$\overline{N}N(1100–3600)$

OMITTED FROM SUMMARY TABLE

This entry contains various high mass, unflavored structures coupled to the baryon-antibaryon system, as well as quasi-nuclear bound states below threshold.

$\overline{N}N(1100–3600)$ MASSES AND WIDTHS

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

VALUE (MeV)	DOCUMENT ID
1100 to 3600 OUR LIMIT	

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

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
1167 ±7	[9]	CHIBA	91	CNTR		$\overline{p}d \to \gamma X$
1191.0±9.9	[9]	CHIBA	87	CNTR	0	0. $\overline{p}p \to \gamma X$
1210 ±5.0	[9,10,11,12]	RICHTER	83	CNTR	0	Stopped $\overline{p}$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
1325 ±5	[9]	CHIBA	91	CNTR		$\overline{p}d \to \gamma X$
1329.2±7.6	[9]	CHIBA	87	CNTR	0	0. $\overline{p}p \to \gamma X$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
1390.9±6.3	[9]	CHIBA	87	CNTR	0	0. $\overline{p}p \to \gamma X$
1395	[9,11,12,13]	PAVLOPO...	78	CNTR		Stopped $\overline{p}$

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
~ 1410	BETTINI	66	DBC	0	0. $\overline{p}N \to 5\pi$
~ 100	BETTINI	66	DBC	0	0. $\overline{p}N \to 5\pi$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
1468± 6	[14]	BRIDGES	86B	DBC	0	0. $\overline{p}N \to 2\pi^- \pi^+ \pi^0$
88±18	[14]	BRIDGES	86B	DBC	0	0. $\overline{p}N \to 2\pi^- \pi^+ \pi^0$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
1512 ± 7	[9]	CHIBA	91	CNTR		$\overline{p}d \to \gamma X$
1523.8± 3.6	[9]	CHIBA	87	CNTR	0	0. $\overline{p}p \to \gamma X$
1522 ± 7	[14]	BRIDGES	86B	DBC	0	0. $\overline{p}N \to 2\pi^- \pi^+$
59 ±12	[14]	BRIDGES	86B	DBC	0	0. $\overline{p}N \to 2\pi^- \pi^+$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
1577.8 ± 3.4	[9]	CHIBA	87	CNTR	0	0. $\overline{p}p \rightarrow \gamma X$
1594 ± 9	[14]	BRIDGES	86B	DBC	–	0. $\overline{p}N \rightarrow 2\pi^- \pi^+ \pi^0$
81 ± 12	[14]	BRIDGES	86B	DBC	–	0. $\overline{p}N \rightarrow 2\pi^- \pi^+ \pi^0$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
1633.6 ± 4.1	[9]	CHIBA	87	CNTR	0	0. $\overline{p}p \rightarrow \gamma X$
$1637.1^{+5.6}_{-7.3}$		ADIELS	84	CNTR		$\overline{p}$He

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
1638 ± 3.0	[9,10,11,12]	RICHTER	83	CNTR	0	Stopped $\overline{p}$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
$1644.0^{+5.6}_{-7.3}$		ADIELS	84	CNTR	$\overline{p}$He

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
1646	[9,11,12,13]	PAVLOPO...	78	CNTR	Stopped $\overline{p}$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
$1687.1^{+5.0}_{-4.3}$		ADIELS	84	CNTR	$\overline{p}$He
1684	[9,11,12,13]	PAVLOPO...	78	CNTR	Stopped $\overline{p}$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
1693 ± 2	[9]	CHIBA	91	CNTR		$\overline{p}d \rightarrow \gamma X$
1694 ± 2.0	[9,10,11,12]	RICHTER	83	CNTR	0	Stopped $\overline{p}$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
1713.0 ± 2.6	[9]	CHIBA	87	CNTR	0	0. $\overline{p}p \rightarrow \gamma X$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
1731.0 ± 1.5	[9]	CHIBA	87	CNTR	0	0. $\overline{p}p \rightarrow \gamma X$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
1771 ± 1.0	[9,11,12,15]	RICHTER	83	CNTR	0	Stopped $\overline{p}$

