

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	² VLADIMIRSK...08	$40 \pi^- p \rightarrow K_S^0 K_S^0 n + m\pi^0$

² 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}	³ ANISOVICH 03	SPEC	
1530^{+90}_{-250}	560 ± 40	⁴ ANISOVICH 03	SPEC	

³ 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.

⁴ 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	$0 \bar{n}p \rightarrow \pi^+ \pi^+ \pi^-$

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

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>COMMENT</u>
1545 ± 3	6.0 ± 2.5	⁵ VLADIMIRSK...08	$40 \pi^- p \rightarrow K_S^0 K_S^0 n + m\pi^0$

⁵ Supersedes VLADIMIRSKII 00.

X(1575) $I^G(J^{PC}) = ??(1^{--})$					
MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT	
1576^{+49+98}_{-55-91}	$818^{+22+64}_{-23-133}$	⁶ ABLIKIM	06S BES	$J/\psi \rightarrow K^+ K^- \pi^0$	

⁶ 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	⁷ ALBRECHT	91F ARG	$10.2 e^+ e^- \rightarrow e^+ e^- 2(\pi^+ \pi^-)$	

⁷ 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	$32,38 \pi p \rightarrow \omega \eta n$

X(1730) $I^G(J^{PC}) = ??(??^+)$					
MASS (MeV)	WIDTH (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
$1731.0 \pm 1.2 \pm 2.0$	$3.2 \pm 0.8 \pm 1.3$	58	VLADIMIRSK...07	SPEC	$40 \pi^- p \rightarrow K_S^0 K_S^0 X$

X(1750) $I^G(J^{PC}) = ??(1^{--})$					
MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT	
$1753.5 \pm 1.5 \pm 2.3$	$122.2 \pm 6.2 \pm 8.0$	LINK	02K FOCS	$20-160 \gamma p \rightarrow K^+ K^- p$	

$$B(X(1750) \rightarrow \bar{K}^*(892)^0 K^0 \rightarrow K^\pm \pi^\mp K_S^0) / B(X(1750) \rightarrow K^+ K^-)$$

VALUE	CL%	DOCUMENT ID	TECN
< 0.065	90	LINK	02K FOCS

$$B(X(1750) \rightarrow \bar{K}^*(892)^\pm K^\mp \rightarrow K^\pm \pi^\mp K_S^0) / B(X(1750) \rightarrow K^+ K^-)$$

VALUE	CL%	DOCUMENT ID	TECN
< 0.183	90	LINK	02K FOCS

f₂(1750) $I^G(J^{PC}) = 0^+(2^{++})$					
MASS (MeV)	WIDTH (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1755 ± 10	67 ± 12	870	⁸ 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	⁹ SCHEGELSKY 06A	RVUE	$\gamma\gamma \rightarrow K_S^0 K_S^0$

$\Gamma(\gamma\gamma)$

<u>VALUE (keV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.13±0.04	870	⁹ SCHEGELSKY 06A	RVUE	$\gamma\gamma \rightarrow K_S^0 K_S^0$

$\Gamma(\pi\pi)$

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1.3±1.0	870	⁹ SCHEGELSKY 06A	RVUE	$\gamma\gamma \rightarrow K_S^0 K_S^0$

$\Gamma(\eta\eta)$

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2.0±0.5	870	⁹ SCHEGELSKY 06A	RVUE	$\gamma\gamma \rightarrow K_S^0 K_S^0$

⁸ From analysis of L3 data at 91 and 183–209 GeV.

⁹ From analysis of L3 data at 91 and 183–209 GeV and using SU(3) relations.

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

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

$f_0(1800)$ $I^G(J^{PC}) = 0^+(0^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1795 ± 7 ⁺²³ ₋₂₀	95 ± 10 ⁺⁷⁸ ₋₈₂	ABLIKIM	13J BES3	$J/\psi \rightarrow \gamma\omega\phi$
1812 ⁺¹⁹ ₋₂₆ ± 18	105 ± 20 ± 28	¹⁰ ABLIKIM	06J BES2	$J/\psi \rightarrow \gamma\omega\phi$

¹⁰ Not seen by LIU 09 in $B^\pm \rightarrow K^\pm\omega\phi$.

