→ UNCHECKED ←
$\psi_2(3823)\pi^+\pi^-$	seen	701	DESIG=10
$\chi_{c1}\gamma$	not seen	993	DESIG=6;OUR EVAL;→ UNCHECKED ←
$\chi_{c1}\phi$	not seen	426	DESIG=13;OUR EVAL;→ UNCHECKED ←
$\chi_{c2}\gamma$	not seen	958	DESIG=7;OUR EVAL;→ UNCHECKED ←
$\chi_{c2}\phi$	not seen	326	DESIG=14;OUR EVAL;→ UNCHECKED ←
$\Lambda_c^+\Lambda_c^-$	seen	397	DESIG=5;OUR EVAL;→ UNCHECKED ←
$D_s^+D_{s1}(2536)^-$	seen	557	DESIG=8;OUR EVAL;→ UNCHECKED ←
$\omega\pi^0$	not seen	2253	DESIG=11
$\omega\eta$	not seen	2220	DESIG=12

$b\bar{b}$ 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

 $\Upsilon(1S)$

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

Mass $m = 9460.40 \pm 0.10$ MeVFull 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 ± 0.10) %		4384
e^+e^-	(2.39 ± 0.08) %		4730
$\mu^+\mu^-$	(2.48 ± 0.04) %		4729

NODE=M049215;DESIG=3

DESIG=2

DESIG=1

Hadronic decays

ggg	(81.7 ± 0.7) %		—	NODE=M049;CLUMP=A
γgg	(2.2 ± 0.6) %		—	DESIG=117
$\eta'(958)$ anything	(2.94 ± 0.24) %		—	DESIG=118
$J/\psi(1S)$ anything	(5.4 ± 0.4) × 10 ⁻⁴	S=1.4	4223	DESIG=73
$J/\psi(1S)\eta_c$	< 2.2	× 10 ⁻⁶ CL=90%	3623	DESIG=12
$J/\psi(1S)\chi_{c0}$	< 3.4	× 10 ⁻⁶ CL=90%	3429	DESIG=146
$J/\psi(1S)\chi_{c1}$	(3.9 ± 1.2) × 10 ⁻⁶		3382	DESIG=147
$J/\psi(1S)\chi_{c2}$	< 1.4	× 10 ⁻⁶ CL=90%	3359	DESIG=148
$J/\psi(1S)\eta_c(2S)$	< 2.2	× 10 ⁻⁶ CL=90%	3317	DESIG=149
$J/\psi(1S)X(3940)$	< 5.4	× 10 ⁻⁶ CL=90%	3148	DESIG=150
$J/\psi(1S)X(4160)$	< 5.4	× 10 ⁻⁶ CL=90%	3020	DESIG=151
$X(4350)$ anything, $X \rightarrow J/\psi(1S)\phi$	< 8.1	× 10 ⁻⁶ CL=90%	—	DESIG=152
$T_{c\bar{c}1}(3900)^\pm$ anything, $T_{c\bar{c}1} \rightarrow J/\psi(1S)\pi^\pm$	< 1.3	× 10 ⁻⁵ CL=90%	—	DESIG=157
$T_{c\bar{c}1}(4200)^\pm$ anything, $Z_c \rightarrow J/\psi(1S)\pi^\pm$	< 6.0	× 10 ⁻⁵ CL=90%	—	DESIG=168
$T_{c\bar{c}1}(4430)^\pm$ anything, $T_{c\bar{c}1} \rightarrow J/\psi(1S)\pi^\pm$	< 4.9	× 10 ⁻⁵ CL=90%	—	DESIG=169
X_{cs}^\pm anything, $X \rightarrow J/\psi K^\pm$	< 5.7	× 10 ⁻⁶ CL=90%	—	DESIG=170
$\psi(4230)$ anything, $\psi \rightarrow J/\psi(1S)\pi^+\pi^-$	< 3.8	× 10 ⁻⁵ CL=90%	—	DESIG=173
$\psi(4230)$ anything, $\psi \rightarrow J/\psi(1S)K^+K^-$	< 7.5	× 10 ⁻⁶ CL=90%	—	DESIG=161
$\chi_{c1}(4140)$ anything, $\chi_{c1} \rightarrow J/\psi(1S)\phi$	< 5.2	× 10 ⁻⁶ CL=90%	—	DESIG=165
χ_{c0} anything	< 4	× 10 ⁻³ CL=90%	—	DESIG=166

