

Further States

OMITTED FROM SUMMARY TABLE

This section contains states observed by a single group or states poorly established that thus need confirmation.

QUANTUM NUMBERS, MASSES, WIDTHS, AND BRANCHING RATIOS

X(360) $I^G(J^{PC}) = ?^?(?^?+)$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$360 \pm 7 \pm 9$	64 ± 18	2.3k	¹ ABRAAMYAN 09	CNTR	$2.75 dC \rightarrow \gamma\gamma X$

¹ Not seen in $pC \rightarrow \gamma\gamma X$ at 5.5 GeV/c.

X(1070) $I^G(J^{PC}) = ?^?(0^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>COMMENT</u>
1072 ± 1	3.5 ± 0.5	¹ VLADIMIRSK...08	$40 \pi^- p \rightarrow K_S^0 K_S^0 n + m\pi^0$

¹ Supersedes GRIGOR'EV 05.

X(1110) $I^G(J^{PC}) = 0^+(\text{even } ++)$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1107 ± 4	$111 \pm 8 \pm 15$	DAFTARI 87	DBC	$0. \bar{p}n \rightarrow \rho^- \pi^+ \pi^-$

f₀(1200–1600) $I^G(J^{PC}) = 0^+(0^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1323 ± 8	237 ± 20	VLADIMIRSK...06	SPEC	$40 \pi^- p \rightarrow K_S^0 K_S^0 n$
1480^{+100}_{-150}	1030^{+80}_{-170}	¹ ANISOVICH 03	SPEC	
1530^{+90}_{-250}	560 ± 40	² ANISOVICH 03	SPEC	

¹ K-matrix pole from combined analysis of $\pi^- p \rightarrow \pi^0 \pi^0 n$, $\pi^- p \rightarrow K \bar{K} n$, $\pi^+ \pi^- \rightarrow \pi^+ \pi^-$, $\bar{p}p \rightarrow \pi^0 \pi^0 \pi^0$, $\pi^0 \eta \eta$, $\pi^0 \pi^0 \eta$, $\pi^+ \pi^- \pi^0$, $K^+ K^- \pi^0$, $K_S^0 K_S^0 \pi^0$, $K^+ K_S^0 \pi^-$ at rest, $\bar{p}n \rightarrow \pi^- \pi^- \pi^+$, $K_S^0 K^- \pi^0$, $K_S^0 K_S^0 \pi^-$ at rest.

² K-matrix pole from combined analysis of $\pi^- p \rightarrow \pi^0 \pi^0 n$, $\pi^- p \rightarrow K \bar{K} n$, $\bar{p}p \rightarrow \pi^0 \pi^0 \pi^0$, $\pi^0 \eta \eta$, $\pi^0 \pi^0 \eta$ at rest.

X(1420) $I^G(J^{PC}) = 2^+(0^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1420 ± 20	160 ± 10	FILIPPI 00	OBLX	$0 \bar{p}p \rightarrow \pi^+ \pi^+ \pi^-$

X(1545) $I^G(J^{PC}) = ??(??^{++})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
1545 ± 3	6.0 ± 2.5	¹ VLADIMIRSK...08		40 $\pi^- p \rightarrow K_S^0 K_S^0 n + m\pi^0$

¹ Supersedes VLADIMIRSKII 00.

X(1575) $I^G(J^{PC}) = ??(1^{--})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
1576 ⁺⁴⁹⁺⁹⁸ ₋₅₅₋₉₁	818 ⁺²²⁺⁶⁴ ₋₂₃₋₁₃₃	¹ ABLIKIM	06s	BES $J/\psi \rightarrow K^+ K^- \pi^0$

¹ A broad peak observed at $K^+ K^-$ invariant mass. Mass and width above are its pole position. The observed branching ratio is $B(J/\psi \rightarrow X \pi^0) B(X \rightarrow K^+ K^-) = (8.5 \pm 0.6^{+2.7}_{-3.6}) \times 10^{-4}$.

X(1600) $I^G(J^{PC}) = 2^+(2^{++})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
1600 ± 100	400 ± 200	¹ ALBRECHT 91F ARG		10.2 $e^+ e^- \rightarrow e^+ e^- 2(\pi^+ \pi^-)$

¹ Our estimate.

