$$\rho$$
(2150)

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

OMITTED FROM SUMMARY TABLE This entry was previously called $T_1(2190)$.

ρ(2150) MASS

e ⁺ e ⁻ PRODUCE	DOCUMENT ID TECN COMMENT			
2149±17 OUR AVE	RAGE Includes data from the datablock that follows this one.	_		
$2150\!\pm\!40\!\pm\!50$	AUBERT 07AU BABR 10.6 $e^+e^- ightarrow f_1(1285) \pi^+\pi^-\gamma$			
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	e the following data for averages, fits, limits, etc. $ullet$ $ullet$	_		
$1990\!\pm\!80$	AUBERT 07AU BABR 10.6 $e^+e^- \rightarrow \eta' \pi^+\pi^-\gamma$			
$\overline{p}p \rightarrow \pi\pi$				
VALUE (MeV)	DOCUMENT ID TECN COMMENT			
\bullet \bullet \bullet We do not use	ullet the following data for averages, fits, limits, etc. $ullet$ $ullet$			
~ 2191	HASAN 94 RVUE $\overline{p} p \rightarrow \pi \pi$			
~ 1988	HASAN 94 RVUE $\overline{p}p \rightarrow \pi\pi$			
~ 2070	$\frac{2}{p}$ OAKDEN 94 RVUE 0.36–1.55 $\overline{p} p \rightarrow \pi \pi$			
~ 2170	³ MARTIN 80B RVUE			
\sim 2100	³ MARTIN 80C RVUE			
	DOCUMENT ID TECH COMMENT			
Me do not use	a the following data for averages fits limits atc.			
	$\frac{4}{100000000000000000000000000000000000$			
2110 ± 35	* ANISOVICH 02 SPEC 0.6–1.9 $p\overline{p} \rightarrow \omega \pi^{0}, \omega \eta \pi^{0}, \pi^{+}\pi^{-}$			
~ 2190	56 COURTS 78B CNTR 0.97–3 pp $\rightarrow NN$			
2155 ± 15	5.7 ALCOLOGICATION 72 CNTR $0.7-2.4 pp \rightarrow pp$			
2193 ± 2 2100 ± 10	$\frac{8}{8}$ ARPAMS 70 CNTR S channel			
2190 ± 10	ADITAINS TO CIVITY 3 channel priv			
$\pi^- p \rightarrow \omega \pi^0 n$				
VALUE (MeV)				
I he data in this bloc	ck is included in the average printed for a previous datablock.			
2155 ± 21 OUR AVE	RAGE			
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 ATKINS ² See however KLC	SON 85. OET 96 who fit $\pi^+\pi^-$ only and find waves only up to $J=3$ to be			
important but not significantly resonant. ³ $I(J^P) = 1(1^-)$ from simultaneous analysis of $p\overline{p} \rightarrow \pi^-\pi^+$ 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 $\overline{p}p$ results of ABRAMS 70, no narrow structure.				

HTTP://PDG.LBL.GOV

ρ(2150) WIDTH

VALUE (MeV)DOCUMENT IDTECNCOMMENT339 ± 40 OUR AVERAGEIncludes data from the datablock that follows this one.350 ± 40 ±50AUBERT07AU BABR10.6 e ⁺ e ⁻ $\rightarrow f_1(1285)\pi^+\pi^-\gamma$ 39 ± 79BIAGINI91RVUE $e^+e^- \rightarrow \pi^+\pi^-$, K^+K^- 410 ±1009 CLEGG90RVUE $e^+e^- \rightarrow \pi^+\pi^-$, $K^+\pi^-\pi^0$ •• We do not use the following data for averages, fits, limits, etc. •••310 ±140AUBERT07AU BABR10.6 $e^+e^- \rightarrow \eta'\pi^+\pi^-\gamma$ $\overline{Pp} \rightarrow \pi\pi$ $\overline{Pp} \rightarrow \pi\pi$ VALUE (MeV)DOCUMENT IDTECNCOMMENT•• We do not use the following data for averages, fits, limits, etc. •••~ 296HASAN94RVUE $\overline{pp} \rightarrow \pi\pi$ ~ 244HASAN94RVUE $\overline{pp} \rightarrow \pi\pi$ ~ 4010 OAKDEN94RVUE~ 25011MARTIN806~ 20011MARTIN806× 20011MARTIN806SCHANNEL $\overline{N}N$ DOCUMENT IDTECNZ0012ANISOVICH2SPEC0.6-1.9 $p\overline{p} \rightarrow \omega\pi^0, \omega\eta\pi^0, \pi^+\pi^-$ 135 ±7513.14COUPLAND77CNTR0.7-2.4 $\overline{p} \rho \rightarrow \overline{p} \rho$ 98 ± 814ALSPECTOR73CNTR \overline{p} s channel~ 8515ABRAMS70CNTRS channel $\overline{p}N$ ~ 400ALDE95GAM238 $\pi^- \rho \rightarrow \omega \pi^0 n$ • • We do not use the following data for averages, fits, limits, etc. • • •~ 300ALDE9	e^+e^- PRODUC	ED				
359 ± 40 OUR AVERAGE Includes data from the datablock that follows this one. 350 ± 40 ± 50 AUBERT 07AU BABR 10.6 $e^+e^- \rightarrow f_1(1285)\pi^+\pi^-\gamma^-$ 369 ± 79 BIAGINI 91 RVUE $e^+e^- \rightarrow \pi^+\pi^-, K^+K^-$ 310 ± 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 $e^+e^- \rightarrow \eta'\pi^+\pi^-\gamma^-$ 76 $p \rightarrow \pi\pi^-$ 77 $p \rightarrow \pi\pi^-$ 78 $p \rightarrow \pi\pi^-$ 79 $p \rightarrow \pi\pi^-$ 70 $p \rightarrow \pi\pi^-$ 71 $p \rightarrow \pi^-\pi^+$ and $\pi^0\pi^0$. 71 $p \rightarrow \pi^-\pi^+$ and $\pi^0\pi^-$ 71 $p^ p \rightarrow \pi^-\pi^+$ 71 $p^ p \rightarrow \pi^-$ 71 $p^ p \rightarrow \pi^-\pi^+$ and $\pi^0\pi^-$. 71 $p^ p^ p \rightarrow \pi^-\pi^+$ and π^- . 71 $p^ p^ p \rightarrow \pi^-\pi^+$ and π^- . 71 $p^ p^ p^-$	VALUE (MeV)	DOCUMENT ID	TECN	COMMEN	Т	
350 ± 40 ± 50 AUBERT 07AU BABR 10.6 e ⁺ e ⁻ → f ₁ (1285) π ⁺ π ⁻ γ 389 ± 79 BIAGINI 91 RVUE e ⁺ e ⁻ → π ⁺ π ⁻ , K ⁺ K ⁻ 410 ± 100 9 CLEGG 90 RVUE e ⁺ e ⁻ → π ⁺ π ⁻ , K ⁺ K ⁻ 310 ± 140 AUBERT 07AU BABR 10.6 e ⁺ e ⁻ → η'π ⁺ π ⁻ γ p <i>p</i> → ππ v AUUE (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> ••• We do not use the following data for averages, fits, limits, etc. ••• ~296 HASAN 94 RVUE $\overline{p}p \rightarrow \pi\pi$ ~244 HASAN 94 RVUE $\overline{p}p \rightarrow \pi\pi$ ~40 10 OAKDEN 94 RVUE $\overline{p}p \rightarrow \pi\pi$ ~40 10 OAKDEN 94 RVUE $\overline{p}p \rightarrow \pi\pi$ ~200 11 MARTIN 806 RVUE ~200 11 MARTIN 806 RVUE S-CHANNEL N <i>N</i> VALUE (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> VALUE (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> S-CHANNEL N <i>N</i> VALUE (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> N A P → ω π ⁰ n A A LSPECTOR 73 CNTR $\overline{p}P = mp$ 98 ± 8 14 ALSPECTOR 73 CNTR $\overline{p}P = mn$ x a a a a b b a b a a a a b b c b b c a a a a a a b b a a a a a a a a a a	359 ± 40 OUR AV	ERAGE Includes d	lata from the o	datablock	that follows this one	÷.