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	$< 2.6 \times 10^{-4}$	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
$K^*(892)^0 K^-\pi^+ + c.c.$	$(4.4 \pm 0.8) \times 10^{-6}$		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
$K^*(892)^0 \bar{K}_2^*(1430)^0 + c.c.$	$(3.0 \pm 0.8) \times 10^{-6}$		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
$K_S^0 K^+\pi^- + c.c.$	$(1.6 \pm 0.4) \times 10^{-6}$		4696 DESIG=133
$K^*(892)^0 \bar{K}^0 + c.c.$	$(2.9 \pm 0.9) \times 10^{-6}$		4675 DESIG=134
$K^*(892)^- K^+ + c.c.$	$< 1.11 \times 10^{-6}$	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

					NODE=M049;CLUMP=B
$\gamma\pi^+\pi^-$	(6.3 ± 1.8)	$\times 10^{-5}$	4728	DESIG=70	
$\gamma\pi^0\pi^0$	(1.7 ± 0.7)	$\times 10^{-5}$	4728	DESIG=71	
$\gamma\pi\pi$ (S-wave)	(4.6 ± 0.7)	$\times 10^{-5}$	4728	DESIG=190	
$\gamma\pi^0\eta$	< 2.4	$\times 10^{-6}$	CL=90%	4713	DESIG=111
γK^+K^-	[r] (1.14 ± 0.13)	$\times 10^{-5}$	4704	DESIG=102	
$\gamma p\bar{p}$	[s] < 6	$\times 10^{-6}$	CL=90%	4636	DESIG=103
$\gamma 2h^+2h^-$	(7.0 ± 1.5)	$\times 10^{-4}$	4720	DESIG=20	
$\gamma 3h^+3h^-$	(5.4 ± 2.0)	$\times 10^{-4}$	4703	DESIG=21	
$\gamma 4h^+4h^-$	(7.4 ± 3.5)	$\times 10^{-4}$	4679	DESIG=22	
$\gamma\pi^+\pi^-K^+K^-$	(2.9 ± 0.9)	$\times 10^{-4}$	4686	DESIG=14	
$\gamma 2\pi^+2\pi^-$	(2.5 ± 0.9)	$\times 10^{-4}$	4720	DESIG=13	
$\gamma 3\pi^+3\pi^-$	(2.5 ± 1.2)	$\times 10^{-4}$	4703	DESIG=17	
$\gamma 2\pi^+2\pi^-K^+K^-$	(2.4 ± 1.2)	$\times 10^{-4}$	4659	DESIG=18	
$\gamma\pi^+\pi^-p\bar{p}$	(1.5 ± 0.6)	$\times 10^{-4}$	4604	DESIG=15	
$\gamma 2\pi^+2\pi^-p\bar{p}$	(4 ± 6)	$\times 10^{-5}$	4563	DESIG=19	
$\gamma 2K^+2K^-$	(2.0 ± 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
γf_0 (980)	< 3	$\times 10^{-5}$	CL=90%	4678	DESIG=105
$\gamma f_2'$ (1525)	(2.9 ± 0.6)	$\times 10^{-5}$	4609	DESIG=52	
γf_2 (1270)	(1.01 ± 0.06)	$\times 10^{-4}$	4644	DESIG=51	
$\gamma\eta$ (1405)	< 8.2	$\times 10^{-5}$	CL=90%	4625	DESIG=65
γf_0 (1500)	< 1.5	$\times 10^{-5}$	CL=90%	4608	DESIG=108
$\gamma f_0(1500) \rightarrow \gamma K^+K^-$	(1.0 ± 0.4)	$\times 10^{-5}$	-	DESIG=192	
$\gamma f_0(1710)$	< 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
γf_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
$\gamma X\bar{X}(m_X < 3.1 \text{ GeV})$	[t] < 1	$\times 10^{-3}$	CL=90%	-	DESIG=67
$\gamma X\bar{X}(m_X < 4.5 \text{ GeV})$	[u] < 2.4	$\times 10^{-4}$	CL=90%	-	DESIG=127
$\gamma X \rightarrow \gamma + \geq 4 \text{ prongs}$	[v] < 1.78	$\times 10^{-4}$	CL=95%	-	DESIG=113
$\gamma A^0 \rightarrow \gamma\mu^+\mu^-$	[x] < 9	$\times 10^{-6}$	CL=90%	-	DESIG=114
$\gamma A^0 \rightarrow \gamma\tau^+\tau^-$	[r] < 1.30	$\times 10^{-4}$	CL=90%	-	DESIG=115
$\gamma A^0 \rightarrow \gamma g g$	[y] < 1	%	CL=90%	-	DESIG=129
$\gamma A^0 \rightarrow \gamma s\bar{s}$	[y] < 1	$\times 10^{-3}$	CL=90%	-	DESIG=130