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1812.3 ± 1.2	CHIBA	97	CNTR	$\overline{p}d \rightarrow nX$
3.7 ± 1.3	CHIBA	97	CNTR	$\overline{p}d \rightarrow nX$

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

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
1870 ± 10		ANTONELLI	98	SPEC		$e^+ e^- \rightarrow n\overline{n}, p\overline{p}$
10 ± 5		ANTONELLI	98	SPEC		$e^+ e^- \rightarrow n\overline{n}, p\overline{p}$
~ 1870	[16]	DALKAROV	97	RVUE	–	0.0 $\overline{p} d \rightarrow p 3\pi^- 2\pi^+$
~ 10	[16]	DALKAROV	97	RVUE	–	0.0 $\overline{p} d \rightarrow p 3\pi^- 2\pi^+$
1873 ± 2.5		BRIDGES	86D	SPEC	0	0. $\overline{p} d \rightarrow \pi\pi N$
< 5		BRIDGES	86D	SPEC	0	0. $\overline{p} d \rightarrow \pi\pi N$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
1897 ± 17	[17]	ABASHIAN	76	STRC	8 $\pi^- p \rightarrow p 3\pi$
110 ± 82	[17]	ABASHIAN	76	STRC	8 $\pi^- p \rightarrow p 3\pi$
1897 ± 1		KALOGERO...	75	DBC	$\overline{p} n$ annihilation near threshold
25 ± 6		KALOGERO...	75	DBC	$\overline{p} n$ annihilation near threshold

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
1910 ± 30	[1,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \rightarrow \pi\pi, \eta\eta, \eta\eta'$
260 ± 40	[1,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \rightarrow \pi\pi, \eta\eta, \eta\eta'$

[1] From a fit to the $I^G(J^{PC}) = 0^+(2^{++})$.

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
~ 1920	[19]	EVANGELISTA	79	OMEG	10,16 $\pi^- p \rightarrow \overline{p} p$
~ 190		EVANGELISTA	79	OMEG	10,16 $\pi^- p \rightarrow \overline{p} p$

VALUE (MeV)	EVTS		DOCUMENT ID		TECN	CHG	COMMENT
$1937.3^{+1.3}_{-0.7}$		[20]	FRANKLIN	87	SPEC		0.586 $\overline{p} p$
< 3.0		[20]	FRANKLIN	87	SPEC		0.586 $\overline{p} p$
1930 ± 2		[21]	ASTON	80D	OMEG		$\gamma p \rightarrow p\overline{p}X$
12 ± 7		[21]	ASTON	80D	OMEG		$\gamma p \rightarrow p\overline{p}X$
1940 ± 1	36		DAUM	80E	CNTR	0	93 $p p \rightarrow \overline{p} p X$
~ 6.0			DAUM	80E	CNTR		93 $p p \rightarrow \overline{p} p X$
1949 ± 10		[22]	DEFOIX	80	HBC	0	$\overline{p} p \rightarrow 5\pi$
80 ± 20		[22]	DEFOIX	80	HBC	0	$\overline{p} p \rightarrow 5\pi$
1939 ± 2		[23]	HAMILTON	80B	CNTR	0	S channel $\overline{p} p$
22 ± 6		[23]	HAMILTON	80B	CNTR	0	S channel $\overline{p} p$
1935.5 ± 1.0			SAKAMOTO	79	HBC	0	0.37–0.73 $\overline{p} p$
2.8 ± 1.4			SAKAMOTO	79	HBC	0	0.37–0.73 $\overline{p} p$
1939 ± 3			BRUCKNER	77	SPEC	0	0.4–0.85 $\overline{p} p$

