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±7±9	64 ± 18	2.3k	[1] ABRAAMYAN 09	CNTR	2.75 $d C \to \gamma\gamma X$

[1] Not seen in $p C \to \gamma\gamma X$ 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	[1] VLADIMIRSK...08	40 $\pi^- p \to K^0_S K^0_S n + \mathrm{m}\pi^0$

[1] Supersedes GRIGOR'EV 05.

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

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

---

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

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

[2] K-matrix pole from combined analysis of $\pi^- p \to \pi^0 \pi^0 n$, $\pi^- p \to K \overline{K} n$, $\overline{p} p \to \pi^0 \pi^0 \pi^0$, $\pi^0 \eta\eta$, $\pi^0 \pi^0 \eta$ 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 $\overline{n} p \to \pi^+ \pi^+ \pi^-$

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	COMMENT
1545±3	6.0 ± 2.5	[1] VLADIMIRSK...08	40 $\pi^- p \to K^0_S K^0_S n + \mathrm{m}\pi^0$

[1] Supersedes VLADIMIRSKII 00.

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
$1576^{+49}_{-55}{}^{+98}_{-91}$	$818^{+22}_{-23}{}^{+64}_{-133}$	[1] ABLIKIM 06S	BES	$J/\psi \to K^+K^-\pi^0$

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

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

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

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

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

MASS (MeV)	WIDTH (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
$1731.0\pm1.2\pm2.0$	$3.2 \pm 0.8 \pm 1.3$	58	VLADIMIRSK...07	SPEC	$40\ \pi^- p \to K^0_S K^0_S X$

f_2(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	$\gamma\gamma \to K^0_S K^0_S$

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

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
17 ± 5	870	[2] SCHEGELSKY 06A	RVUE	$\gamma\gamma \to K^0_S K^0_S$

$\Gamma(\gamma\gamma)$

VALUE (keV)	EVTS	DOCUMENT ID	TECN	COMMENT
0.13 ± 0.04	870	[2] SCHEGELSKY 06A	RVUE	$\gamma\gamma \to K^0_S K^0_S$

$\Gamma(\pi\pi)$

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1.3 ± 1.0	870	[2] SCHEGELSKY 06A	RVUE	$\gamma\gamma \to K^0_S K^0_S$

Γ(ηη)

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

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

$\Gamma(e^+e^-) \cdot B(X \rightarrow$ hadrons) (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<120	90	[1] ANASHIN	11	KEDR	$e^+e^- \rightarrow$ 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. $\overline{p}d \rightarrow \pi\pi N$

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

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

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

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

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% $\rho_3\pi$.

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

VALUE	DOCUMENT ID		TECN	COMMENT
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% $\rho_3\pi$.

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

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

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
1945 ± 20	115 ± 22	[1] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \to \omega\eta, \omega\pi^0\pi^0$

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
1950^{+30}_{-70}	180^{+30}_{-70}	[1] ANISOVICH	01F	SPEC	1.96–2.41 $\overline{p}p$

[1] 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	[1] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \to \omega\eta, \omega\pi^0\pi^0$

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
1960 ± 35	230 ± 50	[1] ANISOVICH	02	SPEC	0.6–1.9 $p\overline{p} \to \omega\pi^0, \omega\eta\pi^0, \pi^+\pi^-$

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
1965±45	345 ± 75	[1] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \to \omega\eta, \omega\pi^0\pi^0$

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

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

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

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

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

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

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

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

VALUE (keV)	EVTS	DOCUMENT ID		TECN	COMMENT
0.11±0.04±0.05	18k	[1] SCHEGELSKY	06	RVUE	$\gamma\gamma \to \pi^+\pi^-\pi^0$

[1] 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	[1] BUGG	04C	RVUE	Compilation
~ 1988	~ 244	HASAN	94	RVUE	$\overline{p}p \to \pi\pi$

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

$f_2(2000)$ $I^G(J^{PC}) = 0^+(2^{++})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
2001±10	312 ± 32	ANISOVICH	00J	SPEC	
∼ 1996	∼ 134	HASAN	94	RVUE	$\overline{p}p \to \pi\pi$

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
1964±35	225 ± 50	[1] ARMSTRONG	93D	E760		$\overline{p}p \to 3\pi^0 \to 6\gamma$
∼ 2100	∼ 500	[1] ANTIPOV	77	CIBS	−	$25\ \pi^- p \to p\pi^-\rho_3$
2214±15	355 ± 21	[2] BALTAY	77	HBC	0	$15\ \pi^- p \to \Delta^{++} 3\pi$
2080±40	340 ± 80	KALELKAR	75	HBC	+	$15\ \pi^+ p \to p\pi^+\rho_3$

