

$\pi_1(1600)$

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

$\pi_1(1600)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1660⁺¹⁵₋₁₁ OUR AVERAGE		Error includes scale factor of 1.2.		
1564 ± 24 ± 86		¹ RODAS	19 JPAC	191 $\pi^- p \rightarrow \eta^{(\prime)} \pi^- p$
1600 ⁺¹¹⁰ ₋₆₀	46M	² AGHASYAN	18B COMP	190 $\pi^- p \rightarrow \pi^- \pi^+ \pi^- p$
1664 ± 8 ± 10	145k	³ LU	05 B852	18 $\pi^- p \rightarrow \omega \pi^- \pi^0 p$
1709 ± 24 ± 41	69k	⁴ KUHN	04 B852	18 $\pi^- p \rightarrow \eta \pi^+ \pi^- \pi^- p$
1597 ± 10 ⁺⁴⁵ ₋₁₀		⁴ IVANOV	01 B852	18 $\pi^- p \rightarrow \eta' \pi^- p$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1660 ± 10 ⁺⁰ ₋₆₄	420k	⁵ ALEKSEEV	10 COMP	190 $\pi^- Pb \rightarrow \pi^- \pi^- \pi^+ Pb'$
1593 ± 8 ⁺²⁹ ₋₄₇		^{4,6} ADAMS	98B B852	18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$

¹ The coupled-channel analysis of both the $\eta\pi$ and $\eta'\pi$ systems using ADOLPH 15data. The mass is extracted from the T-matrix pole.

² Statistical error negligible.

³ May be a different state: natural and unnatural parity exchanges.

⁴ Natural parity exchange.

⁵ Superseded by AGHASYAN 2018B.

⁶ Superseded by DZIERBA 06 excluding this state in a more refined PWA analysis, with 2.6 M events of $\pi^- p \rightarrow \pi^- \pi^- \pi^+ p$ and 3 M events of $\pi^- p \rightarrow \pi^- \pi^0 \pi^0 p$ of E852 data.

$\pi_1(1600)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
257 ± 60 OUR AVERAGE		Error includes scale factor of 1.9. See the ideogram below.		
492 ± 54 ± 102		¹ RODAS	19 JPAC	191 $\pi^- p \rightarrow \eta^{(\prime)} \pi^- p$
580 ⁺¹⁰⁰ ₋₂₃₀	46M	² AGHASYAN	18B COMP	190 $\pi^- p \rightarrow \pi^- \pi^+ \pi^- p$
185 ± 25 ± 28	145k	³ LU	05 B852	18 $\pi^- p \rightarrow \omega \pi^- \pi^0 p$
403 ± 80 ± 115	69k	⁴ KUHN	04 B852	18 $\pi^- p \rightarrow \eta \pi^+ \pi^- \pi^- p$
340 ± 40 ± 50		⁴ IVANOV	01 B852	18 $\pi^- p \rightarrow \eta' \pi^- p$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
269 ± 21 ⁺⁴² ₋₆₄	420k	⁵ ALEKSEEV	10 COMP	190 $\pi^- Pb \rightarrow \pi^- \pi^- \pi^+ Pb'$
168 ± 20 ⁺¹⁵⁰ ₋₁₂		^{4,6} ADAMS	98B B852	18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$

¹ The coupled-channel analysis of both the $\eta\pi$ and $\eta'\pi$ systems using ADOLPH 15data. The width is extracted from the T-matrix pole.

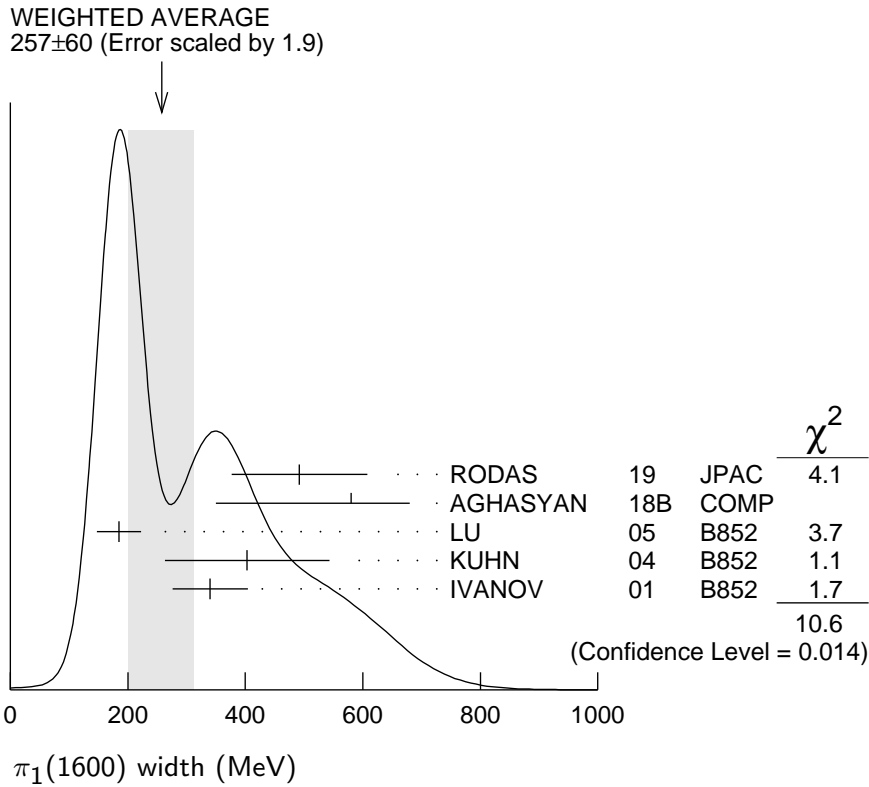
² Statistical error negligible.