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

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

¹¹ This limit is center-of-mass energy dependent. We quote the most stringent one.

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

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

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

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

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

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1874±43±96	385 ± 121 ± 114	CHUNG	02 B852	18.3 $\pi^-\rho \rightarrow \pi^+\pi^-\pi^-\rho$

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

VALUE	DOCUMENT ID	TECN	COMMENT
0.8 ± 0.2	¹² CHUNG	02	B852 $18.3 \pi^- p \rightarrow \pi^+ \pi^- \pi^- p$

¹² Using the observable fractions of 50.0% $\rho\pi$, 56.5% $f_2\pi$, and 11.8% $\rho_3\pi$.

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

VALUE	DOCUMENT ID	TECN	COMMENT
0.9 ± 0.3	¹³ CHUNG	02	B852 $18.3 \pi^- p \rightarrow \pi^+ \pi^- \pi^- p$

¹³ Using the observable fractions of 50.0% $\rho\pi$, 56.5% $f_2\pi$, and 11.8% $\rho_3\pi$.

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

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

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

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
1940 ± 40	155 ± 40	¹⁴ ANISOVICH	02	SPEC $0.6-1.9 p\bar{p} \rightarrow \omega\pi^0, \omega\eta\pi^0, \pi^+\pi^-$

¹⁴ From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
1945 ± 20	115 ± 22	¹⁵ ANISOVICH	02B	SPEC $0.6-1.9 p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

¹⁵ From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
1950^{+30}_{-70}	180^{+30}_{-70}	¹⁶ ANISOVICH	01F	SPEC $1.96-2.41 \bar{p}p$

¹⁶ From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
1960 ± 25	195 ± 60	¹⁷ ANISOVICH	02B	SPEC $0.6-1.9 p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

¹⁷ 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	¹⁸ ANISOVICH 02	SPEC	0.6–1.9 $p\bar{p} \rightarrow \omega\pi^0, \omega\eta\pi^0, \pi^+\pi^-$

¹⁸ 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	¹⁹ ANISOVICH 02B	SPEC	0.6–1.9 $p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

¹⁹ 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>
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	²⁰ ANISOVICH 02B	SPEC	0.6–1.9 $p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

²⁰ 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	²¹ SCHEGELSKY 06	RVUE	$\gamma\gamma \rightarrow \pi^+\pi^-\pi^0$
2003 ± 10 ± 19	249 ± 23 ± 32		LU 05	B852	18 $\pi^- p \rightarrow \omega\pi^-\pi^0 p$

²¹ 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	²² SCHEGELSKY 06	RVUE	$\gamma\gamma \rightarrow \pi^+\pi^-\pi^0$

²² From analysis of L3 data at 183–209 GeV.

$\rho(2000)$		$I^G(J^{PC}) = 1^+(1^{--})$				
MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	TECN	COMMENT	
2000 ± 30	260 ± 45	²³ BUGG	04C	RVUE	Compilation	
~ 1988	~ 244	HASAN	94	RVUE	$\bar{p}p \rightarrow \pi\pi$	

²³ From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

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

$X(2000)$		$I^G(J^{PC}) = 1^-(??^+)$				
MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	CHG	COMMENT	
1964 ± 35	225 ± 50	²⁴ ARMSTRONG	93D	E760	$\bar{p}p \rightarrow 3\pi^0 \rightarrow 6\gamma$	
~ 2100	~ 500	²⁴ ANTIPOV	77	CIBS	- 25 $\pi^- p \rightarrow p\pi^- \rho_3$	
2214 ± 15	355 ± 21	²⁵ BALTAY	77	HBC	0 15 $\pi^- p \rightarrow \Delta^{++} 3\pi$	
2080 ± 40	340 ± 80	KALELKAR	75	HBC	+ 15 $\pi^+ p \rightarrow p\pi^+ \rho_3$	

²⁴ Cannot determine spin to be 3.

²⁵ BALTAY 77 favors $J^P = ,3^+$.