< 4.0		BRUCKNER	77	SPEC	0	0.4–0.85 $\overline{p}p$
1935.9 ± 1.0	[24]	CHALOUPKA	76	HBC	0	$\overline{p}p$ total,elastic
$8.8^{+4.3}_{-3.2}$	[25]	CHALOUPKA	76	HBC	0	$\overline{p}p$ total,elastic
1942 ± 5	[26]	D'ANDLAU	75	HBC	0	0.175–0.750 $\overline{p}p$
57.5 ± 5	[27]	D'ANDLAU	75	HBC	0	0.175–0.750 $\overline{p}p$
$1934.4^{+2.6}_{-1.4}$	[28]	KALOGERO...	75	DBC	–	$\overline{p}N$ annihilation
11^{+11}_{-4}	[28]	KALOGERO...	75	DBC	–	$\overline{p}N$ annihilation
1932 ± 2	[24]	CARROLL	74	CNTR		S channel $\overline{p}p \to d$
9^{+4}_{-3}	[25]	CARROLL	74	CNTR		S channel $\overline{p}p \to d$
1968	[29]	BENVENUTI	71	HBC	0	0.1–0.8 $\overline{p}p$
35	[29]	BENVENUTI	71	HBC	0	0.1–0.8 $\overline{p}p$

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
1990^{+15}_{-30}	[18] ANISOVICH	99C	SPEC		0.6–1.94 $p\overline{p} \to \pi^0\eta$, $\pi^0\eta'$
190 ± 50	[18] ANISOVICH	99C	SPEC		0.6–1.94 $p\overline{p} \to \pi^0\eta$, $\pi^0\eta'$
1949 ± 10	[30] DEFOIX	80	HBC	0	0.0–1.2 $\overline{p}p \to 5\pi$
80 ± 20	[30] DEFOIX	80	HBC	0	0.0–1.2 $\overline{p}p \to 5\pi$

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
1960 ± 15	[2,18] ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi$, $\eta\eta$, $\eta\eta'$
150 ± 25	[2,18] ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi$, $\eta\eta$, $\eta\eta'$
2005 ± 30	[3,18] ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi$, $\eta\eta$, $\eta\eta'$
305 ± 50	[3,18] ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi$, $\eta\eta$, $\eta\eta'$
2005 ± 40	[4,18] ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi$, $\eta\eta$, $\eta\eta'$
275 ± 75	[4,18] ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi$, $\eta\eta$, $\eta\eta'$

[2] From a fit to the $I^G(J^{PC}) = 1^+(3^{--})$.
[3] From a fit to the $I^G(J^{PC}) = 0^+(0^{++})$.
[4] From a fit to the $I^G(J^{PC}) = 1^+(1^{--})$.

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
2005 ± 25	[18,31] ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \to 3\pi^0$
360 ± 80	[18,31] ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \to 3\pi^0$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2025 ± 30	[18]	ANISOVICH	99C	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \eta$, $\pi^0 \eta'$
2025 ± 40	[18]	ANISOVICH	99C	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \eta$, $\pi^0 \eta'$
330 ± 75	[18]	ANISOVICH	99C	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \eta$, $\pi^0 \eta'$
250^{+80}_{-50}	[18]	ANISOVICH	99C	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \eta$, $\pi^0 \eta'$
2000 ± 40	[18,32]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \pi^0 \eta$
250 ± 40	[18,32]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \pi^0 \eta$
2015 ± 3		FERRER	99	RVUE	$\pi p \rightarrow p p \overline{p} \pi (\pi)$
2011 ± 7	[33]	FERRER	93	OMEG	$\pi^- p \rightarrow p p \overline{p} \pi^- \pi^0$
25^{+10}_{-25}	[33]	FERRER	93	OMEG	$\pi^- p \rightarrow p p \overline{p} \pi^- \pi^0$
2025		GIBBARD	79		$e^- p \rightarrow e^- p p \overline{p}$
< 30		GIBBARD	79		$e^- p \rightarrow e^- p p \overline{p}$
2020 ± 3		BENKHEIRI	77	OMEG	$\pi^- p \rightarrow p p \overline{p} \pi^-$
24 ± 12		BENKHEIRI	77	OMEG	$\pi^- p \rightarrow p p \overline{p} \pi^-$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2020 ± 50	[18,34]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \pi^0 \eta$
200 ± 70	[18,34]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \pi^0 \eta$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
2020 ± 30	[1,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \rightarrow \pi\pi$, $\eta\eta$, $\eta\eta'$
275 ± 35	[1,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \rightarrow \pi\pi$, $\eta\eta$, $\eta\eta'$
2020 ± 12	[5,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \rightarrow \pi\pi$, $\eta\eta$, $\eta\eta'$
170 ± 15	[5,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \rightarrow \pi\pi$, $\eta\eta$, $\eta\eta'$

[5] From a fit to the $I^G(J^{PC}) = 0^+(4^{++})$.

