NODE=M032

$\rho(2150)$

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

OMITTED FROM SUMMARY TABLE

This entry was previously called $T_1(2190)$.

NODE=M032

$\rho(2150)$ MASS

NODE=M032205

e^+e^- PRODUCED

NODE=M032M3
NODE=M032M3

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
2149±17 OUR AVERAGE	Includes data from the datablock that follows this one.			
2150±40±50	AUBERT	07AU	BABR	10.6 $e^+e^- \rightarrow f_1(1285)\pi^+\pi^-\gamma$
2153±37	BIAGINI	91	RVUE	$e^+e^- \rightarrow \pi^+\pi^-, K^+K^-$
2110±50	[1] CLEGG	90	RVUE	$e^+e^- \rightarrow 3(\pi^+\pi^-), 2(\pi^+\pi^-\pi^0)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1990±80	AUBERT	07AU	BABR	10.6 $e^+e^- \rightarrow \eta'\pi^+\pi^-\gamma$

OCCUR=2

$\overline{p}p \rightarrow \pi\pi$

NODE=M032M1
NODE=M032M1

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 2191	HASAN	94	RVUE	$\overline{p}p \rightarrow \pi\pi$
~ 1988	HASAN	94	RVUE	$\overline{p}p \rightarrow \pi\pi$
~ 2070	[2] OAKDEN	94	RVUE	0.36–1.55 $\overline{p}p \rightarrow \pi\pi$
~ 2170	[3] MARTIN	80B	RVUE	
~ 2100	[3] MARTIN	80C	RVUE	

OCCUR=2

S-CHANNEL $\overline{N}N$

NODE=M032M2
NODE=M032M2

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

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

NODE=M032M4
NODE=M032M4

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

[1] Includes ATKINSON 85. NODE=M032M3;LINKAGE=A

[2] See however KLOET 96 who fit $\pi^+\pi^-$ only and find waves only up to $J = 3$ to be important but not significantly resonant. NODE=M032M1;LINKAGE=CC

[3] $I(J^P) = 1(1^-)$ from simultaneous analysis of $p\overline{p} \rightarrow \pi^-\pi^+$ and $\pi^0\pi^0$. NODE=M032M;LINKAGE=P

[4] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02. NODE=M032M;LINKAGE=AY

[5] Isospins 0 and 1 not separated. NODE=M032M;LINKAGE=I

[6] From a fit to the total elastic cross section. NODE=M032M;LINKAGE=E

[7] Referred to as T or T region by ALSPECTOR 73. NODE=M032M;LINKAGE=M

[8] Seen as bump in $I = 1$ state. See also COOPER 68. PEASLEE 75 confirm $\overline{p}p$ results of ABRAMS 70, no narrow structure. NODE=M032M;LINKAGE=B

$\rho(2150)$ WIDTH

NODE=M032210

e^+e^- PRODUCED

NODE=M032W3
NODE=M032W3

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
359± 40 OUR AVERAGE	Includes data from the datablock that follows this one.			
350± 40±50	AUBERT	07AU	BABR	10.6 $e^+e^- \rightarrow f_1(1285)\pi^+\pi^-\gamma$
389± 79	BIAGINI	91	RVUE	$e^+e^- \rightarrow \pi^+\pi^-, K^+K^-$
410±100	[9] CLEGG	90	RVUE	$e^+e^- \rightarrow 3(\pi^+\pi^-), 2(\pi^+\pi^-\pi^0)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
310±140	AUBERT	07AU	BABR	10.6 $e^+e^- \rightarrow \eta'\pi^+\pi^-\gamma$

OCCUR=2

$\overline{p}p \to \pi\pi$

NODE=M032W1

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 296	HASAN	94	RVUE	$\overline{p}p \to \pi\pi$
~ 244	HASAN	94	RVUE	$\overline{p}p \to \pi\pi$
~ 40	[10] OAKDEN	94	RVUE	0.36–1.55 $\overline{p}p \to \pi\pi$
~ 250	[11] MARTIN	80B	RVUE	
~ 200	[11] MARTIN	80C	RVUE	

OCCUR=2

S-CHANNEL $\overline{N}N$

NODE=M032W2

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

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

NODE=M032W4

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 $\pi^- p \to \omega\pi^0 n$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 300	ALDE	92C	GAM4	100 $\pi^- p \to \omega\pi^0 n$

[9] Includes ATKINSON 85. NODE=M032W3;LINKAGE=A

[10] See however KLOET 96 who fit $\pi^+\pi^-$ only and find waves only up to $J = 3$ to be important but not significantly resonant. NODE=M032W1;LINKAGE=CC

[11] $I(J^P) = 1(1^-)$ from simultaneous analysis of $p\overline{p} \to \pi^-\pi^+$ and $\pi^0\pi^0$. NODE=M032W;LINKAGE=P

[12] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02. NODE=M032W;LINKAGE=AY

[13] From a fit to the total elastic cross section. NODE=M032W;LINKAGE=E

[14] Isospins 0 and 1 not separated. NODE=M032W;LINKAGE=I

[15] Seen as bump in $I = 1$ state. See also COOPER 68. PEASLEE 75 confirm $\overline{p}p$ results of ABRAMS 70, no narrow structure. NODE=M032W;LINKAGE=B