³ May be a different state: natural and unnatural parity exchanges.

⁴ Natural parity exchange.

⁵ Superseded by AGHASYAN 2018B.

⁶ Superseded by DZIERBA 06 excluding this state in a more refined PWA analysis, with 2.6 M events of $\pi^- p \rightarrow \pi^- \pi^- \pi^+ p$ and 3 M events of $\pi^- p \rightarrow \pi^- \pi^0 \pi^0 p$ of E852 data.



$\pi_1(1600)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $\pi \pi \pi$	seen
Γ_2 $\rho^0 \pi^-$	seen
Γ_3 $f_2(1270) \pi^-$	not seen
Γ_4 $b_1(1235) \pi$	seen
Γ_5 $\eta'(958) \pi^-$	seen
Γ_6 $f_1(1285) \pi$	seen

$\pi_1(1600)$ BRANCHING RATIOS

$\Gamma(\rho^0 \pi^-)/\Gamma_{\text{total}}$				Γ_2/Γ
VALUE	DOCUMENT ID	TECN	COMMENT	
seen	ALEKSEEV	10	COMP 190 $\pi^- Pb \rightarrow \pi^- \pi^- \pi^+ Pb'$	
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
not seen	NOZAR	09	CLAS $\gamma p \rightarrow 2\pi^+ \pi^- n$	
not seen	¹ DZIERBA	06	B852 18 $\pi^- p$	

¹ From the PWA analysis of 2.6 M $\pi^- p \rightarrow \pi^- \pi^- \pi^+ p$ and 3 M events of $\pi^- p \rightarrow \pi^- \pi^0 \pi^0 p$ of E852 data. Supersedes ADAMS 98B.

$\Gamma(f_2(1270)\pi^-)/\Gamma_{\text{total}}$ Γ_3/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
not seen	¹ DZIERBA	06	B852 18 $\pi^- p$

¹ From the PWA analysis of 2.6 M $\pi^- p \rightarrow \pi^- \pi^- \pi^+ p$ and 3 M events of $\pi^- p \rightarrow \pi^- \pi^0 \pi^0 p$ of E852 data. Supersedes CHUNG 02.

$\Gamma(b_1(1235)\pi)/\Gamma_{\text{total}}$ Γ_4/Γ

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
seen	35280	¹ BAKER	03	SPEC $\bar{p} p \rightarrow \omega \pi^+ \pi^- \pi^0$

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

seen	145k	LU	05	B852 18 $\pi^- p \rightarrow \omega \pi^- \pi^0 p$
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¹ $B((b_1\pi)_{D\text{-wave}})/B((b_1\pi)_{S\text{-wave}})=0.3 \pm 0.1$.

$\Gamma(\eta'(958)\pi^-)/\Gamma_{\text{total}}$ Γ_5/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
seen	IVANOV	01	B852 18 $\pi^- p \rightarrow \eta' \pi^- p$

$\Gamma(f_1(1285)\pi)/\Gamma(\eta'(958)\pi^-)$ Γ_6/Γ_5

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
3.80 ± 0.78	69k	¹ KUHN	04	B852 18 $\pi^- p \rightarrow \eta \pi^+ \pi^- \pi^- p$

¹ Using $\eta'(958)\pi$ data from IVANOV 01.

$\pi_1(1600)$ REFERENCES

RODAS	19	PRL 122 042002	A. Rodas <i>et al.</i>	(JPAC Collab.)
AGHASYAN	18B	PR D98 092003	M. Aghasyan <i>et al.</i>	(COMPASS Collab.)
ADOLPH	15	PL B740 303	M. Adolph <i>et al.</i>	(COMPASS Collab.)
ALEKSEEV	10	PRL 104 241803	M.G. Alekseev <i>et al.</i>	(COMPASS Collab.)
NOZAR	09	PRL 102 102002	M. Nozar <i>et al.</i>	(JLab CLAS Collab.)
DZIERBA	06	PR D73 072001	A.R. Dzierba <i>et al.</i>	(BNL E852 Collab.)
LU	05	PRL 94 032002	M. Lu <i>et al.</i>	(BNL E852 Collab.)
KUHN	04	PL B595 109	J. Kuhn <i>et al.</i>	(BNL E852 Collab.)
BAKER	03	PL B563 140	C.A. Baker <i>et al.</i>	
CHUNG	02	PR D65 072001	S.U. Chung <i>et al.</i>	(BNL E852 Collab.)
IVANOV	01	PRL 86 3977	E.I. Ivanov <i>et al.</i>	(BNL E852 Collab.)
ADAMS	98B	PRL 81 5760	G.S. Adams <i>et al.</i>	(BNL E852 Collab.)