

$\rho(2150)$

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

OMITTED FROM SUMMARY TABLE

This entry was previously called $T_1(2190)$. **$\rho(2150)$ MASS** **$e^+e^- \rightarrow \pi^+\pi^-, K^+K^-, 6\pi$**

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
2149±17 OUR AVERAGE	Includes data from the datablock that follows this one.			
2153±37	BIAGINI	91	RVUE	$e^+e^- \rightarrow \pi^+\pi^-, K^+K^-$
2110±50	² CLEGG	90	RVUE 0	$e^+e^- \rightarrow 3(\pi^+\pi^-), 2(\pi^+\pi^-\pi^0)$

 $\bar{p}p \rightarrow \pi\pi$

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
~ 2191	HASAN	94	RVUE $\bar{p}p \rightarrow \pi\pi$
~ 1988	HASAN	94	RVUE $\bar{p}p \rightarrow \pi\pi$
~ 2070	¹ OAKDEN	94	RVUE 0.36–1.55 $\bar{p}p \rightarrow \pi\pi$
~ 2170	³ MARTIN	80B	RVUE
~ 2100	³ MARTIN	80C	RVUE

¹See however KLOET 96 who fit $\pi^+\pi^-$ only and find waves only up to $J = 3$ to be important but not significantly resonant.

S-CHANNEL $\bar{N}N$

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
2110±35	⁴ ANISOVICH	02	SPEC	0.6–1.9 $p\bar{p} \rightarrow \omega\pi^0, \omega\eta\pi^0, \pi^+\pi^-$
~ 2190	⁵ CUTTS	78B	CNTR	0.97–3 $\bar{p}p \rightarrow \bar{N}N$
2155±15	^{5,6} COUPLAND	77	CNTR 0	0.7–2.4 $\bar{p}p \rightarrow \bar{p}p$
2193± 2	^{5,7} ALSPECTOR	73	CNTR	$\bar{p}p$ S channel
2190±10	⁸ ABRAMS	70	CNTR	S channel $\bar{p}N$

 $\pi^-p \rightarrow \omega\pi^0n$

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
The data in this block is included in the average printed for a previous datablock.			

2155±21 OUR AVERAGE

2140±30	ALDE	95	GAM2 38	$\pi^-p \rightarrow \omega\pi^0n$
2170±30	ALDE	92C	GAM4 100	$\pi^-p \rightarrow \omega\pi^0n$

² Includes ATKINSON 85.³ $I(J^P) = 1(1^-)$ from simultaneous analysis of $p\bar{p} \rightarrow \pi^- \pi^+$ and $\pi^0 \pi^0$.⁴ From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.⁵ Isospins 0 and 1 not separated.⁶ From a fit to the total elastic cross section.⁷ Referred to as T or T region by ALSPECTOR 73.⁸ Seen as bump in $I = 1$ state. See also COOPER 68. PEASLEE 75 confirm $\bar{p}p$ results of ABRAMS 70, no narrow structure.

$\rho(2150)$ WIDTH

$e^+ e^- \rightarrow \pi^+ \pi^-, K^+ K^-, 6\pi$

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
363 ± 50 OUR AVERAGE	Includes data from the datablock that follows this one.			
389 ± 79	BIAGINI	91	RVUE	$e^+ e^- \rightarrow \pi^+ \pi^-, K^+ K^-$
410 ± 100	¹⁰ CLEGG	90	RVUE 0	$e^+ e^- \rightarrow 3(\pi^+ \pi^-), 2(\pi^+ \pi^- \pi^0)$

$\bar{p}p \rightarrow \pi\pi$

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
~ 296	HASAN	94	RVUE $\bar{p}p \rightarrow \pi\pi$
~ 244	HASAN	94	RVUE $\bar{p}p \rightarrow \pi\pi$
~ 40	⁹ OAKDEN	94	RVUE 0.36–1.55 $\bar{p}p \rightarrow \pi\pi$
~ 250	¹¹ MARTIN	80B	RVUE
~ 200	¹¹ MARTIN	80C	RVUE

⁹ See however KLOET 96 who fit $\pi^+ \pi^-$ only and find waves only up to $J = 3$ to be important but not significantly resonant.