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
2022 ± 6	[35]	AZOOZ	83	HYBR	+	6 $\overline{p}p \rightarrow p\overline{n}3\pi$
14 ± 13	[35]	AZOOZ	83	HYBR	+	6 $\overline{p}p \rightarrow p\overline{n}3\pi$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
2023 ± 5		BODENKAMP	83	SPEC	0	$\gamma p \rightarrow \overline{p} p p$
27 ± 12		BODENKAMP	83	SPEC	0	$\gamma p \rightarrow \overline{p} p p$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
2026 ± 5	[35]	AZOOZ	83	HYBR	−	4 $\overline{p}p \rightarrow \overline{p}n3\pi$
20 ± 11	[35]	AZOOZ	83	HYBR	−	4 $\overline{p}p \rightarrow \overline{p}n3\pi$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2040 ± 40	[18,36]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \pi^0 \eta$
190 ± 40	[18,36]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \pi^0 \eta$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
2060 ± 20	[18]	ANISOVICH	99	SPEC		$\overline{p}p \rightarrow \pi^0 \eta, \pi^0 \eta'$
195 ± 30	[18]	ANISOVICH	99	SPEC		$\overline{p}p \rightarrow \pi^0 \eta, \pi^0 \eta'$
2080 ± 10	[37]	KREYMER	80	STRC	0	13 $\pi^- d \rightarrow p\overline{p}n(n)$
110 ± 20	[37]	KREYMER	80	STRC	0	13 $\pi^- d \rightarrow p\overline{p}n(n)$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2070 ± 20	[18,38]	ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \rightarrow 3\pi^0$
170 ± 40	[18,38]	ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \rightarrow 3\pi^0$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2090 ± 20	[39]	KREYMER	80	STRC	13 $\pi^- d \rightarrow n p \overline{p} \pi^- p$
170 ± 50	[39]	KREYMER	80	STRC	13 $\pi^- d \rightarrow n p \overline{p} \pi^- p$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
~ 2110	[40]	EVANGELISTA	79	OMEG	10,16 $\pi^- p \rightarrow \overline{p}p$
~ 330	[40]	EVANGELISTA	79	OMEG	10,16 $\pi^- p \rightarrow \overline{p}p$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2100^{+10}_{-30}	[18,41]	ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \rightarrow 3\pi^0$
360^{+40}_{-100}	[18,41]	ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \rightarrow 3\pi^0$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2100 ± 20	[18,42]	ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \rightarrow 3\pi^0$
300^{+30}_{-60}	[18,42]	ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \rightarrow 3\pi^0$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
2105 ± 15	[3,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \rightarrow \pi\pi, \eta\eta, \eta\eta'$
200 ± 25	[3,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \rightarrow \pi\pi, \eta\eta, \eta\eta'$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2110 ± 10	[43]	ROZANSKA	80	SPRK	18 $\pi^- p \rightarrow p\overline{p}n$
190 ± 10	[43]	ROZANSKA	80	SPRK	18 $\pi^- p \rightarrow p\overline{p}n$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2140 ± 30	[18,44]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \pi^0 \eta$
150 ± 30	[18,44]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \pi^0 \eta$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
2141	[45]	DONALD	73	HBC	0	$\overline{p}p$ S channel
14	[45]	DONALD	73	HBC	0	$\overline{p}p$ S channel

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
2165 ± 45	[4,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi,\ \eta\eta,\ \eta\eta'$
160^{+140}_{-70}	[4,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi,\ \eta\eta,\ \eta\eta'$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2180 ± 10	[46]	ROZANSKA	80	SPRK	18 $\pi^- p \to p\overline{p}n$
270 ± 10	[46]	ROZANSKA	80	SPRK	18 $\pi^- p \to p\overline{p}n$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
2207 ± 13	[47]	ALLES-...	67B	HBC	0	5.7 $\overline{p}p$
62 ± 52	[47]	ALLES-...	67B	HBC	0	5.7 $\overline{p}p$