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

$\pi_2(2005)$		$I^G(J^{PC}) = 1^-(2^{-+})$				
MASS (MeV)	WIDTH (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT	
1974 ± 14 ± 83	341 ± 61 ± 139	145k	LU	05 B852	18 $\pi^- p \rightarrow \omega\pi^- \pi^0 p$	
2005 ± 15	200 ± 40		ANISOVICH	01F SPEC	2.0 $\bar{p}p \rightarrow 3\pi^0, \pi^0\eta, \pi^0\eta'$	

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

$\pi_1(2015)$		$I^G(J^{PC}) = 1^-(1^{-+})$				
MASS (MeV)	WIDTH (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT	
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	²⁶ ANISOVICH	02B	SPEC	0.6–1.9 $p \bar{p} \rightarrow \omega \eta, \omega \pi^0 \pi^0$

²⁶ 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	²⁷ ANISOVICH	02	SPEC	0.6–1.9 $p \bar{p} \rightarrow \omega \pi^0, \omega \eta \pi^0, \pi^+ \pi^-$

²⁷ From 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	²⁸ ANISOVICH	01F	SPEC	1.96–2.41 $\bar{p} p$

²⁸ From 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	²⁹ ANISOVICH	01F	SPEC	1.96–2.41 $\bar{p} p$

²⁹ From 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>		
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		³⁰ ANISOVICH	11	SPEC	0.9–1.94 $p \bar{p}$

³⁰ Reanalysis 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		³¹ ANISOVICH	11	SPEC	0.9–1.94 $p \bar{p}$

³¹ Reanalysis 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	³² ANISOVICH	11	SPEC 0.9–1.94 $p\bar{p}$

³² Reanalysis 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	³³ OAKDEN	94	RVUE 0.36–1.55 $\bar{p}p \rightarrow \pi\pi$
~ 2060	~ 50	³³ OAKDEN	94	RVUE 0.36–1.55 $\bar{p}p \rightarrow \pi\pi$

³³ 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>
$2075 \pm 12 \pm 5$	$90 \pm 35 \pm 9$	³⁴ ABLIKIM	04J	BES2 $J/\psi \rightarrow K^- p\bar{\Lambda}$

³⁴ 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 $\pi^- p \rightarrow \eta\pi^+\pi^-\pi^-\pi^- p$

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

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2103±50	187 ± 75	586	³⁵ BISELLO	89B DM2	$J/\psi \rightarrow 4\pi\gamma$

³⁵ 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>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2100±40	250 ± 40	ALDE	86D GAM4	100 $\pi^- p \rightarrow 2\eta X$

 $X(2110)$ $I^G(J^{PC}) = 1^+(3^{-?})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2110±10	330 ± 20	EVANGELIS...	79 OMEG	10,16 $\pi^- p \rightarrow \bar{p}pn$

 $f_2(2140)$ $I^G(J^{PC}) = 0^+(2^{++})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2141±12	49 ± 28	389	GREEN	86 MPSF	400 $pA \rightarrow 4KX$

 $X(2150)$ $I^G(J^{PC}) = ??(2^{+?})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2150±10	260 ± 10	ROZANSKA	80 SPRK	18 $\pi^- p \rightarrow p\bar{p}n$

 $a_2(2175)$ $I^G(J^{PC}) = 1^-(2^{++})$

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

 $\eta(2190)$ $I^G(J^{PC}) = 0^+(0^{-+})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>
2190±50	850 ± 100	BUGG	99 BES

 $\omega_2(2195)$ $I^G(J^{PC}) = 0^-(2^{--})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2195±30	225 ± 40	³⁶ ANISOVICH	02B SPEC	0.6–1.9 $p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

³⁶ From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

$\omega(2205)$ $I^G(J^{PC}) = 0^-(1^{--})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2205 ± 30	350 ± 90	³⁷ ANISOVICH	02B	SPEC 0.6–1.9 $p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

³⁷ From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

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

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2210 ⁺⁷⁹ ₋₂₁	203 ⁺⁴³⁷ ₋₈₇	EVANGELIS...	79B	OMEG 10 $\pi^- p \rightarrow K^+ K^- n$