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID	TECN	COMMENT
1998±3±5	<15	VLADIMIRSK...03	SPEC	$\pi^- p \to K^0_S K^0_S MM$

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

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±20±16	230 ± 32 ± 73	145k	LU	05	B852	$18\ \pi^- p \to \omega\pi^-\pi^0 p$
2001±30±92	333 ± 52 ± 49	69k	KUHN	04	B852	$18\ \pi^- p \to \eta\pi^+\pi^-\pi^- p$

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

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	$\pi p \to pp\overline{p}\pi(\pi)$

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
2025±20	145 ± 30	[1] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \to \omega\eta, \omega\pi^0\pi^0$

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
2032±12	117 ± 11	[1] ANISOVICH	02	SPEC	0.6–1.9 $p\overline{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$

[1] 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	[1] ANISOVICH	01F	SPEC	1.96–2.41 $\overline{p}p$

[1] 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	[1] ANISOVICH	01F	SPEC	1.96–2.41 $\overline{p}p$

[1] 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	COMMENT
0.05±0.03	[1] ANISOVICH	11	SPEC	0.9–1.94 $p\overline{p}$

[1] Reanalysis of ADOMEIT 96 and ANISOVICH 00E.

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.10±0.08	[1] ANISOVICH	11	SPEC	0.9–1.94 $p\overline{p}$

[1] Reanalysis of ADOMEIT 96 and ANISOVICH 00E.

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.13±0.06	[1] ANISOVICH	11	SPEC	0.9–1.94 $p\overline{p}$

[1] Reanalysis of ADOMEIT 96 and ANISOVICH 00E.

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

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
∼ 2050	∼ 120	[1] OAKDEN	94	RVUE	0.36–1.55 $\overline{p}p \to \pi\pi$
∼ 2060	∼ 50	[1] OAKDEN	94	RVUE	0.36–1.55 $\overline{p}p \to \pi\pi$

[1] See SEMENOV 99 and KLOET 96.

π(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 $\overline{p}p \to 3\pi^0, \pi^0\eta, \pi^0\eta'$

X(2075) $I^G(J^{PC}) = ?^?(1^{+?})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
$2084^{+4}_{-2}\pm9$	$58^{+4}_{-3}\pm25$	[1,2] ABLIKIM	23BG	BES3	$e^+e^- \to pK^-\overline{\Lambda}$
2075±12±5	90 ± 35 ± 9	[3] ABLIKIM	04J	BES2	$J/\psi \to K^-p\overline{\Lambda}$

[1] The reported mass and width are the pole positions in the complex (M, Γ) plane.
[2] Signal observed with a statistical significance >20σ comes from 3883 candidate events. Spin parity determined to be $J^P = 1^+$ with a statistical significance >5σ over 0^-, 1^-, 2^+ hypotheses, and in the range within 3.1–7.5 σ with respect to 2^-.
[3] 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. A similar near-threshold enhancement in the $p\overline{\Lambda}$ system is observed in $B^+ \to p\overline{\Lambda}\overline{D}^0$ by CHEN 11F.

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

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

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

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

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

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

B(a_1(2095) → f_1(1285)π) / B(a_1(2095) → a_1(1260))

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

η(2100) $I^G(J^{PC}) = 0^+(0^{-+})$

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

[1] From a partial wave analysis of $J/\psi \to \gamma\phi\phi$, for which the primary signal is $\eta(2225) \to \phi\phi$, 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 = $2470^{+15}_{-19}{}^{+101}_{-23}$ MeV, $\Gamma = 230^{+64}_{-35}{}^{+56}_{-33}$ MeV).