Lepton Family number (LF) violating modes

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

Other decays

invisible $< 3.0 \times 10^{-4}$ CL=90% -
hadrons (96 ± 4)% -

NODE=M049;CLUMP=D
DESIG=106
DESIG=101

 $\chi_{b0}(1P)$ [z]

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

 J needs confirmation.Mass $m = 9859.44 \pm 0.42 \pm 0.31$ MeV

NODE=M076

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 \pm 0.27) %		391	NODE=M076215;DESIG=1
$D^0 X$	< 10.4 %	90%	-	DESIG=2
$\pi^+ \pi^- K^+ K^- \pi^0$	$< 1.6 \times 10^{-4}$	90%	4875	DESIG=3
$2\pi^+ \pi^- K^- K_S^0$	$< 5 \times 10^{-5}$	90%	4875	DESIG=4
$2\pi^+ \pi^- K^- K_S^0 2\pi^0$	$< 5 \times 10^{-4}$	90%	4846	DESIG=5
$2\pi^+ 2\pi^- 2\pi^0$	$< 2.1 \times 10^{-4}$	90%	4905	DESIG=6
$2\pi^+ 2\pi^- K^+ K^-$	(1.1 \pm 0.6) $\times 10^{-4}$		4861	DESIG=7
$2\pi^+ 2\pi^- K^+ K^- \pi^0$	$< 2.7 \times 10^{-4}$	90%	4846	DESIG=8
$2\pi^+ 2\pi^- K^+ K^- 2\pi^0$	$< 5 \times 10^{-4}$	90%	4828	DESIG=9
$3\pi^+ 2\pi^- K^- K_S^0 \pi^0$	$< 1.6 \times 10^{-4}$	90%	4827	DESIG=10
$3\pi^+ 3\pi^-$	$< 8 \times 10^{-5}$	90%	4904	DESIG=11
$3\pi^+ 3\pi^- 2\pi^0$	$< 6 \times 10^{-4}$	90%	4881	DESIG=12
$3\pi^+ 3\pi^- K^+ K^-$	(2.4 \pm 1.2) $\times 10^{-4}$		4827	DESIG=13
$3\pi^+ 3\pi^- K^+ K^- \pi^0$	$< 1.0 \times 10^{-3}$	90%	4808	DESIG=14
$4\pi^+ 4\pi^-$	$< 8 \times 10^{-5}$	90%	4880	DESIG=15
$4\pi^+ 4\pi^- 2\pi^0$	$< 2.1 \times 10^{-3}$	90%	4850	DESIG=16
$J/\psi J/\psi$	$< 7 \times 10^{-5}$	90%	3836	DESIG=17
$J/\psi \psi(2S)$	$< 1.2 \times 10^{-4}$	90%	3571	DESIG=18
$\psi(2S) \psi(2S)$	$< 3.1 \times 10^{-5}$	90%	3273	DESIG=19
$J/\psi(1S)$ anything	$< 2.3 \times 10^{-3}$	90%	-	DESIG=20

 $\chi_{b1}(1P)$ [z]

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

 J needs confirmation.Mass $m = 9892.78 \pm 0.26 \pm 0.31$ MeV

NODE=M077

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

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

 $h_b(1P)$

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

Mass $m = 9899.3 \pm 0.8$ MeV

NODE=M204

NODE=M204M;DTYPE=M

$h_b(1P)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\eta_b(1S)\gamma$	$(52^{+6}_{-5})\%$	488

NODE=M204215;DESIG=1

 $\chi_{b2}(1P)$ [z]

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

J needs confirmation.