389 ± 79 BIAGINI 91 RVUE $e^+e^- → \pi^+\pi^-$, K^+K^- 410±100 9 CLEGG 90 RVUE $e^+e^- → \pi^+\pi^-$, K^+K^- 410±100 AUBERT 07AU BABR 10.6 $e^+e^- → \eta'\pi^+\pi^-\eta$ P → $\pi\pi$ VALUE (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> ••• 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 $\overline{p}p \to \pi\pi$ ~ 250 11 MARTIN 80E RVUE ~ 200 11 MARTIN 80E RVUE S-CHANNEL $\overline{N}N$ VALUE (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> *•• We do not use the following data for averages, fits, limits, etc. ••• 200 11 MARTIN 80C RVUE S-CHANNEL $\overline{N}N$ VALUE (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> *•• 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 $\overline{p}N$ M $\overline{-p} \to \omega\pi^0 n$ VALUE (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> *** We do not use the following data for averages, fits, limits, etc. ••• ~ 300 ALDE 95 GAM2 38 $\pi^- p \to \omega\pi^0 n$ 9 Includes ATKINSON 85. 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. 11 $I(J^P) = 1(1^-)$ from simultaneous analysis of $p\overline{p} \to \pi^-\pi^+$ and $\pi^0\pi^0$. 12 From the combined analysis of ANISOVICH 01D, ANISOVICH 01E and ANISOVICH 02. 13 From a fit to the total elastic cross section. 14 Isospins 0 and 1 not separated.	$350 \pm 40 \pm 50$	AUBERT	07AU BABR	10.6 e^+	$e^- \rightarrow f_1(1285)\pi^+$	$\pi^-\gamma$
410±100 ⁹ CLEGG 90 RVUE e ⁺ e ⁻ → 3(π ⁺ π ⁻), 2(π ⁺ π ⁻ π ⁰) •• We do not use the following data for averages, fits, limits, etc. •• 310±140 AUBERT 07AU BABR 10.6 e ⁺ e ⁻ → η'π ⁺ π ⁻ γ $\overrightarrow{Pp} \rightarrow \pi\pi$ VALUE (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> •• We do not use the following data for averages, fits, limits, etc. •• ~ 296 HASAN 94 RVUE $\overrightarrow{pp} \rightarrow \pi\pi$ ~ 244 HASAN 94 RVUE $\overrightarrow{pp} \rightarrow \pi\pi$ ~ 40 10 OAKDEN 94 RVUE $\overrightarrow{pp} \rightarrow \pi\pi$ ~ 250 11 MARTIN 806 RVUE ~ 200 11 MARTIN 80C RVUE S-CHANNEL \overrightarrow{NN} VALUE (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> •• We do not use the following data for averages, fits, limits, etc. •• 230±50 12 ANISOVICH 02 SPEC 0.6-1.9 $\overrightarrow{pp} \rightarrow \omega\pi^{0}, \omega\eta\pi^{0}, \pi^{+}\pi^{-}$ 135±75 13.14 COUPLAND 77 CNTR 0.7-2.4 $\overrightarrow{pp} \rightarrow \overrightarrow{pp}$ 98± 8 14 ALSPECTOR 73 CNTR \overrightarrow{pp} S channel ~ 85 15 ABRAMS 70 CNTR S channel \overrightarrow{pN} $\overrightarrow{m-p} \rightarrow \omega\pi^{0}n$ VALUE (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> MULUE (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> * We do not use the following data for averages, fits, limits, etc. ••• 230±50 12 ANISOVICH 02 SPEC 0.6-1.9 $\overrightarrow{pp} \rightarrow \overrightarrow{mn}, \omega\pi^{0}, \pi^{+}\pi^{-}$ 135±75 13.14 COUPLAND 77 CNTR 0.7-2.4 $\overrightarrow{pp} \rightarrow \overrightarrow{pp}$ 98± 8 14 ALSPECTOR 73 CNTR \overrightarrow{pp} S channel ~ 85 15 ABRAMS 70 CNTR S channel \overrightarrow{pN} $\overrightarrow{m-p} \rightarrow \omega\pi^{0}n$ VALUE (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> 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 $\pi^{-}p \rightarrow \omega\pi^{0}n$ 9 Includes ATKINSON 85. 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. 11 $I(J^{P}) = 1(1^{-})$ from simultaneous analysis of $\overrightarrow{pp} \rightarrow \pi^{-}\pi^{+}$ and $\pi^{0}\pi^{0}$. 12 From the combined analysis of ANISOVICH 001, ANISOVICH 01D, ANISOVICH 01E and ANISOVICH 02. 13 From a fit to the total elastic cross section. 14 Isospins 0 and 1 not separated.	$389\pm$ 79	BIAGINI	91 RVUE	e ⁺ e ⁻ -	$\rightarrow \pi^+\pi^-$, K^+K^-	0