$\rho(2150)$ DECAY MODES

NODE=M032215;NODE=M032

	Mode	Fraction (Γ_i/Γ)	
Γ_1	e^+e^-		DESIG=1
Γ_2	$\pi^+\pi^-$	seen	DESIG=2;OUR EVAL;→ NOT CHECKED ←
Γ_3	K^+K^-	seen	DESIG=3;OUR EVAL;→ NOT CHECKED ←
Γ_4	$3(\pi^+\pi^-)$	seen	DESIG=4;OUR EVAL;→ NOT CHECKED ←
Γ_5	$2(\pi^+\pi^-\pi^0)$	seen	DESIG=5;OUR EVAL;→ NOT CHECKED ←
Γ_6	$\eta'\pi^+\pi^-$	seen	DESIG=6;OUR EVAL;→ NOT CHECKED ←
Γ_7	$f_1(1285)\pi^+\pi^-$	seen	DESIG=7;OUR EVAL;→ NOT CHECKED ←
Γ_8	$\omega\pi^0$	seen	DESIG=8;OUR EVAL;→ NOT CHECKED ←
Γ_9	$\omega\pi^0\eta$	seen	DESIG=9;OUR EVAL;→ NOT CHECKED ←
Γ_{10}	$p\overline{p}$		DESIG=10

$\rho(2150)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma^2(\text{total})$

NODE=M032230

$\Gamma(f_1(1285)\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma^2_{\text{total}}$ — $\Gamma_7\Gamma_1/\Gamma^2$

NODE=M032G01

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
3.1±0.6±0.5	[16] AUBERT	07AU	BABR	10.6 $e^+e^- \to f_1(1285)\pi^+\pi^-\gamma$

[16] Calculated by us from the reported value of cross section at the peak. NODE=M032G01;LINKAGE=AU

$\Gamma(\eta'\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma^2_{\text{total}}$ — $\Gamma_6\Gamma_1/\Gamma^2$

NODE=M032G02

VALUE (units 10^{-8})	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
4.9±1.9	[17] AUBERT	07AU	BABR	10.6 $e^+e^- \to \eta'\pi^+\pi^-\gamma$

[17] Calculated by us from the reported value of cross section at the peak. NODE=M032G02;LINKAGE=AU

ρ(2150) REFERENCES

NODE=M032

AUBERT	07AU	PR D76 092005	B. Aubert *et al.*	(BABAR Collab.)	REFID=52049
ANISOVICH	02	PL B542 8	A.V. Anisovich *et al.*		REFID=48828
ANISOVICH	01D	PL B508 6	A.V. Anisovich *et al.*		REFID=48327
ANISOVICH	01E	PL B513 281	A.V. Anisovich *et al.*		REFID=48349
ANISOVICH	00J	PL B491 47	A.V. Anisovich *et al.*		REFID=47950
KLOET	96	PR D53 6120	W.M. Kloet, F. Myhrer	(RUTG, NORD)	REFID=45212
ALDE	95	ZPHY C66 379	D.M. Alde *et al.*	(GAMS Collab.) JP	REFID=44371
HASAN	94	PL B334 215	A. Hasan, D.V. Bugg	(LOQM)	REFID=44103
OAKDEN	94	NP A574 731	M.N. Oakden, M.R. Pennington	(DURH)	REFID=45210
ALDE	92C	ZPHY C54 553	D.M. Alde *et al.*	(BELG, SERP, KEK, LANL+)	REFID=41859
BIAGINI	91	NC 104A 363	M.E. Biagini *et al.*	(FRAS, PRAG)	REFID=41894
CLEGG	90	ZPHY C45 677	A.B. Clegg, A. Donnachie	(LANC, MCHS)	REFID=41355
ATKINSON	85	ZPHY C29 333	M. Atkinson *et al.*	(BONN, CERN, GLAS+)	REFID=22000
MARTIN	80B	NP B176 355	B.R. Martin, D. Morgan	(LOUC, RHEL) JP	REFID=21838
MARTIN	80C	NP B169 216	A.D. Martin, M.R. Pennington	(DURH) JP	REFID=21837
CUTTS	78B	PR D17 16	D. Cutts *et al.*	(STON, WISC)	REFID=21733
COUPLAND	77	PL 71B 460	M. Coupland *et al.*	(LOQM, RHEL)	REFID=21830
PEASLEE	75	PL 57B 189	D.C. Peaslee *et al.*	(CANB, BARI, BROW+)	REFID=21824
ALSPECTOR	73	PRL 30 511	J. Alspector *et al.*	(RUTG, UPNJ)	REFID=21813
ABRAMS	70	PR D1 1917	R.J. Abrams *et al.*	(BNL)	REFID=21807
COOPER	68	PRL 20 1059	W.A. Cooper *et al.*	(ANL)	REFID=21805

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AMELIN	00	NP A668 83	D. Amelin *et al.*	(VES Collab.)	REFID=47432
EISENHAND...	75	NP B96 109	E. Eisenhandler *et al.*	(LOQM, LIVP, DARE+)	REFID=21821
BRICMAN	69	PL 29B 451	C. Bricman *et al.*	(CERN, CAEN, SACL)	REFID=21806
ABRAMS	67C	PRL 18 1209	R.J. Abrams *et al.*	(BNL)	REFID=21804