

$\pi(1800)$

$$I^G(J^{PC}) = 1^-(0^{-+})$$

See also minireview under non- $q\bar{q}$ candidates in PDG 06, Journal of Physics, G **33** 1 (2006).

$\pi(1800)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
1812 ± 12 OUR AVERAGE		Error includes scale factor of 2.3. See the ideogram below.			
1785 ± 9 ⁺¹² ₋₆	420k	ALEKSEEV	10	COMP	190 $\pi^- Pb \rightarrow \pi^- \pi^- \pi^+ Pb'$
1876 ± 18 ± 16	4k	¹ EUGENIO	08	B852	- 18 $\pi^- p \rightarrow \eta \eta \pi^- p$
1774 ± 18 ± 20		² CHUNG	02	B852	18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$
1863 ± 9 ± 10		³ CHUNG	02	B852	18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$
1840 ± 10 ± 10	1200	AMELIN	96B	VES	- 37 $\pi^- A \rightarrow \eta \eta \pi^- A$
1775 ± 7 ± 10		⁴ AMELIN	95B	VES	- 36 $\pi^- A \rightarrow \pi^+ \pi^- \pi^- A$
1790 ± 14		⁵ BERDNIKOV	94	VES	- 37 $\pi^- A \rightarrow K^+ K^- \pi^- A$
1873 ± 33 ± 20		BELADIDZE	92C	VES	- 36 $\pi^- Be \rightarrow \pi^- \eta' \eta Be$
1814 ± 10 ± 23	426 ± 57	BITYUKOV	91	VES	- 36 $\pi^- C \rightarrow \pi^- \eta \eta C$
1770 ± 30	1100	BELLINI	82	SPEC	- 40 $\pi^- A \rightarrow 3\pi A$
1737 ± 5 ± 15		AMELIN	99	VES	37 $\pi^- A \rightarrow \omega \pi^- \pi^0 A^*$

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

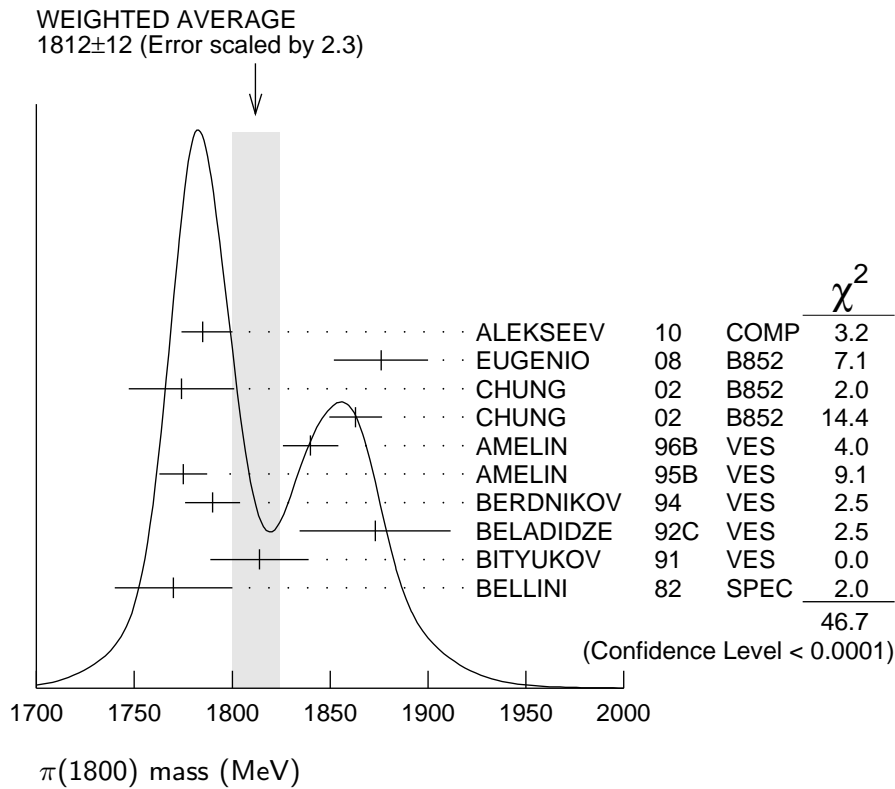
¹ From a single-pole fit.

² In the $f_0(980)\pi$ wave.

³ In the $f_0(500)\pi$ wave.

⁴ From a fit to $J^{PC} = 0^{-+} f_0(980)\pi, f_0(1370)\pi$ waves.

⁵ From a fit to $J^{PC} = 0^{-+} K_0^*(1430)K^-$ and $f_0(980)\pi^-$ waves.