X(1650) $I^G(J^{PC}) = 0^-(??^-)$

MASS (MeV)	WIDTH (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1652 ± 7	< 50	100	PROKOSHKIN 96	GAM2	32,38 $\pi p \rightarrow \omega \eta n$

a₀(1700) $I^G(J^{PC}) = 1^-(0^{++})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
1704 ± 5 ± 2	110 ± 15 ± 11	LEES	21A	$\eta_c(1S) \rightarrow \pi^+ \pi^- \eta$

X(1730) $I^G(J^{PC}) = ??(??^+)$

MASS (MeV)	WIDTH (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1731.0 ± 1.2 ± 2.0	3.2 ± 0.8 ± 1.3	58	VLADIMIRSK...07	SPEC	40 $\pi^- p \rightarrow K_S^0 K_S^0 X$

f₂(1750) $I^G(J^{PC}) = 0^+(2^{++})$

MASS (MeV)	WIDTH (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1755 ± 10	67 ± 12	870	¹ SCHEGELSKY 06A	RVUE	$\gamma\gamma \rightarrow K_S^0 K_S^0$

 $\Gamma(K\bar{K})$

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
17 ± 5	870	² SCHEGELSKY 06A	RVUE	$\gamma\gamma \rightarrow K_S^0 K_S^0$

 $\Gamma(\gamma\gamma)$

VALUE (keV)	EVTS	DOCUMENT ID	TECN	COMMENT
0.13 ± 0.04	870	² SCHEGELSKY 06A	RVUE	$\gamma\gamma \rightarrow K_S^0 K_S^0$

$\Gamma(\pi\pi)$

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1.3 ± 1.0	870	² SCHEGELSKY 06A	RVUE	$\gamma\gamma \rightarrow K_S^0 K_S^0$

$\Gamma(\eta\eta)$

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
2.0 ± 0.5	870	² SCHEGELSKY 06A	RVUE	$\gamma\gamma \rightarrow K_S^0 K_S^0$

¹ From analysis of L3 data at 91 and 183–209 GeV.

² From analysis of L3 data at 91 and 183–209 GeV and using SU(3) relations.

$X(1775)$ $I^G(J^{PC}) = 1^-(?^-+)$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
1763 ± 20	192 ± 60	CONDO 91	SHF	$\gamma p \rightarrow (p\pi^+)(\pi^+\pi^-\pi^-)$
1787 ± 18	118 ± 60	CONDO 91	SHF	$\gamma p \rightarrow n\pi^+\pi^+\pi^-$

$X(1850 - 3100)$ $I^G(J^{PC}) = ?^?(1^{--})$

$\Gamma(e^+e^-)B(X \rightarrow \text{hadrons})$ (eV)	CL%	DOCUMENT ID	TECN	COMMENT
<120	90	¹ ANASHIN	11	KEDR $e^+e^- \rightarrow \text{hadrons}$

¹ This limit is center-of-mass energy dependent. We quote the most stringent one.

$X(1855)$ $I^G(J^{PC}) = ?^?(?^{??})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
1856.6 ± 5	20 ± 5	BRIDGES	86D	SPEC $0. \bar{p}d \rightarrow \pi\pi N$

$X(1870)$ $I^G(J^{PC}) = ?^?(2^{??})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
1870 ± 40	250 ± 30	ALDE	86D	GAM4 $100 \pi^- p \rightarrow 2\eta X$

$a_3(1875)$ $I^G(J^{PC}) = 1^-(3^{++})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
$1874 \pm 43 \pm 96$	$385 \pm 121 \pm 114$	CHUNG	02	B852 $18.3 \pi^- p \rightarrow \pi^+\pi^-\pi^- p$

$B(a_3(1875) \rightarrow f_2(1270)\pi)/B(a_3(1875) \rightarrow \rho\pi)$

VALUE	DOCUMENT ID	TECN	COMMENT
0.8 ± 0.2	¹ CHUNG	02	B852 $18.3 \pi^- p \rightarrow \pi^+\pi^-\pi^- p$

¹ Using the observable fractions of 50.0% $\rho\pi$, 56.5% $f_2\pi$, and 11.8% $\rho_3\pi$.

$B(a_3(1875) \rightarrow \rho_3(1690)\pi)/B(a_3(1875) \rightarrow \rho\pi)$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.9 ± 0.3	¹ CHUNG	02	B852 18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$

¹ Using the observable fractions of 50.0% $\rho\pi$, 56.5% $f_2\pi$, and 11.8% $\rho_3\pi$.

 $a_1(1930)$ $I^G(J^{PC}) = 1^-(1^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1930^{+30}_{-70}	155 ± 45	ANISOVICH	01F	SPEC 2.0 $\bar{p}p \rightarrow 3\pi^0, \pi^0\eta, \pi^0\eta'$

 $X(1935)$ $I^G(J^{PC}) = 1^+(1^{-?})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1935 ± 20	215 ± 30	EVANGELIS...	79	OMEG 10,16 $\pi^- p \rightarrow \bar{p}pn$

 $\rho_2(1940)$ $I^G(J^{PC}) = 1^+(2^{--})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1940 ± 40	155 ± 40	¹ ANISOVICH	02	SPEC 0.6–1.9 $p\bar{p} \rightarrow \omega\pi^0, \omega\eta\pi^0, \pi^+\pi^-$

¹ From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

 $\omega_3(1945)$ $I^G(J^{PC}) = 0^-(3^{--})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1945 ± 20	115 ± 22	¹ ANISOVICH	02B	SPEC 0.6–1.9 $p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

¹ From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

 $a_2(1950)$ $I^G(J^{PC}) = 1^-(2^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1950^{+30}_{-70}	180^{+30}_{-70}	¹ ANISOVICH	01F	SPEC 1.96–2.41 $\bar{p}p$

¹ From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.