S-CHANNEL $\bar{N}N$

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
230 ± 50	¹² ANISOVICH	02	SPEC	0.6–1.9 $p\bar{p} \rightarrow \omega\pi^0, \omega\eta\pi^0, \pi^+ \pi^-$
135 ± 75	^{13,14} COUPLAND	77	CNTR 0	0.7–2.4 $\bar{p}p \rightarrow \bar{p}p$
98 ± 8	¹⁴ ALSPECTOR	73	CNTR	$\bar{p}p$ S channel
~ 85	¹⁵ ABRAMS	70	CNTR	S channel $\bar{p}N$

$\pi^- p \rightarrow \omega\pi^0 n$

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
The data in this block is included in the average printed for a previous datablock.			
320 ± 70	ALDE	95	GAM2 38 $\pi^- p \rightarrow \omega\pi^0 n$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
~ 300	ALDE	92C	GAM4 100 $\pi^- p \rightarrow \omega\pi^0 n$

- ¹⁰ Includes ATKINSON 85.
¹¹ $I(J^P) = 1(1^-)$ from simultaneous analysis of $p\bar{p} \rightarrow \pi^- \pi^+$ and $\pi^0 \pi^0$.
¹² From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.
¹³ From a fit to the total elastic cross section.
¹⁴ Isospins 0 and 1 not separated.
¹⁵ Seen as bump in $l = 1$ state. See also COOPER 68. PEASLEE 75 confirm $\bar{p}p$ results of ABRAMS 70, no narrow structure.

$\rho(2150)$ REFERENCES

ANISOVICH	02	PL B542 8	A.V. Anisovich <i>et al.</i>	
ANISOVICH	01D	PL B508 6	A.V. Anisovich <i>et al.</i>	
ANISOVICH	01E	PL B513 281	A.V. Anisovich <i>et al.</i>	
ANISOVICH	00J	PL B491 47	A.V. Anisovich <i>et al.</i>	
KLOET	96	PR D53 6120	W.M. Kloet, F. Myhrer	(RUTG, NORD)
ALDE	95	ZPHY C66 379	D.M. Alde <i>et al.</i>	(GAMS Collab.) JP
HASAN	94	PL B334 215	A. Hasan, D.V. Bugg	(LOQM)
OAKDEN	94	NP A574 731	M.N. Oakden, M.R. Pennington	(DURH)
ALDE	92C	ZPHY C54 553	D.M. Alde <i>et al.</i>	(BELG, SERP, KEK, LANL+)
BIAGINI	91	NC 104A 363	M.E. Biagini <i>et al.</i>	(FRAS, PRAG)
CLEGG	90	ZPHY C45 677	A.B. Clegg, A. Donnachie	(LANC, MCHS)
ATKINSON	85	ZPHY C29 333	M. Atkinson <i>et al.</i>	(BONN, CERN, GLAS+)
MARTIN	80B	NP B176 355	B.R. Martin, D. Morgan	(LOUC, RHEL) JP
MARTIN	80C	NP B169 216	A.D. Martin, M.R. Pennington	(DURH) JP
CUTTS	78B	PR D17 16	D. Cutts <i>et al.</i>	(STON, WISC)
COUPLAND	77	PL 71B 460	M. Coupland <i>et al.</i>	(LOQM, RHEL)
PEASLEE	75	PL 57B 189	D.C. Peaslee <i>et al.</i>	(CANB, BARI, BROW+)
ALSPECTOR	73	PRL 30 511	J. Alspector <i>et al.</i>	(RUTG, UPNJ)
ABRAMS	70	PR D1 1917	R.J. Abrams <i>et al.</i>	(BNL)
COOPER	68	PRL 20 1059	W.A. Cooper <i>et al.</i>	(ANL)

OTHER RELATED PAPERS

AMELIN	00	NP A668 83	D. Amelin <i>et al.</i>	(VES Collab.)
EISENHAND...	75	NP B96 109	E. Eisenhandler <i>et al.</i>	(LOQM, LIPV, DARE+)
BRICMAN	69	PL 29B 451	C. Bricman <i>et al.</i>	(CERN, CAEN, SACL)
ABRAMS	67C	PRL 18 1209	R.J. Abrams <i>et al.</i>	(BNL)