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

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

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

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 $\pi^- p \to \overline{p} p n$

X(2120) $I^G(J^{PC}) = ?^?(0^{??})$

MASS (MeV)	WIDTH (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
$2122.4\pm6.7^{+4.7}_{-2.7}$	$83 \pm 16^{+31}_{-11}$	647	ABLIKIM	11C	BES3	$J/\psi \to \gamma\pi^+\pi^-\eta'$

---

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 $pA \to 4KX$

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

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

---

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 $\overline{p} p \to 3\pi^0$, $\pi^0\eta$, $\pi^0\eta'$

η(2190) $I^G(J^{PC}) = 0^+(0^{-+})$

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

ω_2(2195) $I^G(J^{PC}) = 0^-(2^{--})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
2195±30	225 ± 40	[1] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \to \omega\eta$, $\omega\pi^0\pi^0$

[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 $\pi^- p \to K^+ K^- n$
2207 ± 22	130	CASO	70	HBC	11.2 $\pi^- p$

X_2(2210) $I^G(J^{PC}) = 0^+(2^{++})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
2210 ± 60	360 ± 120	[1] KLEMPT	22	RVUE	$J/\psi \to \gamma \pi^0 \pi^0$, $\gamma K^0_S K^0_S$

[1] Fit of the tensor partial waves from BES3 in the multipole basis. Might be a cluster of $J^{PC} = 2^{++}$ resonances. The ratio of decay widths $K K^- / \pi\pi$ is 0.23 ± 0.05.

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 $p\overline{p} \to \omega\eta$, $\omega\pi^0\pi^0$

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

ρ_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 $p\overline{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$

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

ρ_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 $p\overline{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$

[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 $p\overline{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$

[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 $p\overline{p}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
∼ 2226	∼ 226	HASAN	94	RVUE	$p\overline{p} \rightarrow \pi\pi$

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN
2245±50	320 ± 70	[1] BUGG	04C	RVUE

[1] 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	[1] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \rightarrow \omega\eta$, $\omega\pi^0\pi^0$

[1] 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	[1] BUGG	04	RVUE

[1] 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	[1] ANISOVICH	02B	SPEC	0.6–1.9 $p\overline{p} \rightarrow \omega\eta$, $\omega\pi^0\pi^0$

[1] 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	291 ± 12	UMAN	06	E835	$5.2\ \overline{p}p \to \eta\eta\pi^0$
2255 ± 40	330^{+110}_{-50}	[1] ANISOVICH	01F	SPEC	1.96–2.41 $\overline{p}p$

[1] 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	[1] ANISOVICH	01G	SPEC	1.96–2.41 $\overline{p}p$

[1] 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 $\pi^- p \to \overline{p}pn$

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

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

[1] 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 $\overline{p}p \to 3\pi^0$, $\pi^0\eta$, $\pi^0\eta'$

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

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

[1] 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}	[1] ANISOVICH	01G	SPEC	1.96–2.41 $\overline{p}p$

[1] 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±20±25	250 ± 20 ± 25	[1] ANISOVICH	11	SPEC	0.9–1.94 $p\overline{p}$

[1] Reanalysis of ADOMEIT 96 and ANISOVICH 00E.

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

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 $p\overline{p} \rightarrow \omega\eta, \omega\pi^0\pi^0$

[1] Partial wave analysis of the data on $p\overline{p} \rightarrow \overline{\Lambda}\Lambda$ from BARNES 00.
[2] 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	[1] BUGG	04A	RVUE

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
2293±13	216 ± 37	[1] ANISOVICH	00J	SPEC	1.92–2.41 $p\overline{p}$

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

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN
2334±25	200 ± 20	[1] BUGG	04A	RVUE

[1] Partial wave analysis of the data on $p\overline{p} \rightarrow \overline{\Lambda}\Lambda$ 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	[1] ANISOVICH	00M	SPEC

[1] 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	[1] BALTAY	75	HBC	15 $\pi^+ p \to p5\pi$

[1] 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 $\overline{p}p \to 3\pi^0$, $\pi^0\eta$, $\pi^0\eta'$

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
2360±10	430 ± 30	ROZANSKA	80	SPRK	18 $\pi^- p \to p\overline{p}n$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2356± 7±15	304 ± 28 ± 54	[1] ABLIKIM	23AY	BES3	$e^+e^- \to (\Lambda\overline{\Lambda})\eta$

[1] Assuming $J^{PC} = 1^{--}$.