 $\omega(1960)$ $I^G(J^{PC}) = 0^-(1^{--})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1960 ± 25	195 ± 60	¹ ANISOVICH	02B	SPEC 0.6–1.9 $p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

¹ From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

 $b_1(1960)$ $I^G(J^{PC}) = 1^+(1^{+-})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1960 ± 35	230 ± 50	¹ ANISOVICH	02	SPEC 0.6–1.9 $p\bar{p} \rightarrow \omega\pi^0, \omega\eta\pi^0, \pi^+\pi^-$

¹ From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

$h_1(1965)$ $I^G(J^{PC}) = 0^-(1^{+-})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1965±45	345 ± 75	¹ ANISOVICH	02B SPEC	0.6–1.9 $\rho\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

¹ From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

$f_1(1970)$ $I^G(J^{PC}) = 0^+(1^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1971±15	240 ± 45	ANISOVICH	00J SPEC	

$X(1970)$ $I^G(J^{PC}) = ?^?(?^{??})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1970±10	40 ± 20	CHLIAPNIK...	80 HBC	32 $K^+p \rightarrow 2K_S^0 2\pi X$

$X(1975)$ $I^G(J^{PC}) = ?^?(?^{??})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1973±15	80	30	CASO	70 HBC	11.2 $\pi^-p \rightarrow \rho 2\pi$

$\omega_2(1975)$ $I^G(J^{PC}) = 0^-(2^{--})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1975±20	175 ± 25	¹ ANISOVICH	02B SPEC	0.6–1.9 $\rho\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

¹ From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

$a_2(1990)$ $I^G(J^{PC}) = 1^-(2^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2050±10±40	190 ± 22 ± 100	18k	¹ SCHEGELSKY	06 RVUE	$\gamma\gamma \rightarrow \pi^+\pi^-\pi^0$
2003±10±19	249 ± 23 ± 32		LU	05 B852	18 $\pi^-p \rightarrow \omega\pi^-\pi^0 p$

¹ From analysis of L3 data at 183–209 GeV.

$\Gamma(\gamma\gamma) \Gamma(\pi^+\pi^-\pi^0) / \Gamma(\text{total})$

<u>VALUE (keV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.11±0.04±0.05	18k	¹ SCHEGELSKY	06 RVUE	$\gamma\gamma \rightarrow \pi^+\pi^-\pi^0$

¹ From analysis of L3 data at 183–209 GeV.

$\rho(2000)$ $I^G(J^{PC}) = 1^+(1^{--})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2000±30	260 ± 45	¹ BUGG	04C RVUE	Compilation
~ 1988	~ 244	HASAN	94 RVUE	$\bar{p}p \rightarrow \pi\pi$

¹ From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

$f_2(2000)$		$I^G(J^{PC}) = 0^+(2^{++})$			
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
2001 ± 10	312 ± 32	ANISOVICH	00J	SPEC	
~ 1996	~ 134	HASAN	94	RVUE	$\bar{p}p \rightarrow \pi\pi$

$X(2000)$		$I^G(J^{PC}) = 1^-(??^+)$			
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
1964 ± 35	225 ± 50	1 ARMSTRONG	93D	E760	$\bar{p}p \rightarrow 3\pi^0 \rightarrow 6\gamma$
~ 2100	~ 500	1 ANTIPOV	77	CIBS	- 25 $\pi^- p \rightarrow p\pi^- \rho_3$
2214 ± 15	355 ± 21	2 BALTAY	77	HBC	0 15 $\pi^- p \rightarrow \Delta^{++} 3\pi$
2080 ± 40	340 ± 80	KALELKAR	75	HBC	+ 15 $\pi^+ p \rightarrow p\pi^+ \rho_3$

¹ Cannot determine spin to be 3.
² BALTAY 77 favors $J^P = ,3^+$.