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
2210^{+79}_{-21}	EVANGELISTA	79B	OMEG	10 $\pi^- p \to K^+ K^- n$
~ 203	EVANGELISTA	79B	OMEG	10 $\pi^- p \to K^+ K^- n$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
2210 ± 40	[2,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi,\ \eta\eta,\ \eta\eta'$
360 ± 55	[2,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi,\ \eta\eta,\ \eta\eta'$

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
~ 2229.2	CARBONELL	93	RVUE	$\overline{p}p \to \Lambda\overline{\Lambda}$
~ 1.8	CARBONELL	93	RVUE	$\overline{p}p \to \Lambda\overline{\Lambda}$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
2230 ± 30	[1,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi,\ \eta\eta,\ \eta\eta'$
245 ± 45	[1,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi,\ \eta\eta,\ \eta\eta'$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2240 ± 40	[18,34]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \to \pi^0\pi^0\eta$
170 ± 50	[18,34]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \to \pi^0\pi^0\eta$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2260 ± 15	[18,31]	ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \to 3\pi^0$
180 ± 20	[18,31]	ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \to 3\pi^0$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2265 ± 20	[18]	ANISOVICH	99C	SPEC	0.6–1.94 $p\overline{p} \to \pi^0\eta,\ \pi^0\eta'$
235^{+60}_{-35}	[18]	ANISOVICH	99C	SPEC	0.6–1.94 $p\overline{p} \to \pi^0\eta,\ \pi^0\eta'$
~ 2260	[48]	EVANGELISTA	79	OMEG	10,16 $\pi^- p \to \overline{p}p$
~ 440	[48]	EVANGELISTA	79	OMEG	10,16 $\pi^- p \to \overline{p}p$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2280 ± 30	[18,49]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \to \pi^0 \pi^0 \eta$
210 ± 30	[18,49]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \to \pi^0 \pi^0 \eta$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2280 ± 30	[18,41]	ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \to 3\pi^0$
280 ± 50	[18,41]	ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \to 3\pi^0$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
2295 ± 30	[6,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi, \eta\eta, \eta\eta'$
235^{+65}_{-40}	[6,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi, \eta\eta, \eta\eta'$

[6] From a fit to the $I^G(J^{PC}) = 1^+(5^{--})$.

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
2300 ± 20	[18]	ANISOVICH	99C	SPEC		0.6–1.94 $p\overline{p} \to \pi^0 \eta, \pi^0 \eta'$
230 ± 40	[18]	ANISOVICH	99C	SPEC		0.6–1.94 $p\overline{p} \to \pi^0 \eta, \pi^0 \eta'$
2307 ± 6		ALPER	80	CNTR	0	62 $\pi^- p \to K^+ K^- n$
245 ± 20		ALPER	80	CNTR	0	62 $\pi^- p \to K^+ K^- n$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2300 ± 40	[18,36]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \to \pi^0 \pi^0 \eta$
270 ± 40	[18,36]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \to \pi^0 \pi^0 \eta$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
2300 ± 35	[1,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi, \eta\eta, \eta\eta'$
290 ± 50	[1,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi, \eta\eta, \eta\eta'$
2300^{+50}_{-80}	[2,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi, \eta\eta, \eta\eta'$
340 ± 150	[2,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi, \eta\eta, \eta\eta'$
2300 ± 25	[5,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi, \eta\eta, \eta\eta'$
270 ± 50	[5,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi, \eta\eta, \eta\eta'$
2320 ± 30		ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi, \eta\eta, \eta\eta'$
175 ± 45		ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi, \eta\eta, \eta\eta'$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2320 ± 30	[18,50]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \pi^0 \eta$
220 ± 30	[18,50]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \pi^0 \eta$
2310 ± 40	[18,38]	ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \rightarrow 3\pi^0$
180^{+12}_{-60}	[18,38]	ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \rightarrow 3\pi^0$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2231.9 ± 0.1	[51]	BARNES	94	SPEC	0–46 $\overline{p}p \rightarrow \overline{\Lambda}\Lambda$
0.59 ± 0.25	[51]	BARNES	94	SPEC	0–46 $\overline{p}p \rightarrow \overline{\Lambda}\Lambda$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2340 ± 40	[18,42]	ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \rightarrow 3\pi^0$
230 ± 70	[18,42]	ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \rightarrow 3\pi^0$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2340 ± 40	[18,44]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \pi^0 \eta$
340 ± 40	[18,44]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \pi^0 \eta$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2370 ± 50	[18,34]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \pi^0 \eta$
320 ± 50	[18,34]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0 \pi^0 \eta$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2380 ± 10	[52]	ROZANSKA	80	SPRK	18 $\pi^- p \rightarrow p\overline{p}n$
380 ± 20	[52]	ROZANSKA	80	SPRK	18 $\pi^- p \rightarrow p\overline{p}n$