••• We do not use the following data for averages, fits, limits, etc. ••• 310 ± 140 AUBERT 07AU BABR 10.6 $e^+e^- \rightarrow \eta'\pi^+\pi^-\gamma$ $\overrightarrow{Pp} \rightarrow \pi\pi$ VALUE (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> ••• We do not use the following data for averages, fits, limits, etc. ••• ~ 296 HASAN 94 RVUE $\overrightarrow{pp} \rightarrow \pi\pi$ ~ 244 HASAN 94 RVUE $\overrightarrow{pp} \rightarrow \pi\pi$ ~ 40 10 OAKDEN 94 RVUE $0.36-1.55 \ \overrightarrow{pp} \rightarrow \pi\pi$ ~ 40 10 OAKDEN 94 RVUE 0.36-1.55 $\overrightarrow{pp} \rightarrow \pi\pi$ ~ 250 11 MARTIN 806 RVUE ~ 200 11 MARTIN 80C RVUE S-CHANNEL \overrightarrow{NN} VALUE (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> ••• We do not use the following data for averages, fits, limits, etc. ••• 230 ± 50 12 ANISOVICH 02 SPEC 0.6-1.9 $p\overrightarrow{p} \rightarrow \omega\pi^{0}, \omega\eta\pi^{0}, \pi^+\pi^-$ 135 ± 75 13,14 COUPLAND 77 CNTR 0.7-2.4 $\overrightarrow{pp} \rightarrow \overrightarrow{pp}$ 98 ± 8 14 ALSPECTOR 73 CNTR \overrightarrow{pp} S channel ~ 85 15 ABRAMS 70 CNTR S channel \overrightarrow{pN} $\overrightarrow{\pi^-p} \rightarrow \omega\pi^0 n$ VALUE (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> 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 $\pi^-p \rightarrow \omega\pi^0 n$ 9 Includes ATKINSON 85. 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. 11 $I(J^P) = 1(1^-)$ from simultaneous analysis of $p\overrightarrow{p} \rightarrow \pi^-\pi^+$ 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 Isospino 0 and 1 not separated.	410 ± 100	⁹ CLEGG	90 RVUE	e ⁺ e ⁻ -	→ $3(\pi^+\pi^-)$, $2(\pi^+)$	$\pi^{-}\pi^{0})$
310±140 AUBERT 07AU BABR 10.6 e ⁺ e ⁻ → η'π ⁺ π ⁻ γ $\overline{p}p \rightarrow \pi\pi$ DOCUMENT ID TECN COMMENT ••• We do not use the following data for averages, fits, limits, etc. ••• ~296 HASAN 94 RVUE $\overline{p}p \rightarrow \pi\pi$ ~244 HASAN 94 RVUE $\overline{p}p \rightarrow \pi\pi$ ~40 10 OAKDEN 94 RVUE 0.36-1.55 $\overline{p}p \rightarrow \pi\pi$ ~250 11 MARTIN 808 RVUE ~200 11 MARTIN 808 RVUE ~200 11 MARTIN 808 RVUE SCHANNEL $\overline{N}N$ DOCUMENT ID TECN COMMENT VALUE (MeV) DOCUMENT ID TECN COMMENT 98±8 1 ⁴ ALSPECTOR 73 CNTR $0.7-2.4 \ \overline{p}p \rightarrow \overline{p}p$ $9 \ \overline{p}p$ 98±8 1 ⁴ ALSPECTOR 73 CNTR $COMMENT$ VALUE (MeV) DOCUMENT ID TECN COMMENT VALUE (MeV) DOCUMENT ID TECN COMMENT VALUE (MeV) DOCUMENT ID TECN COMMENT VALUE (MeV)	• • • We do not u	se the following dat	a for averages	, fits, limi	ts, etc. ● ● ●	