$X(2000)$		$I^G(J^{PC}) = ??(4^{++})$			
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
1998 ± 3 ± 5	< 15	VLADIMIRSK...03	SPEC		$\pi^- p \rightarrow K_S^0 K_S^0 M M$

$\eta(2010)$		$I^G(J^{PC}) = 0^+(0^{-+})$		
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	
2010 ⁺³⁵ ₋₆₀	270 ± 60	ANISOVICH	00J	SPEC

$\pi_1(2015)$		$I^G(J^{PC}) = 1^-(1^{-+})$			
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2014 ± 20 ± 16	230 ± 32 ± 73	145k	LU	05	B852 18 $\pi^- p \rightarrow \omega\pi^- \pi^0 p$
2001 ± 30 ± 92	333 ± 52 ± 49	69k	KUHN	04	B852 18 $\pi^- p \rightarrow \eta\pi^+ \pi^- \pi^- p$

$a_0(2020)$		$I^G(J^{PC}) = 1^-(0^{++})$		
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	
2025 ± 30	330 ± 75	ANISOVICH	99C	SPEC

$X(2020)$		$I^G(J^{PC}) = ??(???)$			
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
2015 ± 3	10 ± 4	FERRER	99	RVUE	$\pi p \rightarrow p p \bar{p} \pi (\pi)$

$h_3(2025)$		$I^G(J^{PC}) = 0^-(3^{+-})$			
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
2025 ± 20	145 ± 30	1 ANISOVICH	02B	SPEC	0.6–1.9 $p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

¹ From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

$b_3(2030)$ $I^G(J^{PC}) = 1^+(3^{+-})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2032±12	117 ± 11	¹ ANISOVICH	02	SPEC 0.6–1.9 $p\bar{p} \rightarrow \omega\pi^0, \omega\eta\pi^0, \pi^+\pi^-$

¹From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

 $a_2(2030)$ $I^G(J^{PC}) = 1^-(2^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2030±20	205 ± 30	¹ ANISOVICH	01F	SPEC 1.96–2.41 $\bar{p}p$

¹From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.

 $a_3(2030)$ $I^G(J^{PC}) = 1^-(3^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2031±12	150 ± 18	¹ ANISOVICH	01F	SPEC 1.96–2.41 $\bar{p}p$

¹From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.

 $\eta_2(2030)$ $I^G(J^{PC}) = 0^+(2^{-+})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2030±5±15	205 ± 10 ± 15	ANISOVICH	00E	SPEC

 $B(a_2\pi)_{L=0}/B(a_2\pi)_{L=2}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.05±0.03	¹ ANISOVICH	11	SPEC 0.9–1.94 $p\bar{p}$

¹Reanalysis of ADOMEIT 96 and ANISOVICH 00E.

 $B(a_0\pi)/B(a_2\pi)_{L=2}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.10±0.08	¹ ANISOVICH	11	SPEC 0.9–1.94 $p\bar{p}$

¹Reanalysis of ADOMEIT 96 and ANISOVICH 00E.

 $B(f_2\eta)/B(a_2\pi)_{L=2}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.13±0.06	¹ ANISOVICH	11	SPEC 0.9–1.94 $p\bar{p}$

¹Reanalysis of ADOMEIT 96 and ANISOVICH 00E.

 $f_3(2050)$ $I^G(J^{PC}) = 0^+(3^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2048±8	213 ± 34	ANISOVICH	00J	SPEC 2.0 $p\bar{p} \rightarrow \eta\pi^0\pi^0$

$f_0(2060)$ $I^G(J^{PC}) = 0^+(0^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
~ 2050	~ 120	¹ OAKDEN	94	RVUE 0.36–1.55 $\bar{p}p \rightarrow \pi\pi$
~ 2060	~ 50	¹ OAKDEN	94	RVUE 0.36–1.55 $\bar{p}p \rightarrow \pi\pi$

¹ See SEMENOV 99 and KLOET 96.

$\pi(2070)$ $I^G(J^{PC}) = 1^-(0^{-+})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2070 ± 35	310^{+100}_{-50}	ANISOVICH	01F SPEC	2.0 $\bar{p}p \rightarrow 3\pi^0, \pi^0\eta, \pi^0\eta'$

$X(2075)$ $I^G(J^{PC}) = ?^?(?^{??})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$2075 \pm 12 \pm 5$	$90 \pm 35 \pm 9$	¹ ABLIKIM	04J BES2	$J/\psi \rightarrow K^- p \bar{\Lambda}$

¹ From a fit in the region $M_{p\bar{\Lambda}} - M_p - M_{\Lambda} < 150$ MeV. S-wave in the $p\bar{\Lambda}$ system preferred. A similar near-threshold enhancement in the $p\bar{\Lambda}$ system is observed in $B^+ \rightarrow p\bar{\Lambda}\bar{D}^0$ by CHEN 11F.