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
2450 ± 10	[53]	ROZANSKA	80	SPRK	18 $\pi^- p \rightarrow p\overline{p}n$
280 ± 20	[53]	ROZANSKA	80	SPRK	18 $\pi^- p \rightarrow p\overline{p}n$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
2485 ± 40	[7,8]	ANISOVICH	99J	SPEC	0	0.79–2.43 $p\overline{p} \rightarrow \pi\pi$
410 ± 90	[7,8]	ANISOVICH	99J	SPEC	0	0.79–2.43 $p\overline{p} \rightarrow \pi\pi$
~ 2500	[6,7]	ANISOVICH	99J	SPEC	0	0.79–2.43 $p\overline{p} \rightarrow \pi\pi$
~ 470	[6,7]	ANISOVICH	99J	SPEC	0	0.79–2.43 $p\overline{p} \rightarrow \pi\pi$

[7] Using data of EISENHANDLER 75 and CARTER 77.
[8] From a fit to the $I^G(J^{PC}) = 0^+(6^{++})$.

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
2480 ± 30	[54]	CARTER	77	CNTR	0	0.7–2.4 $\overline{p}p \rightarrow \pi\pi$
210 ± 25	[54]	CARTER	77	CNTR	0	0.7–2.4 $\overline{p}p \rightarrow \pi\pi$

VALUE (MeV)		DOCUMENT ID		TECN	CHG	COMMENT
~ 2500	[55]	CARTER	78B	CNTR	0	0.7–2.4 $\overline{p}p \rightarrow K^- K^+$
~ 150	[55]	CARTER	78B	CNTR	0	0.7–2.4 $\overline{p}p \rightarrow K^- K^+$

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
~ 2620	[1,7] ANISOVICH	99J	SPEC	0	0.79–2.43 $p\overline{p} \to \pi\pi$
~ 430	[1,7] ANISOVICH	99J	SPEC	0	0.79–2.43 $p\overline{p} \to \pi\pi$

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

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
2850 ± 5	[56] BRAUN	76	DBC	–	5.5 $\overline{p}d \to N\overline{N}\pi$
< 39	[56] BRAUN	76	DBC	–	5.5 $\overline{p}d \to N\overline{N}\pi$

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
3370 ± 10	[57] ALEXANDER	72	HBC	0	6.94 $\overline{p}p$
150 ± 40	[57] ALEXANDER	72	HBC	0	6.94 $\overline{p}p$

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
3600 ± 20	[57] ALEXANDER	72	HBC	0	6.94 $\overline{p}p$
140 ± 20	[57] ALEXANDER	72	HBC	0	6.94 $\overline{p}p$