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

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

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

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2215 ± 40	325 ± 55	³⁸ ANISOVICH	02B	SPEC 0.6–1.9 $p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

³⁸ From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

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

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2225 ± 35	335 ⁺¹⁰⁰ ₋₅₀	³⁹ ANISOVICH	02	SPEC 0.6–1.9 $p\bar{p} \rightarrow \omega\pi^0, \omega\eta\pi^0, \pi^+\pi^-$

³⁹ From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

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

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2230 ± 25	210 ± 30	⁴⁰ ANISOVICH	02	SPEC 0.6–1.9 $p\bar{p} \rightarrow \omega\pi^0, \omega\eta\pi^0, \pi^+\pi^-$

⁴⁰ From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

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

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2240 ± 35	320 ± 85	⁴¹ ANISOVICH	02	SPEC 0.6–1.9 $p\bar{p} \rightarrow \omega\pi^0, \omega\eta\pi^0, \pi^+\pi^-$

⁴¹ From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

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

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2240 ± 15	241 ± 30	⁴² 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 $p\bar{p} \rightarrow \pi\pi$

⁴² 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	⁴³ BUGG	04C RVUE

⁴³ From 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	⁴⁴ ANISOVICH	02B SPEC	$0.6\text{--}1.9 p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

⁴⁴ From 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	⁴⁵ BUGG	04 RVUE

⁴⁵ From 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	⁴⁶ ANISOVICH	02B SPEC	$0.6\text{--}1.9 p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

⁴⁶ From 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}	⁴⁷ ANISOVICH	01F SPEC	$1.96\text{--}2.41 \bar{p}p$

⁴⁷ From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2255 ± 20	230 ± 15	⁴⁸ ANISOVICH	01G SPEC	1.96–2.41 $\bar{p}p$

⁴⁸ From 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 $\pi^- p \rightarrow \bar{p}pn$

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2265 ± 40	325 ± 80	⁴⁹ 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 $\gamma p \rightarrow p\omega\pi^+\pi^-\pi^0$

⁴⁹ From 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	⁵⁰ ANISOVICH	02B SPEC	0.6–1.9 $p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

⁵⁰ From 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}	⁵¹ ANISOVICH	01G SPEC	1.96–2.41 $\bar{p}p$

⁵¹ From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, ANISOVICH 01F, and ANISOVICH 01G.

$\pi_2(2285)$ $I^G(J^{PC}) = 1^-(2^{-+})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
$2285 \pm 20 \pm 25$	$250 \pm 20 \pm 25$	⁵² ANISOVICH	11 SPEC	0.9–1.94 $p\bar{p}$

⁵² Reanalysis of ADOMEIT 96 and ANISOVICH 00E.

$\omega_3(2285)$ $I^G(J^{PC}) = 0^-(3^{--})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2278±28	224 ± 50	⁵³ BUGG	04A	RVUE
2285±60	230 ± 40	⁵⁴ ANISOVICH	02B	SPEC 0.6–1.9 $p\bar{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

⁵³ Partial wave analysis of the data on $p\bar{p} \rightarrow \bar{\Lambda}\Lambda$ from BARNES 00.
⁵⁴ From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

$\omega(2290)$ $I^G(J^{PC}) = 0^-(1^{--})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>
2290±20	275 ± 35	⁵⁵ BUGG	04A RVUE

⁵⁵ Partial 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	⁵⁶ ANISOVICH	00J	SPEC 1.92–2.41 $p\bar{p}$

⁵⁶ From 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	⁵⁷ BUGG	04A RVUE

⁵⁷ Partial wave analysis of the data on $p\bar{p} \rightarrow \bar{\Lambda}\Lambda$ 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	⁵⁸ ANISOVICH	00M SPEC

⁵⁸ From 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 $p\bar{p} \rightarrow \eta\pi^0\pi^0$

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

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

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

MASS (MeV)	WIDTH (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
2340±20	180 ± 60	126	⁵⁹ BALTAY	75	HBC 15 $\pi^+ p \rightarrow p 5\pi$

⁵⁹ Dominant 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 $2\rho^+ \pi^-$.

