$\overline{N}N$(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		$e^+e^- \to n\overline{n}$, $p\overline{p}$
10± 5	ANTONELLI	98	SPEC		$e^+e^- \to n\overline{n}$, $p\overline{p}$
~ 1870	[16] DALKAROV	97	RVUE	−	0.0 $\overline{p}d \to p3\pi^-2\pi^+$
~ 10	[16] DALKAROV	97	RVUE	−	0.0 $\overline{p}d \to p3\pi^-2\pi^+$
1873± 2.5	BRIDGES	86D	SPEC	0	0. $\overline{p}d \to \pi\pi N$
< 5	BRIDGES	86D	SPEC	0	0. $\overline{p}d \to \pi\pi N$

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1897±17	[17] ABASHIAN	76	STRC	8 $\pi^- p \to p3\pi$
110±82	[17] ABASHIAN	76	STRC	8 $\pi^- p \to p3\pi$
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 $p\overline{p} \to \pi\pi$, $\eta\eta$, $\eta\eta'$
260±40	[1,18] ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \to \pi\pi$, $\eta\eta$, $\eta\eta'$

[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 $\pi^- p \to \overline{p}p$
~ 190	EVANGELISTA	79	OMEG	10,16 $\pi^- p \to \overline{p}p$

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		$\gamma p \to p\overline{p}X$
12 ± 7		[21] ASTON	80D	OMEG		$\gamma p \to p\overline{p}X$
1940 ± 1	36	DAUM	80E	CNTR	0	93 $pp \to \overline{p}pX$
~ 6.0		DAUM	80E	CNTR		93 $pp \to \overline{p}pX$
1949 ±10		[22] DEFOIX	80	HBC	0	$\overline{p}p \to 5\pi$
80 ±20		[22] DEFOIX	80	HBC	0	$\overline{p}p \to 5\pi$
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 $\pm$ 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 $\pm$ 5	[26]	D'ANDLAU	75	HBC	0	0.175–0.750 $\overline{p}p$
57.5 $\pm$ 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 $\pm$ 2	[24]	CARROLL	74	CNTR		S channel $\overline{p}p \rightarrow d$
$9\ ^{+4}_{-3}$	[25]	CARROLL	74	CNTR		S channel $\overline{p}p \rightarrow d$
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 $p\overline{p} \rightarrow \pi^0\eta,\ \pi^0\eta'$
190 $\pm$ 50	[18]	ANISOVICH	99C	SPEC		0.6–1.94 $p\overline{p} \rightarrow \pi^0\eta,\ \pi^0\eta'$
1949 $\pm$ 10	[30]	DEFOIX	80	HBC	0	0.0–1.2 $\overline{p}p \rightarrow\ 5\pi$
80 $\pm$ 20	[30]	DEFOIX	80	HBC	0	0.0–1.2 $\overline{p}p \rightarrow\ 5\pi$

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

[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 $\pm$ 25	[18,31]	ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \rightarrow\ 3\pi^0$
360 $\pm$ 80	[18,31]	ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \rightarrow\ 3\pi^0$

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	$\gamma p \rightarrow \overline{p}pp$
27 ± 12	BODENKAMP	83	SPEC	0	$\gamma p \rightarrow \overline{p}pp$

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 $\pi^- d \rightarrow np\overline{p}\pi^- p$
170 ± 50	[39] KREYMER	80	STRC	13 $\pi^- d \rightarrow np\overline{p}\pi^- p$

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 $p\overline{p} \rightarrow$ $\pi\pi$, $\eta\eta$, $\eta\eta'$
160^{+140}_{-70}	[4,18] ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \rightarrow$ $\pi\pi$, $\eta\eta$, $\eta\eta'$

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

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 $\pi^- p \rightarrow K^+ K^- n$
∼ 203	EVANGELISTA	79B	OMEG	10 $\pi^- p \rightarrow K^+ K^- n$

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

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

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

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
2240±40	[18,34] ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0\pi^0\eta$
170±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*
2260±15	[18,31] ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \rightarrow 3\pi^0$
180±20	[18,31] ANISOVICH	99E	SPEC	0.6–1.94 $p\overline{p} \rightarrow 3\pi^0$

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

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

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

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

[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 $p\overline{p} \rightarrow$ $\pi^0\eta$, $\pi^0\eta'$
230 ± 40	[18]	ANISOVICH	99C	SPEC		0.6–1.94 $p\overline{p} \rightarrow$ $\pi^0\eta$, $\pi^0\eta'$
2307 ± 6		ALPER	80	CNTR	0	62 $\pi^- p \rightarrow$ $K^+K^- n$
245 ± 20		ALPER	80	CNTR	0	62 $\pi^- p \rightarrow$ $K^+K^- n$

VALUE (MeV)		*DOCUMENT ID*		*TECN*	*COMMENT*
2300 ± 40	[18,36]	ANISOVICH	99D	SPEC	0.6–1.94 $p\overline{p} \rightarrow \pi^0\pi^0\eta$
270 ± 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*
2300 ± 35	[1,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \rightarrow$ $\pi\pi$, $\eta\eta$, $\eta\eta'$
290 ± 50	[1,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \rightarrow$ $\pi\pi$, $\eta\eta$, $\eta\eta'$
2300^{+50}_{-80}	[2,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \rightarrow$ $\pi\pi$, $\eta\eta$, $\eta\eta'$
340 ± 150	[2,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \rightarrow$ $\pi\pi$, $\eta\eta$, $\eta\eta'$
2300 ± 25	[5,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \rightarrow$ $\pi\pi$, $\eta\eta$, $\eta\eta'$
270 ± 50	[5,18]	ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \rightarrow$ $\pi\pi$, $\eta\eta$, $\eta\eta'$
2320 ± 30		ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \rightarrow$ $\pi\pi$, $\eta\eta$, $\eta\eta'$
175 ± 45		ANISOVICH	99J	SPEC	0	0.6–1.94 $p\overline{p} \rightarrow$ $\pi\pi$, $\eta\eta$, $\eta\eta'$

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 $p\overline{p} \rightarrow \pi\pi$
~ 430	[1,7] ANISOVICH	99J	SPEC	0	0.79–2.43 $p\overline{p} \rightarrow \pi\pi$

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

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

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 $\overline{p}p \rightarrow K^0_S K^0_L$ 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 $\overline{p}p \to \pi\pi$.
[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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