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

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

MASS (MeV)	WIDTH (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
$360 \pm 7 \pm 9$	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.

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		COMMENT
1072 ± 1	3.5 ± 0.5	[2] VLADIMIRSK...08		40 $\pi^- p \rightarrow K^0_S K^0_S n + m\pi^0$

[2] Supersedes GRIGOR'EV 05.

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

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

$f_0(1200\text{–}1600)$ $I^G(J^{PC}) = 0^+(0^{++})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
1323 ± 8	237 ± 20	VLADIMIRSK...06		SPEC	40 $\pi^- p \rightarrow K^0_S K^0_S n$
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 $\pi^- p \rightarrow \pi^0\pi^0 n$, $\pi^- p \rightarrow K\overline{K} n$, $\pi^+\pi^- \rightarrow \pi^+\pi^-$, $\overline{p}p \rightarrow \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$, $\pi^+\pi^-\pi^0$, $K^+K^-\pi^0$, $K^0_S K^0_S \pi^0$, $K^+ K^0_S \pi^-$ at rest, $\overline{p}n \rightarrow \pi^-\pi^-\pi^+$, $K^0_S K^-\pi^0$, $K^0_S K^0_S \pi^-$ at rest.

[4] K-matrix pole from combined analysis of $\pi^- p \rightarrow \pi^0\pi^0 n$, $\pi^- p \rightarrow K\overline{K} n$, $\overline{p}p \rightarrow \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$ at rest.

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

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		COMMENT
1545 ± 3	6.0 ± 2.5	[5] VLADIMIRSK...08		40 $\pi^- p \rightarrow K^0_S K^0_S n + m\pi^0$

[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	$J/\psi \to K^+K^-\pi^0$

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

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1600 ± 100	400 ± 200	[7] ALBRECHT	91F	ARG	$10.2\ e^+e^- \to e^+e^-2(\pi^+\pi^-)$

[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	$32,38\ \pi p \to \omega\eta n$

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

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	$40\ \pi^- p \to K^0_S K^0_S X$

$X(1750)$ $I^G(J^{PC}) = ?^?(1^{--})$

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	$20\text{–}160\ \gamma p \to K^+K^-p$

$B(X(1750) \to \overline{K}^*(892)^0 K^0 \to K^\pm\pi^\mp K^0_S)/B(X(1750) \to K^+K^-)$

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

$B(X(1750) \to \overline{K}^*(892)^\pm K^\mp \to K^\pm\pi^\mp K^0_S)/B(X(1750) \to K^+K^-)$

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

$f_2(1750)$ $I^G(J^{PC}) = 0^+(2^{++})$

MASS (MeV)	*WIDTH* (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1755 ± 10	67 ± 12	870	[8] SCHEGELSKY	06A	RVUE	$\gamma\gamma \to K^0_S K^0_S$

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

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
17 ± 5	870	[9] SCHEGELSKY	06A	RVUE	$\gamma\gamma \to K^0_S K^0_S$

Γ(γγ)

VALUE (keV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.13±0.04	870	[9] SCHEGELSKY	06A	RVUE	$\gamma\gamma \rightarrow K^0_S K^0_S$

Γ(ππ)

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.3±1.0	870	[9] SCHEGELSKY	06A	RVUE	$\gamma\gamma \rightarrow K^0_S K^0_S$

Γ(ηη)

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2.0±0.5	870	[9] SCHEGELSKY	06A	RVUE	$\gamma\gamma \rightarrow K^0_S K^0_S$

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

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

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

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

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

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

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

B(a_3(1875) → f_2(1270)π)/B(a_3(1875) → ρπ)

VALUE	*DOCUMENT ID*			*TECN*	*COMMENT*
0.8±0.2	[10] CHUNG		02	B852	18.3 $\pi^- p \rightarrow \pi^+\pi^-\pi^- p$

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

B(a_3(1875) → ρ_3(1690)π)/B(a_3(1875) → ρπ)

VALUE	*DOCUMENT ID*			*TECN*	*COMMENT*
0.9±0.3	[11] CHUNG		02	B852	18.3 $\pi^- p \rightarrow \pi^+\pi^-\pi^- p$

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

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

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

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

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
1940±40	155 ± 40	[12] ANISOVICH	02	SPEC	0.6–1.9 $p\overline{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$