$X(2080)$ $I^G(J^{PC}) = ?^?(?^{??})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2080 ± 10	110 ± 20	KREYMER	80 STRC	13 $\pi^- d \rightarrow p\bar{p}n(n_S)$

$X(2080)$ $I^G(J^{PC}) = ?^?(3^{-?})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2080 ± 10	190 ± 15	ROZANSKA	80 SPRK	18 $\pi^- p \rightarrow p\bar{p}n$

$a_1(2095)$ $I^G(J^{PC}) = 1^-(1^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$2096 \pm 17 \pm 121$	$451 \pm 41 \pm 81$	69k	KUHN	04 B852	18 $\pi^- p \rightarrow \eta\pi^+\pi^-\pi^-p$

 $B(a_1(2095) \rightarrow f_1(1285)\pi) / B(a_1(2095) \rightarrow a_1(1260))$

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
3.18 ± 0.64	69k	KUHN	04 B852	18 $\pi^- p \rightarrow \eta\pi^+\pi^-\pi^-p$

$\eta(2100)$ $I^G(J^{PC}) = 0^+(0^{-+})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2050^{+30+75}_{-24-26}	$250^{+36+181}_{-30-164}$		¹ ABLIKIM	16N BES3	$J/\psi \rightarrow \gamma K^+ K^- K^+ K^-$
2103 ± 50	187 ± 75	586	² BISELLO	89B DM2	$J/\psi \rightarrow 4\pi\gamma$

¹ From a partial wave analysis of $J/\psi \rightarrow \gamma\phi\phi$, for which the primary signal is $\eta(2225) \rightarrow \phi\phi$, and that also finds significant signals for for 0^{-+} phase space, $f_0(2100)$, $f_2(2010)$, $f_2(2300)$, $f_2(2340)$, and a previously unseen 0^{-+} state $X(2500)$ ($M = 2470^{+15+101}_{-19-23}$ MeV, $\Gamma = 230^{+64+56}_{-35-33}$ MeV).

² ASTON 81B sees no peak, has 850 events in Ajinenko+Barth bins. ARESTOV 80 sees no peak.

X(2100) $I^G(J^{PC}) = ??(0^{??})$		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>			
2100±40	250 ± 40	ALDE	86D GAM4	100 $\pi^- p \rightarrow 2\eta X$

X(2110) $I^G(J^{PC}) = 1^+(3^{-?})$		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>			
2110±10	330 ± 20	EVANGELIS...	79 OMEG	10,16 $\pi^- p \rightarrow \bar{p}pn$

f₂(2140) $I^G(J^{PC}) = 0^+(2^{++})$		<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>				
2141±12	49 ± 28	389	GREEN	86 MPSF	400 $pA \rightarrow 4KX$

X(2150) $I^G(J^{PC}) = ??(2^{+?})$		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>			
2150±10	260 ± 10	ROZANSKA	80 SPRK	18 $\pi^- p \rightarrow p\bar{p}n$

a₂(2175) $I^G(J^{PC}) = 1^-(2^{++})$		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>			
2175±40	310 ⁺⁹⁰ ₋₄₅	ANISOVICH	01F SPEC	2.0 $\bar{p}p \rightarrow 3\pi^0, \pi^0\eta, \pi^0\eta'$

η(2190) $I^G(J^{PC}) = 0^+(0^{-+})$		<u>DOCUMENT ID</u>	<u>TECN</u>
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>		
2190±50	850 ± 100	BUGG	99 BES

ω₂(2195) $I^G(J^{PC}) = 0^-(2^{--})$		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>			
2195±30	225 ± 40	¹ ANISOVICH	02B SPEC	0.6–1.9 $p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

¹ From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

ω(2205) $I^G(J^{PC}) = 0^-(1^{--})$		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>			
2205±30	350 ± 90	¹ ANISOVICH	02B SPEC	0.6–1.9 $p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

¹ From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

X(2210) $I^G(J^{PC}) = ??(???)$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2210^{+79}_{-21}	203^{+437}_{-87}	EVANGELIS...	79B	OMEG 10 $\pi^- p \rightarrow K^+ K^- n$

X(2210) $I^G(J^{PC}) = ??(???)$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2207 ± 22	130	CASO	70	HBC 11.2 $\pi^- p$

$h_1(2215)$ $I^G(J^{PC}) = 0^-(1^+ -)$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2215 ± 40	325 ± 55	¹ ANISOVICH	02B	SPEC 0.6–1.9 $p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

¹ From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

$\rho_2(2225)$ $I^G(J^{PC}) = 1^+(2^- -)$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2225 ± 35	335^{+100}_{-50}	¹ ANISOVICH	02	SPEC 0.6–1.9 $p\bar{p} \rightarrow \omega\pi^0, \omega\eta\pi^0, \pi^+\pi^-$

¹ From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

$\rho_4(2230)$ $I^G(J^{PC}) = 1^+(4^- -)$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2230 ± 25	210 ± 30	¹ ANISOVICH	02	SPEC 0.6–1.9 $p\bar{p} \rightarrow \omega\pi^0, \omega\eta\pi^0, \pi^+\pi^-$

¹ From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

$b_1(2240)$ $I^G(J^{PC}) = 1^+(1^+ -)$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2240 ± 35	320 ± 85	¹ ANISOVICH	02	SPEC 0.6–1.9 $p\bar{p} \rightarrow \omega\pi^0, \omega\eta\pi^0, \pi^+\pi^-$

¹ From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

$f_2(2240)$ $I^G(J^{PC}) = 0^+(2^+ +)$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2240 ± 15	241 ± 30	¹ ANISOVICH	00J	SPEC 1.92–2.41 $p\bar{p}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

~ 2226	~ 226	HASAN	94	RVUE $p\bar{p} \rightarrow \pi\pi$
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¹ From the combined analysis of ANISOVICH 99C, ANISOVICH 99F, ANISOVICH 99J, ANISOVICH 99K, and ANISOVICH 00B. See also ANISOVICH 12.