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

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

$X(2360)$ $I^G(J^{PC}) = ?^?(4^{+?})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2360±10	430 ± 30	ROZANSKA	80	SPRK 18 $\pi^- p \rightarrow p \bar{p} n$

$X(2440)$ $I^G(J^{PC}) = ?^?(5^{-?})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2440±10	310 ± 20	ROZANSKA	80	SPRK 18 $\pi^- p \rightarrow p \bar{p} n$

$X(2540)$ $I^G(J^{PC}) = 0^+(0^{++})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2539±14 $^{+38}_{-14}$	$274^{+77+126}_{-61-163}$	UEHARA	13	BELL $\gamma\gamma \rightarrow K_S^0 K_S^0$

 $\Gamma(\gamma\gamma) \times B(K\bar{K})$

VALUE (eV)	DOCUMENT ID	TECN	COMMENT
40^{+9+17}_{-7-40}	UEHARA	13	BELL $\gamma\gamma \rightarrow K_S^0 K_S^0$

$X(2632)$ $I^G(J^{PC}) = ?^?(?^{??})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
2635.2±3.3		⁶⁰ EVDOKIMOV	04	SELX $X(2632) \rightarrow D_S^+ \eta$
2631.6±2.1	< 17	⁶¹ EVDOKIMOV	04	SELX $X(2632) \rightarrow D_S^0 K^+$

⁶⁰ From a mass difference to D_S^+ of 666.9 ± 3.3 MeV.

⁶¹ From a mass difference to D_S^0 of 767.0 ± 2.0 MeV.

$B(X(2632) \rightarrow D^0 K^+)/B(X(2632) \rightarrow D_s^+ \eta)$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>
0.14 ± 0.06	⁶² EVDOKIMOV 04	SELX

⁶² Possible interpretation of this decay pattern is discussed by YASUI 07.

X(2680) $I^G(J^{PC}) = ?^?(?^{??})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2676 ± 27	150	CASO	70 HBC	$11.2 \pi^- p \rightarrow \rho^- \pi^+ \pi^- p$

X(2710) $I^G(J^{PC}) = ?^?(6^{+?})$

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2710 ± 20	170 ± 40	ROZANSKA	80 SPRK	$18 \pi^- p \rightarrow \rho \bar{p} n$

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

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

$f_6(3100)$ $I^G(J^{PC}) = 0^+(6^{++})$

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

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

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

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

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

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

<u>MASS (MeV)</u>	<u>WIDTH (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$3350_{-20}^{+10} \pm 20$	$70_{-30}^{+40} \pm 40$	50 ± 10	⁶³ GABYSHEV 06A	BELL	$B^- \rightarrow \Lambda_c^+ \bar{p} \pi^-$

⁶³ A similar enhancement in the $\Lambda_c^+ \bar{p}$ final state is also reported by BABAR collaboration in AUBERT 10H.