[12] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
1945±20	115 ± 22	[13] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \to \omega\eta$, $\omega\pi^0\pi^0$

[13] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
1950^{+30}_{-70}	180^{+30}_{-70}	[14] ANISOVICH	01F	SPEC	1.96–2.41 $\overline{p}p$

[14] From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
1960±25	195 ± 60	[15] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \to \omega\eta$, $\omega\pi^0\pi^0$

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
1960±35	230 ± 50	[16] ANISOVICH	02	SPEC	0.6–1.9 $p\overline{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$

[16] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1965±45	345 ± 75	[17] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \to \omega\eta, \omega\pi^0\pi^0$

[17] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*
1971±15	240 ± 45	ANISOVICH	00J	SPEC

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1970±10	40 ± 20	CHLIAPNIK...	80	HBC	32 $K^+ p \to 2K^0_S 2\pi X$

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

MASS (MeV)	*WIDTH* (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1973±15	80	30	CASO	70	HBC	11.2 $\pi^- p \to \rho 2\pi$

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1975±20	175 ± 25	[18] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \to \omega\eta, \omega\pi^0\pi^0$

[18] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

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

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

[19] From analysis of L3 data at 183–209 GeV.

$\Gamma(\gamma\gamma)\,\Gamma(\pi^+\pi^-\pi^0)$ / Γ(total)

VALUE (keV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.11±0.04±0.05	18k	[20] SCHEGELSKY	06	RVUE	$\gamma\gamma \to \pi^+\pi^-\pi^0$

[20] From analysis of L3 data at 183–209 GeV.

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
2000±30	260 ± 45	[21] BUGG	04C	RVUE	Compilation
~ 1988	~ 244	HASAN	94	RVUE	$\overline{p}p \to \pi\pi$

[21] 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*	*COMMENT*
2001 ± 10	312 ± 32	ANISOVICH	00J	SPEC	
~ 1996	~ 134	HASAN	94	RVUE	$\overline{p}p \rightarrow \pi\pi$

$X(2000)$ $I^G(J^{PC}) = 1^-(?^{?+})$

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
1964 ± 35	225 ± 50	[22] ARMSTRONG	93D	E760		$\overline{p}p \rightarrow 3\pi^0 \rightarrow 6\gamma$
~ 2100	~ 500	[22] ANTIPOV	77	CIBS	$-$	$25\ \pi^- p \rightarrow p\pi^- \rho_3$
2214 ± 15	355 ± 21	[23] BALTAY	77	HBC	0	$15\ \pi^- p \rightarrow \Delta^{++} 3\pi$
2080 ± 40	340 ± 80	KALELKAR	75	HBC	$+$	$15\ \pi^+ p \rightarrow p\pi^+ \rho_3$

[22] Cannot determine spin to be 3.
[23] BALTAY 77 favors $J^P = ,3^+$.

$X(2000)$ $I^G(J^{PC}) = ?^?(4^{++})$

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*	*TECN*	*COMMENT*
$1998 \pm 3 \pm 5$	<15	VLADIMIRSK...03	SPEC	$\pi^- p \rightarrow K^0_S K^0_S M M$

$\pi_2(2005)$ $I^G(J^{PC}) = 1^-(2^{-+})$

MASS (MeV)	*WIDTH* (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
$1974 \pm 14 \pm 83$	$341 \pm 61 \pm 139$	145k	LU	05	B852	$18\ \pi^- p \rightarrow \omega\pi^-\pi^0 p$
2005 ± 15	200 ± 40		ANISOVICH	01F	SPEC	$2.0\ \overline{p}p \rightarrow 3\pi^0,\ \pi^0\eta,$ $\pi^0\eta'$

$\eta(2010)$ $I^G(J^{PC}) = 0^+(0^{-+})$

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*
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*
$2014 \pm 20 \pm 16$	$230 \pm 32 \pm 73$	145k	LU	05	B852	$18\ \pi^- p \rightarrow \omega\pi^-\pi^0 p$
$2001 \pm 30 \pm 92$	$333 \pm 52 \pm 49$	69k	KUHN	04	B852	$18\ \pi^- p \rightarrow \eta\pi^+\pi^-\pi^- p$

$a_0(2020)$ $I^G(J^{PC}) = 1^-(0^{++})$

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*
2025 ± 30	330 ± 75	ANISOVICH	99C	SPEC