NODE=M078

Mass $m = 9912.21 \pm 0.26 \pm 0.31$ 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

 $\Upsilon(2S)$

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

NODE=M052

Mass $m = 10023.4 \pm 0.5$ MeV

NODE=M052M;DTYPE=M

$m_{\Upsilon(3S)} - m_{\Upsilon(2S)} = 331.50 \pm 0.13$ MeV

Full width $\Gamma = 31.98 \pm 2.63$ keV

NODE=M052DM3;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 ± 0.26) %		475	NODE=M052215;DESIG=4
$\Upsilon(1S)\pi^0\pi^0$	(8.6 ± 0.4) %		480	DESIG=5
$\tau^+\tau^-$	(2.00 ± 0.21) %		4686	DESIG=3
$\mu^+\mu^-$	(1.93 ± 0.17) %	S=2.2	5011	DESIG=1
e^+e^-	(1.91 ± 0.16) %		5012	DESIG=2
$\Upsilon(1S)\pi^0$	< 4	$\times 10^{-5}$ CL=90%	531	DESIG=10
$\Upsilon(1S)\eta$	(2.9 ± 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%	3707	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 ± 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 ± 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
2H anything	(2.78 $^{+0.30}_{-0.26}$)	$\times 10^{-5}$ S=1.2	–	DESIG=16
hadrons	(94 ± 11) %		–	DESIG=101
ggg	(58.8 ± 1.2) %		–	DESIG=105
γgg	(1.87 ± 0.28) %		–	DESIG=106
$\phi K^+ K^-$	(1.6 ± 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 ± 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 ± 0.6)	$\times 10^{-6}$	4869	DESIG=139
$K_1(1270)^\pm K^\mp$	< 3.22	$\times 10^{-6}$ CL=90%	4921	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 ± 0.28)	$\times 10^{-5}$	5002	DESIG=129
$K_S^0 K^+\pi^- + c.c.$	(1.14 ± 0.33)	$\times 10^{-6}$	4979	DESIG=130
$K^*(892)^0 \bar{K}^0 + c.c.$	< 4.22	$\times 10^{-6}$ CL=90%	4959	DESIG=131
$K^*(892)^- K^+ + c.c.$	< 1.45	$\times 10^{-6}$ CL=90%	4960	DESIG=132

$f_1(1285)$ 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			
$\gamma X_{b1}(1P)$	$(6.9 \pm 0.4) \%$	130	NODE=M052;CLUMP=A DESIG=8
$\gamma X_{b2}(1P)$	$(7.15 \pm 0.35) \%$	111	DESIG=7
$\gamma X_{b0}(1P)$	$(3.8 \pm 0.4) \%$	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% 4568	DESIG=111
γX_{c0}	$< 1.0 \times 10^{-4}$	CL=90% 4430	DESIG=112
γX_{c1}	$< 3.6 \times 10^{-6}$	CL=90% 4397	DESIG=113
γX_{c2}	$< 1.5 \times 10^{-5}$	CL=90% 4381	DESIG=114
$\gamma X_{c1}(3872)$	$< 2.2 \times 10^{-5}$	CL=90% 4264	DESIG=172
$\gamma X_{c1}(3872), \chi_{c1} \rightarrow \pi^+ \pi^- \pi^0 J/\psi$	$< 2.4 \times 10^{-6}$	CL=90% —	DESIG=116
$\gamma X_{c0}(3915) \rightarrow \omega J/\psi$	$< 2.8 \times 10^{-6}$	CL=90% —	DESIG=117
$\gamma X_{c1}(4140) \rightarrow \phi J/\psi$	$< 1.2 \times 10^{-6}$	CL=90% —	DESIG=118
$\gamma X(4350) \rightarrow \phi J/\psi$	$< 1.3 \times 10^{-6}$	CL=90% —	DESIG=119
$\gamma \eta_b(1S)$	$(5.5 \pm_{-0.9}^{1.1}) \times 10^{-4}$	S=1.2 605	DESIG=102
$\gamma \eta_b(1S) \rightarrow \gamma$ Sum of 26 exclusive modes	$< 3.7 \times 10^{-6}$	CL=90% —	DESIG=124
$\gamma X_{b\bar{b}} \rightarrow \gamma$ Sum of 26 exclusive modes	$< 4.9 \times 10^{-6}$	CL=90% —	DESIG=125
$\gamma X \rightarrow \gamma + \geq 4$ prongs [aa]	$< 1.95 \times 10^{-4}$	CL=95% —	DESIG=103
$\gamma A^0 \rightarrow \gamma$ 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 $< 3.2 \times 10^{-6}$	CL=90% 4854	NODE=M052;CLUMP=B DESIG=107
$\mu^\pm \tau^\mp$	LF $< 3.3 \times 10^{-6}$	CL=90% 4854	DESIG=104