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

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

$a_6(2450)$ $I^G(J^{PC}) = 1^-(6^{++})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
2450±130	400 ± 250	CLELAND	82B	SPEC	50 $\pi p \to K^0_S K^\pm p$

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
$2539\pm14^{+38}_{-14}$	$274^{+77}_{-61}{}^{+126}_{-163}$	UEHARA	13	BELL	$\gamma\gamma \to K^0_S K^0_S$

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

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

$X(2600)$ $I^G(J^{PC}) = ?^?(?^{??})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
$2618.3\pm2.0^{+16.3}_{-\ 1.4}$	$195 \pm 5^{+26}_{-17}$	ABLIKIM	22G	BES3	$J/\psi \to \gamma\pi^+\pi^-\eta'$

$B(J/\psi \to \gamma X(2600)) \times B(X(2600) \to f_0(1500)\eta') \times B(f_0(1500) \to \pi^+\pi^-)$

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
$3.09\pm0.21^{+1.14}_{-0.77}$	[1] ABLIKIM	22G	BES3	$J/\psi \to \gamma\pi^+\pi^-\eta'$

[1] The $\pi^+\pi^-$ mass spectrum is described by a coherent sum of two Breit-Wigner resonances, $f_0(1500)$ and a new $X(1540)$ with mass $1540.2 \pm 7.0^{+36.3}_{-\ 6.1}$ MeV and width $157 \pm 19^{+11}_{-77}$ MeV.

$B(J/\psi \to \gamma X(2600)) \times B(X(2600) \to X(1540)\eta') \times B(X(1540) \to \pi^+\pi^-)$

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
$2.69\pm0.19^{+0.38}_{-1.21}$	[1] ABLIKIM	22G	BES3	$J/\psi \to \gamma\pi^+\pi^-\eta'$

[1] The $\pi^+\pi^-$ mass spectrum is described by a coherent sum of two Breit-Wigner resonances, $f_0(1500)$ and a new $X(1540)$ with mass $1540.2 \pm 7.0^{+36.3}_{-\ 6.1}$ MeV and width $157 \pm 19^{+11}_{-77}$ MeV.

$K_0^*(2600)$ $I(J^P) = 1/2(0^+)$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
$2662\pm59\pm201$	$480 \pm 47 \pm 72$	[1] AAIJ	23AH	LHCB	$B^+ \to K^+(K^0_S K\pi)$

[1] From Dalitz plot analyses of $\eta_c(1S, 2S) \to K^0_S K^+\pi^- +$ c.c..

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

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
2635.2 ± 3.3		[1] EVDOKIMOV	04	SELX	$X(2632) \to D_s^+\eta$
2631.6 ± 2.1	< 17	[2] EVDOKIMOV	04	SELX	$X(2632) \to D^0 K^+$

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

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

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

VALUE	DOCUMENT ID		TECN
0.14 ± 0.06	[1] EVDOKIMOV	04	SELX

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

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

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

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

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

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

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

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 $\pi^- p \to \eta \eta n$

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	$X(3250) \to \Lambda \overline{p} K^+$
3265±7±20	40 ± 18	ALEEV	93	BIS2	$X(3250) \to \overline{\Lambda} p K^-$

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	$X(3250) \to \Lambda \overline{p} K^+ \pi^\pm$
3250±9±20	50 ± 20	ALEEV	93	BIS2	$X(3250) \to \overline{\Lambda} p K^- \pi^\mp$
3270±8±20	25 ± 11	ALEEV	93	BIS2	$X(3250) \to K^0_S p \overline{p} K^\pm$

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

MASS (MeV)	WIDTH (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
$3350^{+10}_{-20}\pm20$	$70^{+40}_{-30} \pm 40$	50 ± 10	[1] GABYSHEV	06A	BELL	$B^- \to \Lambda_c^+ \overline{p} \pi^-$

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

ψ(4500) $I^G(J^{PC}) = 0^-(1^{--})$

MASS (MeV)	WIDTH (MeV)	DOCUMENT ID		TECN	COMMENT
4469.1±26.2± 3.6	246.3 ± 36.7 ± 9.4	[1] ABLIKIM	23X	BES3	$e^+ e^- \to D^{*0} D^{*-} \pi^+$
4484.7±13.3±24.1	111.1 ± 30 ± 15.2	[2] ABLIKIM	22AU	BES3	$e^+ e^- \to K^+ K^- J/\psi$

[1] From a cross-section measurement of $e^+ e^- \rightarrow D^{*0} D^{*-} \pi^+$ between 4.189 and 4.951 GeV, assuming a coherent sum of 3 Breit-Wigner resonances plus a continuum amplitude. $\Gamma(e^+ e^-) \cdot B(D^{*0} D^{*-} \pi^+) = 107$–1744 eV depending on solutions I – VIII with the same fit qualities. The two other resonances have masses (widths) 4209.6 $\pm$ 7.5 (81.6 $\pm$ 19.9) MeV and 4675.3 $\pm$ 29.7 (218.3 $\pm$ 73.5) MeV.