$X(2020)$ $I^G(J^{PC}) = ?^?(?^{??})$

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
2015±3	10 ± 4	FERRER	99	RVUE	$\pi p \rightarrow p p \overline{p} \pi(\pi)$

$h_3(2025)$ $I^G(J^{PC}) = 0^-(3^{+-})$

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
2025±20	145 ± 30	[24] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

[24] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
2032±12	117 ± 11	[25] ANISOVICH	02	SPEC	0.6–1.9 $p\overline{p} \rightarrow \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$

[25] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
2030±20	205 ± 30	[26] ANISOVICH	01F	SPEC	1.96–2.41 $\overline{p}p$

[26] From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
2031±12	150 ± 18	[27] ANISOVICH	01F	SPEC	1.96–2.41 $\overline{p}p$

[27] From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*
2030±5±15	205 ± 10 ± 15	ANISOVICH	00E	SPEC

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

VALUE	*DOCUMENT ID*		*TECN*
0.74±0.17	[28] ANISOVICH	00E	SPEC

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

VALUE	*DOCUMENT ID*		*TECN*
0.072±0.016	[28] ANISOVICH	00E	SPEC

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

VALUE	*DOCUMENT ID*		*TECN*
0.074 ± 0.026	[28] ANISOVICH	00E	SPEC

[28] Corrected for all decay modes.

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

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

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
~ 2050	~ 120	[29] OAKDEN	94	RVUE	0.36–1.55 $\overline{p}p \rightarrow \pi\pi$
~ 2060	~ 50	[29] OAKDEN	94	RVUE	0.36–1.55 $\overline{p}p \rightarrow \pi\pi$

[29] See SEMENOV 99 and KLOET 96.

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

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

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
$2075 \pm 12 \pm 5$	$90 \pm 35 \pm 9$	[30] ABLIKIM	04J	BES2	$J/\psi \rightarrow K^- p\overline{\Lambda}$

[30] From a fit in the region $M_{p\overline{\Lambda}} - M_p - M_\Lambda < 150$ MeV. S-wave in the $p\overline{\Lambda}$ system preferred.

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
2080 ± 10	110 ± 20	KREYMER	80	STRC	13 $\pi^- d \rightarrow p\overline{p}n(n_s)$

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

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

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

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

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

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

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

MASS (MeV)	WIDTH (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
2103±50	187 ± 75	586	[31] BISELLO	89B	DM2	$J/\psi \rightarrow 4\pi\gamma$

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

$X(2100)$ $I^G(J^{PC}) = ?^?(0^{??})$

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
2110±10	330 ± 20	EVANGELIS...	79	OMEG	10,16 $\pi^- p \rightarrow \overline{p} p n$

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

MASS (MeV)	WIDTH (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
2141±12	49 ± 28	389	GREEN	86	MPSF	400 pA $\rightarrow 4K X$

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

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
2175±40	310^{+90}_{-45}	ANISOVICH	01F	SPEC	2.0 $\overline{p}p \rightarrow 3\pi^0$, $\pi^0\eta$, $\pi^0\eta'$

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

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
2195±30	225 ± 40	[32] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \rightarrow \omega\eta$, $\omega\pi^0\pi^0$

[32] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
2205 ± 30	350 ± 90	[33] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \to \omega\eta$, $\omega\pi^0\pi^0$

[33] 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 $\pi^- p \to K^+ K^- n$

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

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	[34] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \to \omega\eta$, $\omega\pi^0\pi^0$

[34] 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}	[35] ANISOVICH	02	SPEC	0.6–1.9 $p\overline{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$

[35] 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	[36] ANISOVICH	02	SPEC	0.6–1.9 $p\overline{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$

[36] 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	[37] ANISOVICH	02	SPEC	0.6–1.9 $p\overline{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$

[37] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

$\pi_2(2245)$ $I^G(J^{PC}) = 1^-(2^{-+})$

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
2245 ± 60	$320^{+100}_{-\ 40}$	ANISOVICH	01F	SPEC	2.0 $\overline{p}p \rightarrow\ 3\pi^0,\ \pi^0\eta,\ \pi^0\eta'$

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*
2245 ± 50	320 ± 70	[38] BUGG	04C	RVUE

[38] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

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

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

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

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

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
2250 ± 30	150 ± 50	[39] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \rightarrow\ \omega\eta,\ \omega\pi^0\pi^0$

