

$\pi(1800)$

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

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
1816±14 OUR AVERAGE		Error includes scale factor of 2.3. See the ideogram below.			
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 $\pi^- A \rightarrow 3\pi A$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
1737± 5±15		AMELIN	99	VES	37 $\pi^- A \rightarrow \omega\pi^-\pi^0 A^*$

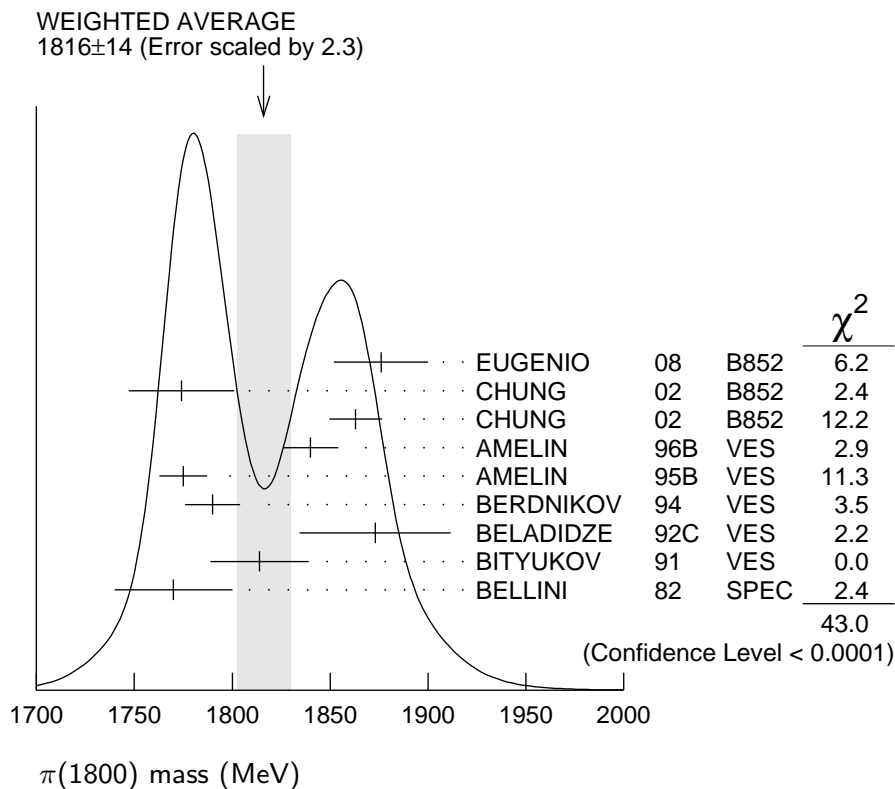
¹ From a single-pole fit.

² In the $f_0(980)\pi$ wave.

³ In the $f_0(600)\pi$ wave.

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

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



$\pi(1800)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
208 ± 12 OUR AVERAGE					
$221 \pm 26 \pm 38$	4k	⁶ EUGENIO	08	B852	— 18 $\pi^- p \rightarrow \eta \eta \pi^- p$
$223 \pm 48 \pm 50$		⁷ CHUNG	02	B852	18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$
$191 \pm 21 \pm 20$		⁸ CHUNG	02	B852	18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$
$210 \pm 30 \pm 30$	1200	AMELIN	96B	VES	— 37 $\pi^- A \rightarrow \eta \eta \pi^- A$
$190 \pm 15 \pm 15$		⁹ AMELIN	95B	VES	— 36 $\pi^- A \rightarrow \pi^+ \pi^- \pi^- A$
210 ± 70		¹⁰ BERDNIKOV	94	VES	— 37 $\pi^- A \rightarrow K^+ K^- \pi^- A$
$225 \pm 35 \pm 20$		BELADIDZE	92C	VES	— 36 $\pi^- Be \rightarrow \pi^- \eta' \eta Be$
$205 \pm 18 \pm 32$	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. • • •

$259 \pm 19 \pm 6$ 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 $f_0(600)\pi$ 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)
$\Gamma_1 \quad \pi^+ \pi^- \pi^-$	seen
$\Gamma_2 \quad f_0(600) \pi^-$	seen
$\Gamma_3 \quad f_0(980) \pi^-$	seen
$\Gamma_4 \quad f_0(1370) \pi^-$	seen
$\Gamma_5 \quad f_0(1500) \pi^-$	not seen
$\Gamma_6 \quad \rho \pi^-$	not seen
$\Gamma_7 \quad \eta \eta \pi^-$	seen
$\Gamma_8 \quad a_0(980) \eta$	seen
$\Gamma_9 \quad a_2(1320) \eta$	not seen
$\Gamma_{10} \quad f_2(1270) \pi$	not seen
$\Gamma_{11} \quad f_0(1370) \pi^-$	not seen
$\Gamma_{12} \quad f_0(1500) \pi^-$	seen
$\Gamma_{13} \quad \eta \eta'(958) \pi^-$	seen
$\Gamma_{14} \quad K_0^*(1430) K^-$	seen
$\Gamma_{15} \quad K^*(892) K^-$	not seen

$\pi(1800)$ BRANCHING RATIOS

$\Gamma(f_0(980)\pi^-)/\Gamma(f_0(600)\pi^-)$ 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
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.5 ± 0.1	1200	¹² AMELIN	96B	VES	– 37 $\pi^- A \rightarrow \eta\eta\pi^- A$
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$\Gamma(a_2(1320)\eta)/\Gamma_{\text{total}}$ Γ_9/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
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not seen	EUGENIO	08	B852 18 $\pi^- p \rightarrow \eta\eta\pi^- p$
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$\Gamma(f_2(1270)\pi)/\Gamma_{\text{total}}$ Γ_{10}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
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not seen	EUGENIO	08	B852 18 $\pi^- p \rightarrow \eta\eta\pi^- p$
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$\Gamma(f_0(1370)\pi^-)/\Gamma_{\text{total}}$ Γ_{11}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
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not seen	EUGENIO	08	B852 18 $\pi^- p \rightarrow \eta\eta\pi^- p$
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$\Gamma(f_0(1500)\pi^-)/\Gamma(a_0(980)\eta)$ Γ_{12}/Γ_8

VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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• • • 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
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• • • 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
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seen	BERDNIKOV	94	VES	– 37 $\pi^- A \rightarrow K^+ K^- \pi^- A$
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$\Gamma(K^*(892)K^-)/\Gamma_{\text{total}}$ Γ_{15}/Γ

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
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not seen	BERDNIKOV	94	VES	– 37 $\pi^- A \rightarrow K^+ K^- \pi^- A$
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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

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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. Bityukov, G.V. Borisov	(SERP+)
		Translated from YAF 55 2748.		
BITYUKOV	91	PL B268 137	S.I. Bityukov <i>et al.</i>	(SERP, TBIL)
BELLINI	82	PRL 48 1697	G. Bellini <i>et al.</i>	(MILA, BGNA, JINR)

OTHER RELATED PAPERS

EBERT	05	MPL A20 1887	D. Ebert, R.N. Faustov, V.O. Galkin	
ZAIMIDOROGA	99	PAN 30 1	O.A. Zaimidoroга	
		Translated from SJPN 30 5.		
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