REFERENCES for Further States

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UEHARA	13	PTEP 2013 123C01	S. Uehara <i>et al.</i>	(BELLE Collab.)
ANISOVICH	12	PR D85 014001	A.V. Anisovich <i>et al.</i>	
ANASHIN	11	PL B703 543	V.V. Anashin <i>et al.</i>	(KEDR Collab.)
ANISOVICH	11	EPJ C71 1511	A.V. Anisovich <i>et al.</i>	(LOQM, RAL, PNPI)
CHEN	11F	PR D84 071501	P. Chen <i>et al.</i>	(BELLE Collab.)
AUBERT	10H	PR D82 031102	B. AUBERT <i>et al.</i>	(BABAR Collab.)
ABRAAMYAN	09	PR C80 034001	Kh.U. Abraamyan <i>et al.</i>	
LIU	09	PR D79 071102	C. Liu <i>et al.</i>	(BELLE Collab.)
VLADIMIRSK...	08	PAN 71 2129	V.V. Vladimirsky <i>et al.</i>	(ITEP)
VLADIMIRSK...	07	Translated from YAF 71 2166. PAN 70 1706	V. Vladimirsky <i>et al.</i>	
YASUI	07	PR D76 034009	S. Yasui, M. Oka	
ABLIKIM	06J	PRL 96 162002	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	06S	PRL 97 142002	M. Ablikim <i>et al.</i>	(BES Collab.)
GABYSHEV	06A	PRL 97 242001	N. Gabyshev <i>et al.</i>	(BELLE Collab.)
SCHEGELSKY	06	EPJ A27 199	V.A. Schegelsky <i>et al.</i>	
SCHEGELSKY	06A	EPJ A27 207	V.A. Schegelsky <i>et al.</i>	
UMAN	06	PR D73 052009	I. Uman <i>et al.</i>	(FNAL E835)
VLADIMIRSK...	06	PAN 69 493	V.V. Vladimirsky <i>et al.</i>	(ITEP, Moscow)
BINON	05	Translated from YAF 69 515. PAN 68 960	F. Binon <i>et al.</i>	
GRIGOR'EV	05	Translated from YAF 68 998. PAN 68 1271	V.K. Grigor'ev <i>et al.</i>	(ITEP)
LU	05	Translated from YAF 68 1324. PRL 94 032002	M. Lu <i>et al.</i>	(BNL E852 Collab.)
ABLIKIM	04J	PRL 93 112002	M. Ablikim <i>et al.</i>	(BES Collab.)
BUGG	04	PL B595 556 (errat.)	D.V. Bugg	
BUGG	04A	EPJ C36 161	D.V. Bugg	
BUGG	04C	PRPL 397 257	D.V. Bugg	
EVDOKIMOV	04	PRL 93 242001	A.V. Evdokimov <i>et al.</i>	(SELEX Collab.)
KUHN	04	PL B595 109	J. Kuhn <i>et al.</i>	(BNL E852 Collab.)
ANISOVICH	03	EPJ A16 229	V.V. Anisovich <i>et al.</i>	
VLADIMIRSK...	03	PAN 66 700	V.V. Vladimirsky <i>et al.</i>	
ANISOVICH	02	Translated from YAF 66 729. PL B542 8	A.V. Anisovich <i>et al.</i>	
ANISOVICH	02B	PL B542 19	A.V. Anisovich <i>et al.</i>	
CHUNG	02	PR D65 072001	S.U. Chung <i>et al.</i>	(BNL E852 Collab.)
LINK	02K	PL B545 50	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
ANISOVICH	01C	PL B507 23	A.V. Anisovich <i>et al.</i>	
ANISOVICH	01D	PL B508 6	A.V. Anisovich <i>et al.</i>	
ANISOVICH	01E	PL B513 281	A.V. Anisovich <i>et al.</i>	
ANISOVICH	01F	PL B517 261	A.V. Anisovich <i>et al.</i>	
ANISOVICH	01G	PL B517 273	A.V. Anisovich <i>et al.</i>	
ANISOVICH	00B	NP A662 319	A.V. Anisovich <i>et al.</i>	
ANISOVICH	00D	PL B476 15	A.V. Anisovich <i>et al.</i>	
ANISOVICH	00E	PL B477 19	A.V. Anisovich <i>et al.</i>	
ANISOVICH	00I	PL B491 40	A.V. Anisovich <i>et al.</i>	
ANISOVICH	00J	PL B491 47	A.V. Anisovich <i>et al.</i>	
ANISOVICH	00M	PL B496 145	A.V. Anisovich <i>et al.</i>	
BARNES	00	PR C62 055203	P.D. Barnes <i>et al.</i>	
FILIPPI	00	PL B495 284	A. Filippi <i>et al.</i>	(OBELIX Experiment)
VLADIMIRSKII	00	JETPL 72 486	V.V. Vladimirskii <i>et al.</i>	
ANISOVICH	99C	Translated from ZETFP 72 698. PL B452 173	A.V. Anisovich <i>et al.</i>	
ANISOVICH	99E	PL B452 187	A.V. Anisovich <i>et al.</i>	
ANISOVICH	99F	NP A651 253	A.V. Anisovich <i>et al.</i>	
ANISOVICH	99J	PL B471 271	A.V. Anisovich <i>et al.</i>	
ANISOVICH	99K	PL B468 309	A.V. Anisovich <i>et al.</i>	
BUGG	99	PL B458 511	D.V. Bugg <i>et al.</i>	
FERRER	99	EPJ C10 249	A. Ferrer <i>et al.</i>	
SEMENOV	99	SPU 42 847	S.V. Semenov	
ADOMEIT	96	Translated from UFN 42 937. ZPHY C71 227	J. Adomeit <i>et al.</i>	(Crystal Barrel Collab.)
KLOET	96	PR D53 6120	W.M. Kloet, F. Myhrer	(RUTG, NORD)
PROKOSHKIN	96	SPD 41 247	Y.D. Prokoshkin, V.D. Samoilenko	(SERP)
		Translated from DANS 348 481.		