$\overline{p} p \rightarrow \pi \pi$ $\frac{VALUE (MeV)}{VALUE (MeV)} DOCUMENT ID TECN COMMENT$ •• We do not use the following data for averages, fits, limits, etc. ••• $\sim 296 HASAN 94 RVUE \overline{p} p \rightarrow \pi \pi$ $\sim 244 HASAN 94 RVUE \overline{p} p \rightarrow \pi \pi$ $\sim 40 10 OAKDEN 94 RVUE 0.36-1.55 \overline{p} p \rightarrow \pi \pi$ $\sim 250 11 MARTIN 80B RVUE 0.36-1.55 \overline{p} p \rightarrow \pi \pi$ $\sim 200 11 MARTIN 80C RVUE$ •• We do not use the following data for averages, fits, limits, etc. ••• $230 \pm 50 12 ANISOVICH 02 SPEC 0.6-1.9 p\overline{p} \rightarrow \omega \pi^{0}, \omega \eta \pi^{0}, \pi^{+} \pi^{-}$ $135 \pm 75 13.14 COUPLAND 77 CNTR 0.7-2.4 \overline{p} \rightarrow \overline{p} p$ $98 \pm 8 14 ALSPECTOR 73 CNTR \overline{p} p S channel$ $\sim 85 15 ABRAMS 70 CNTR S channel \overline{p}N$ $\pi^{-} p \rightarrow \omega \pi^{0} n$ $VALUE (MeV) DOCUMENT ID TECN COMMENT$ The data in this block is included in the average printed for a previous datablock. $320 \pm 70 ALDE 95 GAM2 38 \pi^{-} p \rightarrow \omega \pi^{0} n$ $9 Includes ATKINSON 85.$ $10 See however KLOET 96 who fit \pi^{+} \pi^{-} only and find waves only up to J = 3 to be important but not significantly resonant. 11 I(J^{P}) = 1(1^{-}) \text{ from simultaneous analysis of p\overline{p} \rightarrow \pi^{-} \pi^{+} and \pi^{0} \pi^{0}. 12 From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E and ANISOVICH 02. 13 From a fit to the total elastic cross section. 14 Isospins 0 and 1 not separated.$	310±140	AUBERT	07AU BABR	10.6 e ⁺	$e^- \rightarrow \eta' \pi^+ \pi^- \gamma$	
b UNLDE (MEV) b UNLDE (MEV) b UNLDE (MEV) b UNLDE (MEV) c U	$\overline{p}p \rightarrow \pi\pi$	D	OCUMENT ID	TEC		
• • We do not use the following data for averages, fits, limits, etc. • • • ~ 296 HASAN 94 RVUE $\overline{p}p \rightarrow \pi\pi$ ~ 40 HASAN 94 RVUE $\overline{p}p \rightarrow \pi\pi$ ~ 40 10 OAKDEN 94 RVUE 0.36-1.55 $\overline{p}p \rightarrow \pi\pi$ ~ 250 11 MARTIN 806 RVUE 0.36-1.55 $\overline{p}p \rightarrow \pi\pi$ ~ 200 11 MARTIN 806 RVUE ~ 200 11 MARTIN 80C RVUE SCHANNEL $\overline{N}N$ <i>VALUE</i> (MeV) <u>DOCUMENT ID</u> TECN COMMENT • • We do not use the following data for averages, fits, limits, etc. • • • 230 ± 50 12 ANISOVICH 02 SPEC 0.6-1.9 $p\overline{p} \rightarrow \omega\pi^{0}, \omega\eta\pi^{0}, \pi^{+}\pi^{-}$ 135 ± 75 13,14 COUPLAND 77 CNTR 0.7-2.4 $\overline{p}p \rightarrow \overline{p}p$ 98 ± 8 14 ALSPECTOR 73 CNTR $\overline{p}p$ S channel ~ 85 15 ABRAMS 70 CNTR S channel ~ 85 15 ABRAMS 70 CNTR S channel ~ 85 15 ABRAMS 70 CNTR S channel ~ 85 0.00 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 $\pi^{-}p \rightarrow \omega\pi^{0}n$ 9 Includes ATKINSON 85. 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. 11 $I(J^{P}) = 1(1^{-})$ from simultaneous analysis of $p\overline{p} \rightarrow \pi^{-}\pi^{+}$ 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.	VALOL (Nev)	<u>v</u>				
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	• • • vve do not u	se the following dat	a for averages	, fits, limi	ts, etc. ● ● ●	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	~ 296	H	IASAN	94 RV	$\bigcup E \ \overline{p} p \to \pi \pi$	