$\pi(1800)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
208±12 OUR AVERAGE					
208±22 ⁺²¹ ₋₃₇	420k	ALEKSEEV	10	COMP	190 $\pi^- Pb \rightarrow \pi^- \pi^- \pi^+ Pb'$
221±26±38	4k	⁶ EUGENIO	08	B852	- 18 $\pi^- p \rightarrow \eta \eta \pi^- p$
223±48±50		⁷ CHUNG	02	B852	18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$
191±21±20		⁸ CHUNG	02	B852	18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$
210±30±30	1200	AMELIN	96B	VES	- 37 $\pi^- A \rightarrow \eta \eta \pi^- A$
190±15±15		⁹ AMELIN	95B	VES	- 36 $\pi^- A \rightarrow \pi^+ \pi^- \pi^- A$
210±70		¹⁰ BERDNIKOV	94	VES	- 37 $\pi^- A \rightarrow K^+ K^- \pi^- A$
225±35±20		BELADIDZE	92C	VES	- 36 $\pi^- Be \rightarrow \pi^- \eta' \eta Be$
205±18±32	426 ± 57	BITYUKOV	91	VES	- 36 $\pi^- C \rightarrow \pi^- \eta \eta C$
310±50	1100	BELLINI	82	SPEC	- 40 $\pi^- A \rightarrow 3\pi A$

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

259±19±6 AMELIN 99 VES 37 $\pi^- A \rightarrow \omega \pi^- \pi^0 A^*$

⁶ From a single-pole fit.

⁷ In the $f_0(980)\pi$ wave.

⁸ In the $f_0(500)\pi$ wave.

⁹ From a fit to $J^{PC} = 0^- + f_0(980)\pi, f_0(1370)\pi$ waves.

¹⁰ From a fit to $J^{PC} = 0^- + K_0^*(1430)K^-$ and $f_0(980)\pi^-$ waves.

$\pi(1800)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $\pi^+ \pi^- \pi^-$	seen
Γ_2 $f_0(500) \pi^-$	seen
Γ_3 $f_0(980) \pi^-$	seen
Γ_4 $f_0(1370) \pi^-$	seen
Γ_5 $f_0(1500) \pi^-$	not seen
Γ_6 $\rho \pi^-$	not seen
Γ_7 $\eta \eta \pi^-$	seen
Γ_8 $a_0(980) \eta$	seen
Γ_9 $a_2(1320) \eta$	not seen
Γ_{10} $f_2(1270) \pi$	not seen
Γ_{11} $f_0(1370) \pi^-$	not seen
Γ_{12} $f_0(1500) \pi^-$	seen
Γ_{13} $\eta \eta'(958) \pi^-$	seen
Γ_{14} $K_0^*(1430) K^-$	seen
Γ_{15} $K^*(892) K^-$	not seen

$\pi(1800)$ BRANCHING RATIOS

$\Gamma(f_0(980)\pi^-)/\Gamma(f_0(500)\pi^-)$ Γ_3/Γ_2

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
0.44 ± 0.08 ± 0.38	¹¹ CHUNG	02	B852	18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$

$\Gamma(f_0(980)\pi^-)/\Gamma(f_0(1370)\pi^-)$ Γ_3/Γ_4

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.7 ± 1.3	¹² AMELIN	95B	VES	— 36 $\pi^- A \rightarrow \pi^+ \pi^- \pi^- A$

$\Gamma(f_0(1370)\pi^-)/\Gamma_{\text{total}}$ Γ_4/Γ

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
seen	BELLINI	82	SPEC	— 40 $\pi^- A \rightarrow 3\pi A$

$\Gamma(f_0(1500)\pi^-)/\Gamma_{\text{total}}$ Γ_5/Γ

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
not seen	CHUNG	02	B852	18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$

$\Gamma(\rho\pi^-)/\Gamma_{\text{total}}$ Γ_6/Γ

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
not seen	BELLINI	82	SPEC	— 40 $\pi^- A \rightarrow 3\pi A$

$\Gamma(\rho\pi^-)/\Gamma(f_0(980)\pi^-)$ Γ_6/Γ_3

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.25		CHUNG	02	B852	18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$
<0.14	90	AMELIN	95B	VES	— 36 $\pi^- A \rightarrow \pi^+ \pi^- \pi^- A$