HASAN	94	PL B334 215	A. Hasan, D.V. Bugg	(LOQM)
OAKDEN	94	NP A574 731	M.N. Oakden, M.R. Pennington	(DURH)
ALEEV	93	PAN 56 1358	A.N. Aleev <i>et al.</i>	(BIS-2 Collab.)
ARMSTRONG	93D	PL B307 399	T.A. Armstrong <i>et al.</i>	(FNAL, FERR, GENO+)
ALBRECHT	91F	ZPHY C50 1	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
CONDO	91	PR D43 2787	G.T. Condo <i>et al.</i>	(SLAC Hybrid Collab.)
BISELLO	89B	PR D39 701	G. Busetto <i>et al.</i>	(DM2 Collab.)
ATKINSON	88	ZPHY C38 535	M. Atkinson <i>et al.</i>	(BONN, CERN, GLAS+)
DAFTARI	87	PRL 58 859	I.K. Daftari <i>et al.</i>	(SYRA)
ALDE	86D	NP B269 485	D.M. Alde <i>et al.</i>	(BELG, LAPP, SERP, CERN+)
BRIDGES	86D	PL B180 313	D.L. Bridges <i>et al.</i>	(SYRA, BNL, CASE+)
GREEN	86	PRL 56 1639	D.R. Green <i>et al.</i>	(FNAL, ARIZ, FSU+)
ATKINSON	85	ZPHY C29 333	M. Atkinson <i>et al.</i>	(BONN, CERN, GLAS+)
DENNEY	83	PR D28 2726	D.L. Denney <i>et al.</i>	(IOWA, MICH)
ASTON	81B	NP B189 205	D. Aston <i>et al.</i>	(BONN, CERN, EPOL, GLAS+)
ARESTOV	80	IHEP 80-165	Y.I. Arestov <i>et al.</i>	(SERP)
CHLIAPNIK...	80	ZPHY C3 285	P.V. Chliapnikov <i>et al.</i>	(SERP, BRUX, MONS)
KREYMER	80	PR D22 36	A.E. Kreymer <i>et al.</i>	(IND, PURD, SLAC+)
ROZANSKA	80	NP B162 505	M. Rozanska <i>et al.</i>	(MPIM, CERN)
EVANGELIS...	79	NP B153 253	C. Evangelista <i>et al.</i>	(BARI, BONN, CERN+)
EVANGELIS...	79B	NP B154 381	C. Evangelista <i>et al.</i>	(BARI, BONN, CERN+)
BALTAY	78	PR D17 52	C. Baltay <i>et al.</i>	(COLU, BING)
ANTIPOV	77	NP B119 45	Y.M. Antipov <i>et al.</i>	(SERP, GEVA)
BALTAY	77	PRL 39 591	C. Baltay, C.V. Cautis, M. Kalelkar	(COLU)
BALTAY	75	PRL 35 891	C. Baltay <i>et al.</i>	(COLU, BING)
KALELKAR	75	Thesis Nevis 207	M.S. Kalelkar	(COLU)
CASO	70	LNC 3 707	C. Caso <i>et al.</i>	(GENO, HAMB, MILA, SACL)