~ 40 ~ 250 ~ 250 ~ 200 11 MARTIN 80B RVUE SCHANNEL $\overline{N}N$ VALUE (MeV) $\overline{DOCUMENT ID}$ <u>TECN</u> <u>COMMENT</u> • • We do not use the following data for averages, fits, limits, etc. • • 230±50 12 ANISOVICH 02 SPEC 0.6–1.9 $p\overline{p} \rightarrow \omega \pi^{0}, \omega \eta \pi^{0}, \pi^{+}\pi^{-}$ 135±75 13,14 COUPLAND 77 CNTR 0.7–2.4 $\overline{p}p \rightarrow \overline{p}p$ 98±8 14 ALSPECTOR 73 CNTR $\overline{p}p$ S channel ~ 85 $\pi^{-}p \rightarrow \omega \pi^{0}n$ VALUE (MeV) The data in this block is included in the average printed for a previous datablock. 320±70 • • We do not use the following data for averages, fits, limits, etc. • • • ~ 300 ALDE 95 GAM2 38 $\pi^{-}p \rightarrow \omega \pi^{0}n$ 9 Includes ATKINSON 85. 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. 11 $I(J^{P}) = 1(1^{-})$ from simultaneous analysis of $p\overline{p} \rightarrow \pi^{-}\pi^{+}$ 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.	~ 244	H	IASAN	94 RV	UE $\overline{p}p \rightarrow \pi\pi$	
^{A MARTIN} 80B RVUE ~ 200 ^{A MARTIN} 80C RVUE SCHANNEL \overline{NN} ^{VALUE (MeV)} DOCUMENT ID <u>TECN</u> <u>COMMENT</u> SOLUTION A COMMENT A COMPLAND 77 CNTR 0.7-2.4 $\overline{p}p \rightarrow \overline{p}p$ 98±8 ¹⁴ ALSPECTOR 73 CNTR $\overline{p}p$ S channel ~ 85 ¹⁵ ABRAMS 70 CNTR S channel $\overline{p}N$ $\pi^{-}p \rightarrow \omega \pi^{0}n$ <u>VALUE (MeV)</u> The data in this block is included in the average printed for a previous datablock. 320±70 ALDE 95 GAM2 38 $\pi^{-}p \rightarrow \omega \pi^{0}n$ A COMMENT ALDE 95 GAM2 38 $\pi^{-}p \rightarrow \omega \pi^{0}n$ C OMMENT C OMMENT ⁹ Includes ATKINSON 85. 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. ¹¹ $I(J^{P}) = 1(1^{-})$ from simultaneous analysis of $p\overline{p} \rightarrow \pi^{-}\pi^{+}$ 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.	~ 40	10 O		94 RV	UE 0.36-1.55 <u>p</u> p -	$\rightarrow \pi\pi$
SCHANNEL \overline{NN} 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 $p\overline{p} \rightarrow \omega \pi^0$, $\omega \eta \pi^0$, $\pi^+ \pi^-$ 135±75 13,14 COUPLAND 77 CNTR 0.7–2.4 $\overline{p}p \rightarrow \overline{p}p$ 98± 8 14 ALSPECTOR 73 CNTR $\overline{p}p$ S channel ~ 85 15 ABRAMS 70 CNTR S channel $\overline{p}N$ $\pi^- p \rightarrow \omega \pi^0 n$ 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 $\pi^- p \rightarrow \omega \pi^0 n$ ⁹ Includes ATKINSON 85. 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. ¹¹ $I(J^P) = 1(1^-)$ from simultaneous analysis of $p\overline{p} \rightarrow \pi^- \pi^+$ 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.	~ 250	11 N		80B RV		
SCHANNEL \overline{NN} VALUE (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> • • • We do not use the following data for averages, fits, limits, etc. • • • 230 ± 50 1 ² ANISOVICH 02 SPEC 0.6-1.9 $p\overline{p} \rightarrow \omega \pi^{0}, \omega \eta \pi^{0}, \pi^{+} \pi^{-}$ 135 ± 75 13,14 COUPLAND 77 CNTR 0.7-2.4 $\overline{p}p \rightarrow \overline{p}p$ 98 ± 8 14 ALSPECTOR 73 CNTR $\overline{p}p$ S channel ~ 85 15 ABRAMS 70 CNTR S channel $\overline{p}N$ $\pi^{-}p \rightarrow \omega \pi^{0}n$ <u>VALUE (MeV)</u> <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> 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 $\pi^{-}p \rightarrow \omega \pi^{0}n$ ⁹ Includes ATKINSON 85. 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. ¹¹ $I(J^{P}) = 1(1^{-})$ from simultaneous analysis of $p\overline{p} \rightarrow \pi^{-}\pi^{+}$ 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.	~ 200	IV	IARTIN	OUL RV	UE	