$b_3(2245)$ $I^G(J^{PC}) = 1^+(3^{+-})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>
2245 ± 50	320 ± 70	¹ BUGG	04C RVUE

¹From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

 $\eta_2(2250)$ $I^G(J^{PC}) = 0^+(2^{-+})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>
2248 ± 20	280 ± 20	ANISOVICH	00I SPEC
2267 ± 14	290 ± 50	ANISOVICH	00J SPEC

 $\pi_4(2250)$ $I^G(J^{PC}) = 1^-(4^{-+})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2250 ± 15	215 ± 25	ANISOVICH	01F SPEC	2.0 $\bar{p}p \rightarrow 3\pi^0, \pi^0\eta, \pi^0\eta'$

 $\omega_4(2250)$ $I^G(J^{PC}) = 0^-(4^{--})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2250 ± 30	150 ± 50	¹ ANISOVICH	02B SPEC	0.6–1.9 $p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

¹From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

 $\omega_5(2250)$ $I^G(J^{PC}) = 0^-(5^{--})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>
2250 ± 70	320 ± 95	¹ BUGG	04 RVUE

¹From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

 $\omega_3(2255)$ $I^G(J^{PC}) = 0^-(3^{--})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2255 ± 15	175 ± 30	¹ ANISOVICH	02B SPEC	0.6–1.9 $p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

¹From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

 $a_4(2255)$ $I^G(J^{PC}) = 1^-(4^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2237 ± 5	291 ± 12	UMAN	06 E835	5.2 $\bar{p}p \rightarrow \eta\eta\pi^0$
2255 ± 40	330 ⁺¹¹⁰ ₋₅₀	¹ ANISOVICH	01F SPEC	1.96–2.41 $\bar{p}p$

¹From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.

 $a_2(2255)$ $I^G(J^{PC}) = 1^-(2^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2255 ± 20	230 ± 15	¹ ANISOVICH	01G SPEC	1.96–2.41 $\bar{p}p$

¹From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, ANISOVICH 01F, and ANISOVICH 01G.

X(2260) $I^G(J^{PC}) = 0^+(4^{+?})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2260 ± 20	400 ± 100	EVANGELIS... 79	OMEG	10,16 $\pi^- p \rightarrow \bar{p} p n$

ρ (2270) $I^G(J^{PC}) = 1^+(1^{--})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2265 ± 40	325 ± 80	¹ ANISOVICH 02	SPEC	0.6–1.9 $p\bar{p} \rightarrow \omega\pi^0, \omega\eta\pi^0, \pi^+\pi^-$
2280 ± 50	440 ± 110	ATKINSON 85	OMEG	20–70 $\gamma p \rightarrow p\omega\pi^+\pi^-\pi^0$

¹From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

a_1 (2270) $I^G(J^{PC}) = 1^-(1^{++})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2270 ⁺⁵⁵ ₋₄₀	305 ⁺⁷⁰ ₋₄₀	ANISOVICH 01F	SPEC	2.0 $\bar{p}p \rightarrow 3\pi^0, \pi^0\eta, \pi^0\eta'$

h_3 (2275) $I^G(J^{PC}) = 0^-(3^{+-})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2275 ± 25	190 ± 45	¹ ANISOVICH 02B	SPEC	0.6–1.9 $p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

¹From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

a_3 (2275) $I^G(J^{PC}) = 1^-(3^{++})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2275 ± 35	350 ⁺¹⁰⁰ ₋₅₀	¹ ANISOVICH 01G	SPEC	1.96–2.41 $\bar{p}p$

¹From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, ANISOVICH 01F, and ANISOVICH 01G.

π_2 (2285) $I^G(J^{PC}) = 1^-(2^{-+})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2285 ± 20 ± 25	250 ± 20 ± 25	¹ ANISOVICH 11	SPEC	0.9–1.94 $p\bar{p}$

¹Reanalysis of ADOMEIT 96 and ANISOVICH 00E.