[2] ABLIKIM 22AU cross sections analysis of the process $e^+ e^- \rightarrow K^+ K^- J/\psi$ at c.m. energies 4.127–4.600 GeV from 15.6 fb^{-1} of data.

REFERENCES for Further States

AAIJ	23AH	PR D108 032010	R. Aaij et al.	(LHCb Collab.)
ABLIKIM	23AY	PR D107 112001	M. Ablikim et al.	(BESIII Collab.)
ABLIKIM	23BG	PRL 131 151901	M. Ablikim et al.	(BESIII Collab.)
ABLIKIM	23X	PRL 130 121901	M. Ablikim et al.	(BESIII Collab.)
ABLIKIM	22AU	CP C46 111002	M. Ablikim et al.	(BESIII Collab.)
ABLIKIM	22G	PRL 129 042001	M. Ablikim et al.	(BESIII Collab.)
KLEMPT	22	PL B830 137171	E. Klempt et al.	(BONN)
ABLIKIM	16N	PR D93 112011	M. Ablikim	(BESIII Collab.)
UEHARA	13	PTEP 2013 123C01	S. Uehara et al.	(BELLE Collab.)
ANISOVICH	12	PR D85 014001	A.V. Anisovich et al.	
ABLIKIM	11C	PRL 106 072002	M. Ablikim et al.	(BESIII Collab.)
ANASHIN	11	PL B703 543	V.V. Anashin et al.	(KEDR Collab.)
ANISOVICH	11	EPJ C71 1511	A.V. Anisovich et al.	(LOQM, RAL, PNPI)
CHEN	11F	PR D84 071501	P. Chen et al.	(BELLE Collab.)
AUBERT	10H	PR D82 031102	B. Aubert et al.	(BABAR Collab.)
ABRAAMYAN	09	PR C80 034001	Kh.U. Abraamyan et al.	
VLADIMIRSK...	08	PAN 71 2129	V.V. Vladimirsky et al.	(ITEP)
		Translated from YAF 71 2166.		
VLADIMIRSK...	07	PAN 70 1706	V. Vladimirsky et al.	
		Translated from YAF 70 1751.		
YASUI	07	PR D76 034009	S. Yasui, M. Oka	
ABLIKIM	06S	PRL 97 142002	M. Ablikim et al.	(BES Collab.)
GABYSHEV	06A	PRL 97 242001	N. Gabyshev et al.	(BELLE Collab.)
SCHEGELSKY	06	EPJ A27 199	V.A. Schegelsky et al.	
SCHEGELSKY	06A	EPJ A27 207	V.A. Schegelsky et al.	
UMAN	06	PR D73 052009	I. Uman et al.	(FNAL E835)
VLADIMIRSK...	06	PAN 69 493	V.V. Vladimirsky et al.	(ITEP, Moscow)
		Translated from YAF 69 515.		
BINON	05	PAN 68 960	F. Binon et al.	
		Translated from YAF 68 998.		
GRIGOR'EV	05	PAN 68 1271	V.K. Grigor'ev et al.	(ITEP)
		Translated from YAF 68 1324.		
LU	05	PRL 94 032002	M. Lu et al.	(BNL E852 Collab.)
ABLIKIM	04J	PRL 93 112002	M. Ablikim et al.	(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 et al.	(SELEX Collab.)
KUHN	04	PL B595 109	J. Kuhn et al.	(BNL E852 Collab.)
ANISOVICH	03	EPJ A16 229	V.V. Anisovich et al.	
VLADIMIRSK...	03	PAN 66 700	V.V. Vladimirsky et al.	
		Translated from YAF 66 729.		
ANISOVICH	02	PL B542 8	A.V. Anisovich et al.	
ANISOVICH	02B	PL B542 19	A.V. Anisovich et al.	
CHUNG	02	PR D65 072001	S.U. Chung et al.	(BNL E852 Collab.)
ANISOVICH	01C	PL B507 23	A.V. Anisovich et al.	
ANISOVICH	01D	PL B508 6	A.V. Anisovich et al.	
ANISOVICH	01E	PL B513 281	A.V. Anisovich et al.	
ANISOVICH	01F	PL B517 261	A.V. Anisovich et al.	
ANISOVICH	01G	PL B517 273	A.V. Anisovich et al.	
ANISOVICH	00B	NP A662 319	A.V. Anisovich et al.	
ANISOVICH	00D	PL B476 15	A.V. Anisovich et al.	
ANISOVICH	00E	PL B477 19	A.V. Anisovich et al.	
ANISOVICH	00I	PL B491 40	A.V. Anisovich et al.	
ANISOVICH	00J	PL B491 47	A.V. Anisovich et al.	(RAL, LOQM, PNPI+)
ANISOVICH	00M	PL B496 145	A.V. Anisovich et al.	
BARNES	00	PR C62 055203	P.D. Barnes et al.	
FILIPPI	00	PL B495 284	A. Filippi et al.	(OBELIX Experiment)
VLADIMIRSKII	00	JETPL 72 486	V.V. Vladimirskii et al.	
		Translated from ZETFP 72 698.		