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93± 8 15 ABRAMS 70 CNTR <i>pp</i> 5 channel π ⁻ <i>p</i> → <i>ωπ</i> ⁰ <i>n</i> <i>VALUE</i> (MeV) <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> The data in this block is included in the average printed for a previous datablock. 320±70 ALDE 95 GAM2 38 π ⁻ <i>p</i> → <i>ωπ</i> ⁰ <i>n</i> • • We do not use the following data for averages, fits, limits, etc. • • • ~ 300 ALDE 92C GAM4 100 π ⁻ <i>p</i> → <i>ωπ</i> ⁰ <i>n</i> ⁹ Includes ATKINSON 85. ¹⁰ See however KLOET 96 who fit π ⁺ π ⁻ only and find waves only up to <i>J</i> = 3 to be important but not significantly resonant. ¹¹ <i>I</i> (<i>J</i> ^{<i>P</i>}) = 1(1 ⁻) from simultaneous analysis of <i>pp</i> → π ⁻ π ⁺ and π ⁰ π 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.	135 ± 75	14 ALCOLOTION	77 CNIR	(0.7-2.4)	$pp \rightarrow pp$	
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 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. 	$II I(J^P) = 1(1^-)$	from simultaneous	analysis of <i>p</i> ₁	$\overline{\mathbf{D}} \to \pi^- c$	π^+ and $\pi^0\pi^0$.	
and ANISOVICH 02. ¹³ From a fit to the total elastic cross section. ¹⁴ Isospins 0 and 1 not separated.	¹² From the comb	ined analysis of AN	VISOVICH 00.	J, ANISO	VICH 01D, ANISOV	CH 01E,
14 Isospins 0 and 1 not separated.	and ANISOVIC	H 02.				
isospins v anu i nor separateu.	14 Isospins 0 and 1	e total elastic cross	section.			
15 Seen as hump in $I = 1$ state. See also COOPER 68. PEASLEE 75 confirm The result.	15 Seen as huma :	n l = 1 state See	also COOPER	2 68 PF	SIFE 75 confirm 7	n resulte
of ABRAMS 70, no narrow structure.	of ABRAMS 70	, no narrow structu	re.	、00. T L/		Presuits
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	Mode	Fraction (Γ_i/Γ)			
Г1	e^+e^-				
Γ ₂	$\pi^+\pi^-$	seen			
Γ ₃	K^+K^-	seen			
Г ₄	$3(\pi^{+}\pi^{-})$	seen			
Γ ₅	$2(\pi^+\pi^-\pi^0)$	seen			
Г ₆	$\eta' \pi^+ \pi^-$	seen			
Г ₇	$f_1(1285)\pi^+\pi^-$	seen			
Г ₈	$\omega \pi^0$	seen			
Г9	$\omega \pi^0 \eta$	seen			
Γ ₁₀	p p				
		$ ho$ (2150) Γ(i)Γ(e^+e^-)/Γ ² (total)			
Г(f ₁	$(1285)\pi^{+}\pi^{-}) \times$	$\Gamma(e^+e^-)/\Gamma_{\text{total}}^2$	$\Gamma_7\Gamma_1/\Gamma^2$		
VALUE	(units 10 ⁻⁷)	DOCUMENT ID TECN COMMENT			
3.1±	0.6±0.5 ¹⁶	AUBERT 07AU BABR 10.6 $e^+e^- \rightarrow f_1(12)$	285) $\pi^+ \pi^- \gamma$		
¹⁶ C	alculated by us from	the reported value of cross section at the peak.			
Г(η′	$\pi^+\pi^-)$ × $\Gamma(e^+e^-)$	e ⁻)/Γ ² _{total}	$\Gamma_6\Gamma_1/\Gamma^2$		
VALUE	E (units 10 ⁻⁸)	DOCUMENT ID TECN COMMENT			
• • •	We do not use the f	ollowing data for averages, fits, limits, etc. $ullet$ $ullet$			
$4.9\pm$.9±1.9 ¹⁷ AUBERT 07AU BABR 10.6 $e^+e^- \rightarrow \eta' \pi^+\pi^-\gamma$				
¹⁷ C	alculated by us from	the reported value of cross section at the peak.			

ρ (2150) DECAY MODES

ρ (2150) REFERENCES

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

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ABRAMS	67C	PRL 18 1209	R.J. Abrams <i>et al.</i>	` (BNL)

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