ω_3 (2285) $I^G(J^{PC}) = 0^-(3^{--})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2278 ± 28	224 ± 50	¹ BUGG 04A	RVUE	
2285 ± 60	230 ± 40	² ANISOVICH 02B	SPEC	0.6–1.9 $p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

¹Partial wave analysis of the data on $p\bar{p} \rightarrow \bar{\Lambda}\Lambda$ from BARNES 00.
²From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

ω (2290) $I^G(J^{PC}) = 0^-(1^{--})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2290 ± 20	275 ± 35	¹ BUGG 04A	RVUE	

¹Partial wave analysis of the data on $p\bar{p} \rightarrow \bar{\Lambda}\Lambda$ from BARNES 00.

$f_2(2295)$ $I^G(J^{PC}) = 0^+(2^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2293±13	216 ± 37	¹ ANISOVICH	00J SPEC	1.92–2.41 $\rho\bar{p}$

¹From the combined analysis of ANISOVICH 99C, ANISOVICH 99F, ANISOVICH 99J, ANISOVICH 99K, and ANISOVICH 00B. See also ANISOVICH 12.

$f_3(2300)$ $I^G(J^{PC}) = 0^+(3^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>
2334±25	200 ± 20	¹ BUGG	04A RVUE

¹Partial wave analysis of the data on $\rho\bar{p} \rightarrow \bar{\Lambda}\Lambda$ from BARNES 00.

$f_1(2310)$ $I^G(J^{PC}) = 0^+(1^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>
2310±60	255 ± 70	ANISOVICH	00J SPEC

$\eta(2320)$ $I^G(J^{PC}) = 0^+(0^{-+})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>
2320±15	230 ± 35	¹ ANISOVICH	00M SPEC

¹From the combined analysis of $\bar{p}p \rightarrow \eta\eta\eta$ from ANISOVICH 00M and $\bar{p}p \rightarrow \eta\pi^0\pi^0$ from ANISOVICH 00J.

$\eta_4(2330)$ $I^G(J^{PC}) = 0^+(4^{-+})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2328±38	240 ± 90	ANISOVICH	00J SPEC	2.0 $\rho\bar{p} \rightarrow \eta\pi^0\pi^0$

$\omega(2330)$ $I^G(J^{PC}) = 0^-(1^{--})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2330±30	435 ± 75	ATKINSON	88 OMEG	25–50 $\gamma p \rightarrow \rho^\pm \rho^0 \pi^\mp$

$X(2340)$ $I^G(J^{PC}) = ??(???)$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2340±20	180 ± 60	126	¹ BALTAY	75 HBC	15 $\pi^+ p \rightarrow p5\pi$

¹Dominant decay into $\rho^0\rho^0\pi^+$. BALTAY 78 finds confirmation in $2\pi^+\pi^-2\pi^0$ events which contain $\rho^+\rho^0\pi^0$ and $2\rho^+\pi^-$.

$\pi(2360)$ $I^G(J^{PC}) = 1^-(0^{-+})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2360±25	300^{+100}_{-50}	ANISOVICH	01F SPEC	2.0 $\bar{p}p \rightarrow 3\pi^0, \pi^0\eta, \pi^0\eta'$

X(2360) $I^G(J^{PC}) = ??(4^{+?})$		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>			
2360±10	430 ± 30	ROZANSKA 80	SPRK	18 $\pi^- p \rightarrow p\bar{p}n$

X(2440) $I^G(J^{PC}) = ??(5^{-?})$		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>			
2440±10	310 ± 20	ROZANSKA 80	SPRK	18 $\pi^- p \rightarrow p\bar{p}n$

a₆(2450) $I^G(J^{PC}) = 1^-(6^{++})$		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>			
2450±130	400 ± 250	CLELAND 82B	SPEC	50 $\pi p \rightarrow K_S^0 K^\pm p$

X(2540) $I^G(J^{PC}) = 0^+(0^{++})$		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>			
2539±14 ⁺³⁸ ₋₁₄	274 ⁺⁷⁷⁺¹²⁶ ₋₆₁₋₁₆₃	UEHARA 13	BELL	$\gamma\gamma \rightarrow K_S^0 K_S^0$

$\Gamma(\gamma\gamma) \times B(K\bar{K})$		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<u>VALUE (eV)</u>				
40 ⁺⁹⁺¹⁷ ₋₇₋₄₀		UEHARA 13	BELL	$\gamma\gamma \rightarrow K_S^0 K_S^0$

X(2632) $I^G(J^{PC}) = ??(???)$		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>			
2635.2±3.3		¹ EVDOKIMOV 04	SELX	X(2632) → $D_s^+ \eta$
2631.6±2.1	< 17	² EVDOKIMOV 04	SELX	X(2632) → $D_s^0 K^+$

¹ From a mass difference to D_s^+ of 666.9 ± 3.3 MeV.

² From a mass difference to D_s^0 of 767.0 ± 2.0 MeV.