$\Gamma(\eta\eta\pi^-)/\Gamma(\pi^+\pi^-\pi^-)$ Γ_7/Γ_1

VALUE EVTS DOCUMENT ID TECN CHG COMMENT

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

0.5 ± 0.1 1200 ¹² AMELIN 96B VES – 37 $\pi^- A \rightarrow \eta\eta\pi^- A$

$\Gamma(a_2(1320)\eta)/\Gamma_{\text{total}}$ Γ_9/Γ

VALUE DOCUMENT ID TECN COMMENT

not seen EUGENIO 08 B852 18 $\pi^- p \rightarrow \eta\eta\pi^- p$

$\Gamma(f_2(1270)\pi)/\Gamma_{\text{total}}$ Γ_{10}/Γ

VALUE DOCUMENT ID TECN COMMENT

not seen EUGENIO 08 B852 18 $\pi^- p \rightarrow \eta\eta\pi^- p$

$\Gamma(f_0(1370)\pi^-)/\Gamma_{\text{total}}$ Γ_{11}/Γ

VALUE DOCUMENT ID TECN COMMENT

not seen EUGENIO 08 B852 18 $\pi^- p \rightarrow \eta\eta\pi^- p$

$\Gamma(f_0(1500)\pi^-)/\Gamma(a_0(980)\eta)$ Γ_{12}/Γ_8

VALUE EVTS DOCUMENT ID TECN CHG COMMENT

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

0.48 ± 0.17 4k ^{12,13} EUGENIO 08 B852 – 18 $\pi^- p \rightarrow \eta\eta\pi^- p$

0.030 ^{+0.014} _{-0.011} ¹² ANISOVICH 01B SPEC 0 0.6–1.94 $p\bar{p} \rightarrow \eta\eta\pi^0\pi^0$

0.08 ± 0.03 1200 ^{12,14} AMELIN 96B VES – 37 $\pi^- A \rightarrow \eta\eta\pi^- A$

$\Gamma(\eta\eta'(958)\pi^-)/\Gamma(\eta\eta\pi^-)$ Γ_{13}/Γ_7

VALUE EVTS DOCUMENT ID TECN CHG COMMENT

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

0.29 ± 0.07 ¹² BELADIDZE 92C VES – 36 $\pi^- \text{Be} \rightarrow \pi^- \eta' \eta \text{Be}$

0.3 ± 0.1 426 ± 57 ¹² BITYUKOV 91 VES – 36 $\pi^- C \rightarrow \pi^- \eta \eta C$

$\Gamma(K_0^*(1430)K^-)/\Gamma_{\text{total}}$ Γ_{14}/Γ

VALUE DOCUMENT ID TECN CHG COMMENT

seen BERDNIKOV 94 VES – 37 $\pi^- A \rightarrow K^+ K^- \pi^- A$

$\Gamma(K^*(892)K^-)/\Gamma_{\text{total}}$ Γ_{15}/Γ

VALUE DOCUMENT ID TECN CHG COMMENT

not seen BERDNIKOV 94 VES – 37 $\pi^- A \rightarrow K^+ K^- \pi^- A$

¹¹ Assuming that $f_0(980)$ decays only to $\pi\pi$.

¹² Systematic errors not estimated.

¹³ From a single-pole fit.

¹⁴ Assuming that $f_0(1500)$ decays only to $\eta\eta$ and $a_0(980)$ decays only to $\eta\pi$.

$\pi(1800)$ REFERENCES

ALEKSEEV	10	PRL 104 241803	M.G. Alekseev <i>et al.</i>	(COMPASS Collab.)
EUGENIO	08	PL B660 466	P. Eugenio <i>et al.</i>	(BNL E852 Collab.)
PDG	06	JPG 33 1	W.-M. Yao <i>et al.</i>	(PDG Collab.)
CHUNG	02	PR D65 072001	S.U. Chung <i>et al.</i>	(BNL E852 Collab.)
ANISOVICH	01B	PL B500 222	A.V. Anisovich <i>et al.</i>	
AMELIN	99	PAN 62 445	D.V. Amelin <i>et al.</i>	(VES Collab.)
		Translated from YAF 62	487.	
AMELIN	96B	PAN 59 976	D.V. Amelin <i>et al.</i>	(SERP, TBIL) IGJPC
		Translated from YAF 59	1021.	
AMELIN	95B	PL B356 595	D.V. Amelin <i>et al.</i>	(SERP, TBIL)
BERDNIKOV	94	PL B337 219	E.B. Berdnikov <i>et al.</i>	(SERP, TBIL)
BELADIDZE	92C	SJNP 55 1535	G.M. Beladidze, S.I. Bitukov, G.V. Borisov	(SERP+)
		Translated from YAF 55	2748.	
BITYUKOV	91	PL B268 137	S.I. Bitukov <i>et al.</i>	(SERP, TBIL)
BELLINI	82	PRL 48 1697	G. Bellini <i>et al.</i>	(MILA, BGNA, JINR)