ANISOVICH	99C	PL B452 173	A.V. Anisovich *et al.*	
ANISOVICH	99E	PL B452 187	A.V. Anisovich *et al.*	
ANISOVICH	99F	NP A651 253	A.V. Anisovich *et al.*	
ANISOVICH	99J	PL B471 271	A.V. Anisovich *et al.*	
ANISOVICH	99K	PL B468 309	A.V. Anisovich *et al.*	
BUGG	99	PL B458 511	D.V. Bugg *et al.*	
FERRER	99	EPJ C10 249	A. Ferrer *et al.*	
SEMENOV	99	SPU 42 847	S.V. Semenov	
		Translated from UFN 42 937.		
ADOMEIT	96	ZPHY C71 227	J. Adomeit *et al.*	(Crystal Barrel Collab.)
KLOET	96	PR D53 6120	W.M. Kloet, F. Myhrer	(RUTG, NORD)
PROKOSHKIN	96	PD 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 *et al.*	(BIS-2 Collab.)
		Translated from YAF 56 100.		
ARMSTRONG	93D	PL B307 399	T.A. Armstrong *et al.*	(FNAL, FERR, GENO+)
ALBRECHT	91F	ZPHY C50 1	H. Albrecht *et al.*	(ARGUS Collab.)
CONDO	91	PR D43 2787	G.T. Condo *et al.*	(SLAC Hybrid Collab.)
BISELLO	89B	PR D39 701	G. Busetto *et al.*	(DM2 Collab.)
ATKINSON	88	ZPHY C38 535	M. Atkinson *et al.*	(BONN, CERN, GLAS+)
DAFTARI	87	PRL 58 859	I.K. Daftari *et al.*	(SYRA)
ALDE	86D	NP B269 485	D.M. Alde *et al.*	(BELG, LAPP, SERP, CERN+)
BRIDGES	86D	PL B180 313	D.L. Bridges *et al.*	(SYRA, BNL, CASE+)
GREEN	86	PRL 56 1639	D.R. Green *et al.*	(FNAL, ARIZ, FSU+)
ATKINSON	85	ZPHY C29 333	M. Atkinson *et al.*	(BONN, CERN, GLAS+)
DENNEY	83	PR D28 2726	D.L. Denney *et al.*	(IOWA, MICH)
CLELAND	82B	NP B208 228	W.E. Cleland *et al.*	(DURH, GEVA, LAUS+)
ASTON	81B	NP B189 205	D. Aston *et al.*	(BONN, CERN, EPOL, GLAS+)
ARESTOV	80	IHEP 80-165	Y.I. Arestov *et al.*	(SERP)
CHLIAPNIK...	80	ZPHY C3 285	P.V. Chliapnikov *et al.*	(SERP, BRUX, MONS)
KREYMER	80	PR D22 36	A.E. Kreymer *et al.*	(IND, PURD, SLAC+)
ROZANSKA	80	NP B162 505	M. Rozanska *et al.*	(MPIM, CERN)
EVANGELIS...	79	NP B153 253	C. Evangelista *et al.*	(BARI, BONN, CERN+)
EVANGELIS...	79B	NP B154 381	C. Evangelista *et al.*	(BARI, BONN, CERN+)
BALTAY	78	PR D17 52	C. Baltay *et al.*	(COLU, BING)
ANTIPOV	77	NP B119 45	Y.M. Antipov *et al.*	(SERP, GEVA)
BALTAY	77	PRL 39 591	C. Baltay, C.V. Cautis, M. Kalelkar	(COLU)
BALTAY	75	PRL 35 891	C. Baltay *et al.*	(COLU, BING)
KALELKAR	75	Thesis Nevis 207	M.S. Kalelkar	(COLU)
CASO	70	LNC 3 707	C. Caso *et al.*	(GENO, HAMB, MILA, SACL)