[39] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*
2250 ± 70	320 ± 95	[40] BUGG	04	RVUE

[40] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
2255 ± 15	175 ± 30	[41] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \rightarrow\ \omega\eta,\ \omega\pi^0\pi^0$

[41] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
2237 ± 5 OUR AVERAGE					
2237 ± 5	291 ± 12	UMAN	06	E835	5.2 $\overline{p}p \rightarrow\ \eta\eta\pi^0$
2255 ± 40	$330^{+110}_{-\ 50}$	[42] ANISOVICH	01F	SPEC	1.96–2.41 $\overline{p}p$

[42] 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	[43] ANISOVICH	01G	SPEC	1.96–2.41 $\overline{p}p$

[43] 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 $\pi^- p \rightarrow \overline{p}pn$

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
2265 ± 40	325 ± 80	[44] ANISOVICH	02	SPEC	0.6–1.9 $p\overline{p} \rightarrow \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$
2280 ± 50	440 ± 110	ATKINSON	85	OMEG	20–70 $\gamma p \rightarrow p\omega\pi^+\pi^-\pi^0$

[44] 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 $\overline{p}p \rightarrow 3\pi^0$, $\pi^0\eta$, $\pi^0\eta'$

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

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

[45] 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}	[46] ANISOVICH	01G	SPEC	1.96–2.41 $\overline{p}p$

[46] From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, ANISOVICH 01F, and ANISOVICH 01G.

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
2278 ± 28	224 ± 50	[47] BUGG	04A	RVUE	
2285 ± 60	230 ± 40	[48] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \rightarrow \omega\eta$, $\omega\pi^0\pi^0$

[47] Partial wave analysis of the data on $p\overline{p} \to \overline{\Lambda}\Lambda$ from BARNES 00.
[48] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B.

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*
2290 ± 20	275 ± 35	[49] BUGG	04A	RVUE

[49] Partial wave analysis of the data on $p\overline{p} \to \overline{\Lambda}\Lambda$ from BARNES 00.

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
2334 ± 25	200 ± 20	[50] BUGG	04A	RVUE	
2303 ± 15	214 ± 29	ANISOVICH	00J	SPEC	2.0 $p\overline{p} \to \eta\pi^0\pi^0$

[50] Partial wave analysis of the data on $p\overline{p} \to \overline{\Lambda}\Lambda$ from BARNES 00.

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*
2310 ± 60	255 ± 70	ANISOVICH	00J	SPEC

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*
2320 ± 15	230 ± 35	[51] ANISOVICH	00M	SPEC

[51] From the combined analysis of $\overline{p}p \to \eta\eta\eta$ from ANISOVICH 00M and $\overline{p}p \to \eta\pi^0\pi^0$ from ANISOVICH 00J.

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

MASS (MeV)	*WIDTH* (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
2328 ± 38	240 ± 90	ANISOVICH	00J	SPEC	2.0 $p\overline{p} \to \eta\pi^0\pi^0$

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

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

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

MASS (MeV)	*WIDTH* (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2340 ± 20	180 ± 60	126	[52] BALTAY	75	HBC	15 $\pi^+ p \to p5\pi$

[52] 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 $\overline{p}p \rightarrow\ 3\pi^0,\ \pi^0\eta,\ \pi^0\eta'$

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

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

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

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
2635.2 ± 3.3		[53] EVDOKIMOV	04	SELX	$X(2632) \rightarrow\ D_s^+\eta$
2631.6 ± 2.1	< 17	[54] EVDOKIMOV	04	SELX	$X(2632) \rightarrow\ D^0K^+$

[53] From a mass difference to D_s^+ of 666.9 ± 3.3 MeV.

[54] From a mass difference to D^0 of 767.0 ± 2.0 MeV.

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

VALUE	DOCUMENT ID		TECN
0.14 ± 0.06	[55] EVDOKIMOV	04	SELX

[55] Possible interpretation of this decay pattern is discussed by YASUI 07.

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

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

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

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

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

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

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

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*
$3250 \pm 8 \pm 20$	45 ± 18	ALEEV	93	BIS2	$X(3250) \rightarrow \Lambda\overline{p}K^+$
$3265 \pm 7 \pm 20$	40 ± 18	ALEEV	93	BIS2	$X(3250) \rightarrow \overline{\Lambda}pK^-$

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

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

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

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

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