

π(1800)

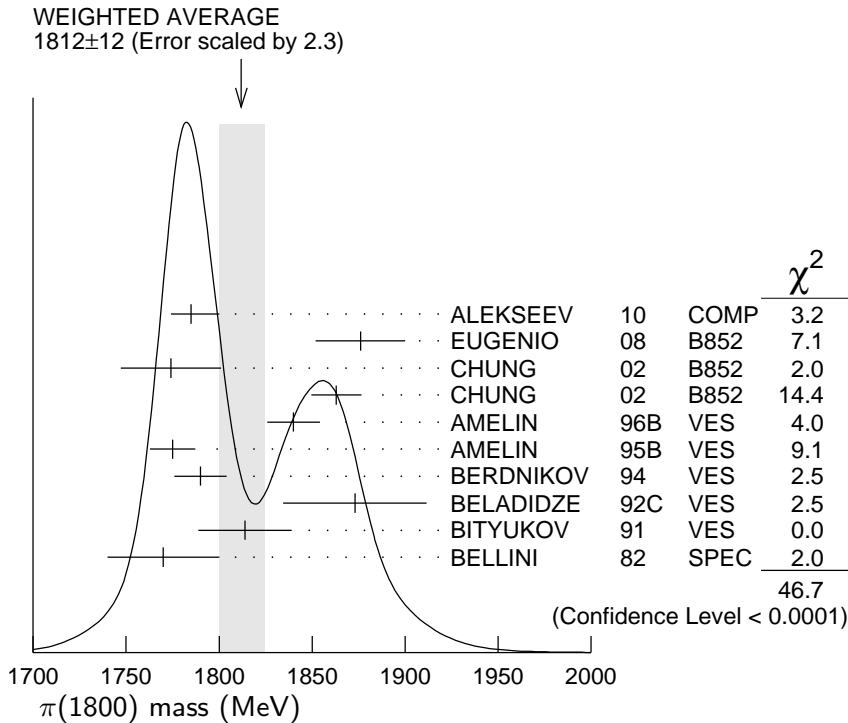
$$I^G(J^{PC}) = 1^-(0^{-+})$$

See also minireview under non- $q\bar{q}$ candidates in PDG 06, *Journal of Physics G33* 1 (2006).

π(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 π ⁻ Pb → π ⁻ π ⁻ π ⁺ Pb'
1876±18±16	4k	¹ EUGENIO	08	B852 -	18 π ⁻ p → ηηπ ⁻ p
1774±18±20		² CHUNG	02	B852	18.3 π ⁻ p → π ⁺ π ⁻ π ⁻ p
1863± 9±10		³ CHUNG	02	B852	18.3 π ⁻ p → π ⁺ π ⁻ π ⁻ p
1840±10±10	1200	AMELIN	96B	VES -	37 π ⁻ A → ηηπ ⁻ A
1775± 7±10		⁴ AMELIN	95B	VES -	36 π ⁻ A → π ⁺ π ⁻ π ⁻ A
1790±14		⁵ BERDNIKOV	94	VES -	37 π ⁻ A → K ⁺ K ⁻ π ⁻ A
1873±33±20		BELADIDZE	92C	VES -	36 π ⁻ Be → π ⁻ η'ηBe
1814±10±23	426 ± 57	BITYUKOV	91	VES -	36 π ⁻ C → π ⁻ ηηC
1770±30	1100	BELLINI	82	SPEC -	40 π ⁻ A → 3πA
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
1737± 5±15		AMELIN	99	VES	37 π ⁻ A → ωπ ⁻ π ⁰ A*

- 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

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
$0.44 \pm 0.08 \pm 0.38$	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

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
1.7 ± 1.3	¹² AMELIN	95B	VES	$36 \pi^- A \rightarrow \pi^+ \pi^- \pi^- A$

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

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
seen	BELLINI	82	SPEC	$40 \pi^- A \rightarrow 3\pi A$

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

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

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

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

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

VALUE	CL%	DOCUMENT ID	TECN	CHG	COMMENT
< 0.25		CHUNG	02	B852	$18.3 \pi^- p \rightarrow \pi^+ \pi^- \pi^- p$
< 0.14	90	AMELIN	95B	VES	$36 \pi^- A \rightarrow \pi^+ \pi^- \pi^- A$

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

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

VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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 $\pi^- \text{C} \rightarrow \pi^- \eta \eta \text{C}$

 $\Gamma(K_0^*(1430)K^-)/\Gamma_{\text{total}}$ 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	JP G33 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.)
AMELIN	96B	Translated from YAF 62 487.		
AMELIN	96B	PAN 59 976	D.V. Amelin <i>et al.</i>	(SERP, TBIL) IGJPC
AMELIN	95B	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. Bitjukov, G.V. Borisov	(SERP+)
BITYUKOV	91	Translated from YAF 55 2748.		
BITYUKOV	91	PL B268 137	S.I. Bitjukov <i>et al.</i>	(SERP, TBIL)
BELLINI	82	PRL 48 1697	G. Bellini <i>et al.</i>	(MILA, BGNA, JINR)