[9] Not seen by GRAF 91.
[10] Not seen by CHIBA 88, ANGELOPOULOS 86, ADIELS 86.
[11] They looked for radiative transitions to bound $p\overline{p}$ states, mono-energetic γ rays detected.
[12] Observed widths consistent with experimental resolution.
[13] Not seen by ADIELS 86.
[14] From analysis of difference of π^- and π^+ spectra.
[15] Not seen by CHIBA 88, ANGELOPOULOS 86.
[16] From a phenomenological analysis of ASTERIX data.
[17] Produced backwards.
[18] Using preliminary Crystal Barrel data.
[19] $I(J^P) = 1(1^-)$ from a mass dependent partial-wave analysis taking solution A.
[20] From reanalysis of data from JASTRZEMBSKI 81.
[21] Not seen by BUSENITZ 89.
[22] From energy dependence of 5π cross section. $I^G = 1^-$ from observation of $\omega\rho$ decay. $P = +$ and $J > 1$. $a_2(1320)\pi\pi$ also seen.
[23] $I = 0$ favored, $J = 0$ or 1, seen in total $\overline{p}p$ total cross section. Primarily from annihilation reactions. Not seen in $\overline{p}d$ total and annihilation cross sections.
[24] Narrow bump seen in total $\overline{p}p$, $\overline{p}d$ cross sections. Isospin uncertain. Not seen in $\overline{p}p$ charge exchange by ALSTON-GARNJOST 75, CHALOUPKA 76. Integrated cross section three times larger than BRUCKNER 77.
[25] Narrow bump seen in total $\overline{p}p$, $\overline{p}d$ cross sections. Isospin uncertain. Not seen in $\overline{p}p$ charge exchange by ALSTON-GARNJOST 75, CHALOUPKA 76. Integrated cross section three times larger than BRUCKNER 77. Not seen by CLOUGH 84.
[26] From energy dependence of far backward elastic scattering. Some indication of additional structure.
[27] From energy dependence of far backward elastic scattering. Some indication of additional structure.
[28] Not seen by ALBERI 79 with comparable statistics.
[29] Seen as a bump in the $\overline{p}p \to K^0_S K^0_L$ cross section with $J^{PC} = 1^{--}$.
[30] Isospin 1 favored.
[31] From a fit to the $I^G(J^{PC}) = 1^+(4^{++})$ $f_2(1270)\pi$ wave.

[32] From a fit to the $I^G(J^{PC}) = 0^+(3^{++})\ \pi^0\pi^0\eta$ wave.
[33] Not seen by AJALTOUNI 82, ARMSTRONG 79, BUZZO 97.
[34] From a fit to the $I^G(J^{PC}) = 0^+(2^{++})\ \pi^0\pi^0\eta$ wave.
[35] Not seen by BIONTA 80, CARROLL 80, HAMILTON 80, BANKS 81, CHUNG 81, BARNETT 83.
[36] From a fit to the $I^G(J^{PC}) = 0^+(2^{-+})\ \pi^0\pi^0\eta$ wave.
[37] Neutron spectator. See also $np\overline{p}\pi^-(p)$ channel following.
[38] From a fit to the $I^G(J^{PC}) = 1^+(3^{++})\ f_2(1270)\pi$ wave.
[39] Proton spectator. See also $p\overline{p}n(n)$ channel above.
[40] $I(J^P) = 1(3^-)$ from a mass dependent partial-wave analysis taking solution A.
[41] From a fit to the $I^G(J^{PC}) = 1^+(2^{++})\ f_2(1270)\pi$ wave.
[42] From a fit to the $I^G(J^{PC}) = 1^+(1^{++})\ f_2(1270)\pi$ wave.
[43] $I(J^P) = 1(3^-)$ from amplitude analysis assuming one-pion exchange.
[44] From a fit to the $I^G(J^{PC}) = 0^+(1^{++})\ \pi^0\pi^0\eta$ wave.
[45] Seen in final state $\omega\pi^+\pi^-$.
[46] $I(J^P) = 0(2^+)$ from amplitude analysis assuming one-pion exchange.
[47] ALLES-BORELLI 67B see neutral mode only $\pi^+\pi^-\pi^0$.
[48] $I(J^P) = 0(4^+)$ from a mass dependent partial-wave analysis taking solution A.
[49] From a fit to the $I^G(J^{PC}) = 0^+(3^{++})\ \pi^0\pi^0\eta$ wave.
[50] From a fit to the $I^G(J^{PC}) = 0^+(4^{++})\ \pi^0\pi^0\eta$ wave.
[51] Supersedes CARBONELL 93.
[52] $I(J^P) = 0(4^+)$ from amplitude analysis assuming one-pion exchange.
[53] $I(J^P) = 1(5^-)$ from amplitude analysis assuming one-pion exchange.
[54] $I(J^P) = 1(5^-)$ from amplitude analysis of $\overline{p}p \rightarrow \pi\pi$.
[55] I=0,1 $J^P = 5^-$ from Barrelet-zero analysis.
[56] Decays to $\overline{N}N$ and $\overline{N}N\pi$. Not seen by BARNETT 83.
[57] Decays to $4\pi^+4\pi^-$.

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