$B(X(2632) \rightarrow D_s^0 K^+)/B(X(2632) \rightarrow D_s^+ \eta)$		<u>DOCUMENT ID</u>	<u>TECN</u>	
<u>VALUE</u>				
0.14±0.06		¹ EVDOKIMOV 04	SELX	

¹ Possible interpretation of this decay pattern is discussed by YASUI 07.

X(2680) $I^G(J^{PC}) = ??(???)$		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>			
2676±27	150	CASO 70	HBC	11.2 $\pi^- p \rightarrow \rho^- \pi^+ \pi^- p$

X(2710) $I^G(J^{PC}) = ??(6^{+?})$		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>			
2710±20	170 ± 40	ROZANSKA 80	SPRK	18 $\pi^- p \rightarrow p\bar{p}n$

X(2750) $I^G(J^{PC}) = ??(7^{-?})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2747 ± 32	195 ± 75	DENNEY	83	LASS 10 $\pi^+ p \rightarrow K^+ K^- \pi^+ p$

f₆(3100) $I^G(J^{PC}) = 0^+(6^{++})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
3100 ± 100	700 ± 130	BINON	05	GAMS 33 $\pi^- p \rightarrow \eta \eta n$

X(3250) $I^G(J^{PC}) = ??(???)$ 3-Body Decays

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
3250 ± 8 ± 20	45 ± 18	ALEEV	93	BIS2 X(3250) → $\Lambda \bar{p} K^+$
3265 ± 7 ± 20	40 ± 18	ALEEV	93	BIS2 X(3250) → $\bar{\Lambda} p K^-$

X(3250) $I^G(J^{PC}) = ??(???)$ 4-Body Decays

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
3245 ± 8 ± 20	25 ± 11	ALEEV	93	BIS2 X(3250) → $\Lambda \bar{p} K^+ \pi^\pm$
3250 ± 9 ± 20	50 ± 20	ALEEV	93	BIS2 X(3250) → $\bar{\Lambda} p K^- \pi^\mp$
3270 ± 8 ± 20	25 ± 11	ALEEV	93	BIS2 X(3250) → $K_S^0 p \bar{p} K^\pm$

X(3350) $I^G(J^{PC}) = ??(???)$

MASS (MeV)	WIDTH (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
3350 ⁺¹⁰ ₋₂₀ ± 20	70 ⁺⁴⁰ ₋₃₀ ± 40	50 ± 10	¹ GABYSHEV	06A	BELL $B^- \rightarrow \Lambda_c^+ \bar{p} \pi^-$

¹ A similar enhancement in the $\Lambda_c^+ \bar{p}$ final state is also reported by BABAR collaboration in AUBERT 10H.

Z_{cs}(4000)⁺ $I(J^P) = 1/2(1^+)$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
4003 ± 6 ⁺⁴ ₋₁₄	131 ± 15 ± 26	^{1,2} AAIJ	21E	LHCB $B^+ \rightarrow J/\psi \phi K^+$
3982.5 ^{+1.8} _{-2.6} ± 2.1	12.8 ^{+5.3} _{-4.4} ± 3.0	^{2,3} ABLIKIM	21G	BES3 $e^+ e^- \rightarrow K^+ (D_s^- D^{*0} + D_s^{*-} D^0)$

¹ From an amplitude analysis of the decay $B^+ \rightarrow J/\psi \phi K^+$ with a significance of 15 σ .

² Properties incompatible with a $q\bar{q}$ structure (exotic state). See the review on "Heavy Non- $q\bar{q}$ Mesons."

³ Pole mass, width for a mass-,width-dependent Breit-Wigner fit to the mass, width spectrum recoiling against K^+ at center of mass energies between 4.628 and 4.698 GeV, with a significance of 5.3 σ .

Z_{cs}(4220)⁺ $I(J^P) = 1/2(1^+)$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
4216 ± 24 ⁺⁴³ ₋₃₀	233 ± 52 ⁺⁹⁷ ₋₇₃	^{1,2} AAIJ	21E	LHCB $B^+ \rightarrow J/\psi \phi K^+$

¹ From an amplitude analysis of the decay $B^+ \rightarrow J/\psi \phi K^+$ with a significance of 5.9 σ .

² Properties incompatible with a $q\bar{q}$ structure (exotic state). See the review on "Heavy Non- $q\bar{q}$ Mesons."

X(6900)

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$6886 \pm 11 \pm 11$	$168 \pm 33 \pm 69$	¹ AAIJ	20AY LHCb	$p p \rightarrow J/\psi J/\psi X$

¹ Assuming the interference of a Breit-Wigner shape with non-resonant single-parton scattering. Without interference, the mass and width are $6905 \pm 11 \pm 7$ and $80 \pm 19 \pm 33$ MeV. State incompatible with a $q\bar{q}$ structure. See the review on "Heavy Non- $q\bar{q}$ Mesons."

REFERENCES for Further States

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