$\Upsilon_2(1D)$

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

NODE=M177

was $\Upsilon(1D)$

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

NODE=M177M;DTYPE=M

$T_2(1D)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\gamma\gamma T(1S)$	seen	679
$\gamma\chi_{bJ}(1P)$	seen	300
$\eta T(1S)$	not seen	426
$\pi^+\pi^- T(1S)$	$(6.6\pm 1.6) \times 10^{-3}$	623

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

$\chi_{b0}(2P)$ [z]

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

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)
$\gamma T(2S)$	$(1.38\pm 0.30) \%$		207
$\gamma T(1S)$	$(3.8 \pm 1.7) \times 10^{-3}$		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

$\chi_{b1}(2P)$ [z]

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

J needs confirmation.

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

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

NODE=M080

NODE=M080M;DTYPE=M;OUR EVAL;

→ UNCHECKED ←

NODE=M080M2;DTYPE=D

$\chi_{b1}(2P)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\omega T(1S)$	$(1.63^{+0.40}_{-0.34}) \%$	134
$\gamma T(2S)$	$(18.1 \pm 1.9) \%$	229
$\gamma T(1S)$	$(9.9 \pm 1.0) \%$	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

$h_b(2P)$

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

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

NODE=M205

NODE=M205M;DTYPE=M

$h_b(2P)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
hadrons	not seen	—
$\eta_b(1S)\gamma$	$(22 \pm 5) \%$	825
$\eta_b(2S)\gamma$	$(48 \pm 13) \%$	257

NODE=M205215;DESIG=1
DESIG=2
DESIG=3

$\chi_{b2}(2P)$ [z]

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

J needs confirmation.

NODE=M081

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

$$m_{\chi_{b2}(2P)} - m_{\chi_{b1}(2P)} = 13.10 \pm 0.24 \text{ MeV}$$

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
$2\pi^+2\pi^-K^+K^-\pi^0$	$(4.7 \pm 2.3) \times 10^{-4}$		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

$\Upsilon(3S)$

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

NODE=M048

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

NODE=M048M;DTYPE=M

$$m_{\Upsilon(3S)} - m_{\Upsilon(2S)} = 331.50 \pm 0.13 \text{ MeV}$$

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

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
ggg	(35.7 \pm 2.6) %		–	DESIG=109
γgg	(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	[bb] < 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
$\gamma A^0 \rightarrow \gamma\tau^+\tau^-$	[cc] < 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

 $\chi_{b1}(3P)$ ^[z]

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

NODE=M206

 J needs confirmation.

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	NODE=M206215;DESIG=1
$\Upsilon(2S)\gamma$	seen	479	DESIG=2
$\Upsilon(3S)\gamma$	seen	157	DESIG=3

 $\chi_{b2}(3P)$ ^[z]

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

NODE=M238

 J needs confirmation.

Mass $m = 10524.0 \pm 0.8$ MeV

NODE=M238M;DTYPE=M

$\chi_{b2}(3P)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Upsilon(3S)\gamma$	seen	168

NODE=M238215;DESIG=1

 $\Upsilon(4S)$

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

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

NODE=M047

NODE=M047M;DTYPE=M

NODE=M047W;DTYPE=G

$\Upsilon(4S)$ DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$B\bar{B}$	> 96 %	95%	326
$B^+ B^-$	(51.4 ± 0.6) %		331
D_s^+ anything + c.c.	(17.8 ± 2.6) %		–
$B^0 \bar{B}^0$	(48.6 ± 0.6) %		326
$J/\psi K_S^0 + (J/\psi, \eta_c) K_S^0$	< 4 × 10 ⁻⁷	90%	–
non- $B\bar{B}$	< 4 %	95%	–
$e^+ e^-$	(1.57 ± 0.08) × 10 ⁻⁵		5290
$\rho^+ \rho^-$	< 5.7 × 10 ⁻⁶	90%	5233
$K^*(892)^0 \bar{K}^0$	< 2.0 × 10 ⁻⁶	90%	5240
$J/\psi(1S)$ anything	< 1.9 × 10 ⁻⁴	95%	–
D^{*+} anything + c.c.	< 7.4 %	90%	5099
ϕ anything	(7.1 ± 0.6) %		5240
$\phi\eta$	< 1.8 × 10 ⁻⁶	90%	5226
$\phi\eta'$	< 4.3 × 10 ⁻⁶	90%	5196
$\rho\eta$	< 1.3 × 10 ⁻⁶	90%	5247
$\rho\eta'$	< 2.5 × 10 ⁻⁶	90%	5217
$\Upsilon(1S)$ anything	< 4 × 10 ⁻³	90%	1053
$\Upsilon(1S)\pi^+\pi^-$	(8.2 ± 0.4) × 10 ⁻⁵		1026
$\Upsilon(1S)\eta$	(1.81 ± 0.18) × 10 ⁻⁴		924
$\Upsilon(1S)\eta'$	(3.4 ± 0.9) × 10 ⁻⁵		–
$\Upsilon(2S)\pi^+\pi^-$	(8.2 ± 0.8) × 10 ⁻⁵		468
$h_b(1P)\pi^+\pi^-$	not seen		600
$h_b(1P)\eta$	(2.18 ± 0.21) × 10 ⁻³		390
$\eta_b(1S)\omega$	< 1.8 × 10 ⁻⁴	90%	–
2H anything	< 1.3 × 10 ⁻⁵	90%	–
Double Radiative Decays			
$\gamma\gamma \Upsilon(D) \rightarrow \gamma\gamma\eta \Upsilon(1S)$	< 2.3 × 10 ⁻⁵	90%	–

NODE=M047215;DESIG=8;OUR EST;
→ UNCHECKED ←

DESIG=10

DESIG=12

DESIG=11

DESIG=15

DESIG=6

DESIG=1

DESIG=16

DESIG=22

DESIG=2

DESIG=3

DESIG=4

DESIG=13

DESIG=18

DESIG=19

DESIG=20

DESIG=5

DESIG=7

DESIG=17

DESIG=26

DESIG=9

DESIG=21

DESIG=23

DESIG=27

DESIG=14

NODE=M047;CLUMP=B

DESIG=24

 $\Upsilon(10860)$

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

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

NODE=M092

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
$\gamma X_b \rightarrow \gamma\Upsilon(1S)\omega$	< 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	—
$D^0 D^{*-} + c.c.$	seen	152
$D^- D^{*0} + c.c.$	seen	143
$\omega\pi^\pm$	not seen	1862
$J/\psi\eta$	not seen	510
$D^+ D^{*-} + c.c.$	seen	—
$D^0 \bar{D}^{*0} + c.c.$	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 $m = 4024.1 \pm 1.9$ MeV
Full 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
$D\bar{D}^* + c.c.$	not seen	542
$\eta_c\pi^+\pi^-$	not seen	872
$J/\psi(1S)\pi^\pm$	not seen	811

NODE=M213215;DESIG=1
DESIG=2
DESIG=4
DESIG=3
DESIG=5

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

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

G, C need confirmation.

NODE=M195

was $Z_c(4430)$, $X(4430)^\pm$

Quantum numbers not established.

Mass $m = 4478^{+15}_{-18}$ MeV
Full width $\Gamma = 181 \pm 31$ MeV

NODE=M195M;DTYPE=M
NODE=M195W;DTYPE=G

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

NODE=M195215;DESIG=1
DESIG=2

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

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

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

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

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

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

$T_{b\bar{b}1}(10650)^-$ decay modes are charge conjugates of the modes below.

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

NODE=M208215;NODE=M208

$T_{b\bar{b}1}(10650)^+$ 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	–
$B^{*+} \bar{B}^{*0}$	$(74 \pm 4_{-6})\%$	120

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

NOTES

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