

$\pi(1800)$

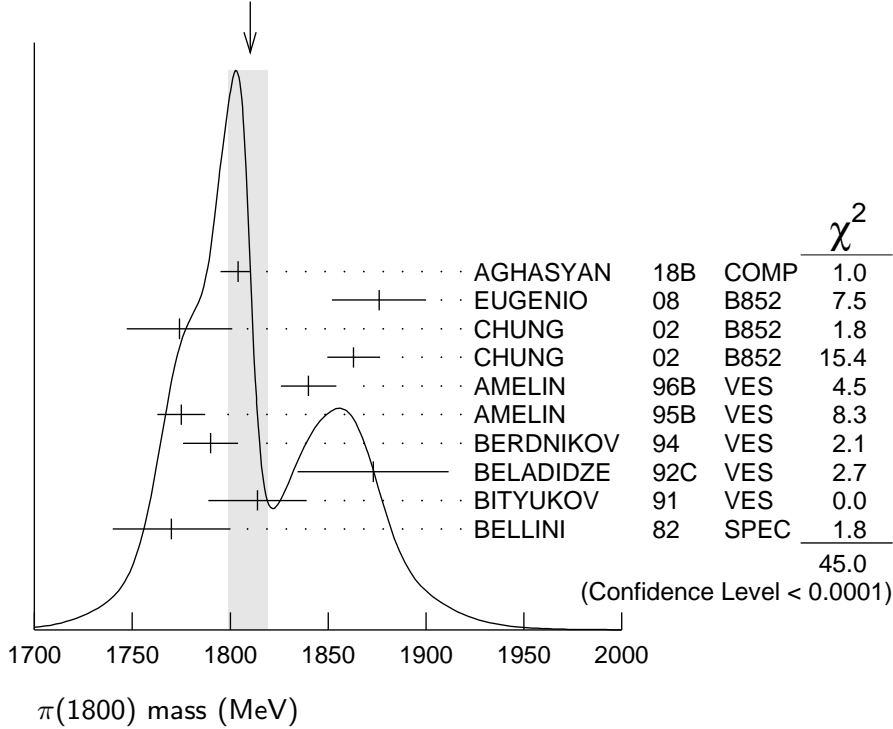
$$I^G(J^{PC}) = 1^-(0^{-+})$$

See the review on "Non- $q\bar{q}$ Mesons." **$\pi(1800)$ MASS**

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
1810^{+9}_{-11}	OUR AVERAGE	Error includes scale factor of 2.2. See the ideogram below.			
1804^{+6}_{-9}	46M	¹ AGHASYAN	18B	COMP	190 $\pi^- p \rightarrow \pi^- \pi^+ \pi^- p$
$1876 \pm 18 \pm 16$	4k	² EUGENIO	08	B852	– 18 $\pi^- p \rightarrow \eta \eta \pi^- p$
$1774 \pm 18 \pm 20$		³ CHUNG	02	B852	18.3 $\pi^- p \rightarrow$ $\pi^+ \pi^- \pi^- p$
$1863 \pm 9 \pm 10$		⁴ CHUNG	02	B852	18.3 $\pi^- p \rightarrow$ $\pi^+ \pi^- \pi^- p$
$1840 \pm 10 \pm 10$	1.2k	AMELIN	96B	VES	– 37 $\pi^- A \rightarrow \eta \eta \pi^- A$
$1775 \pm 7 \pm 10$		⁵ AMELIN	95B	VES	– 36 $\pi^- A \rightarrow \pi^+ \pi^- \pi^- A$
1790 ± 14		⁶ BERDNIKOV	94	VES	– 37 $\pi^- A \rightarrow K^+ K^- \pi^- A$
$1873 \pm 33 \pm 20$		BELADIDZE	92C	VES	– 36 $\pi^- Be \rightarrow \pi^- \eta' \eta Be$
$1814 \pm 10 \pm 23$	426	BITYUKOV	91	VES	– 36 $\pi^- C \rightarrow \pi^- \eta \eta C$
1770 ± 30	1.1k	BELLINI	82	SPEC	– 40 $\pi^- A \rightarrow 3\pi A$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
$1785 \pm 9^{+12}_{-6}$	420k	⁷ ALEKSEEV	10	COMP	190 $\pi^- Pb \rightarrow$ $\pi^- \pi^- \pi^+ Pb'$
$1737 \pm 5 \pm 15$		AMELIN	99	VES	37 $\pi^- A \rightarrow \omega \pi^- \pi^0 A^*$

¹ Statistical error negligible.² From a single-pole fit.³ In the $f_0(980)\pi$ wave.⁴ In the $f_0(500)\pi$ wave.⁵ From a fit to $J^{PC} = 0^{-+} f_0(980)\pi, f_0(1370)\pi$ waves.⁶ From a fit to $J^{PC} = 0^{-+} K_0^*(1430)K^-$ and $f_0(980)\pi^-$ waves.⁷ Superseded by AGHASYAN 2018B.

WEIGHTED AVERAGE
1810+9-11 (Error scaled by 2.2)



$\pi(1800)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
215^{+7}_{-8}					OUR AVERAGE
220^{+8}_{-11}	46M	⁸ AGHASYAN	18B	COMP	190 $\pi^- p \rightarrow \pi^- \pi^+ \pi^- p$
$221 \pm 26 \pm 38$	4k	⁹ EUGENIO	08	B852	18 $\pi^- p \rightarrow \eta \eta \pi^- p$
$223 \pm 48 \pm 50$		¹⁰ CHUNG	02	B852	18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$
$191 \pm 21 \pm 20$		¹¹ CHUNG	02	B852	18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$
$210 \pm 30 \pm 30$	1.2k	AMELIN	96B	VES	37 $\pi^- A \rightarrow \eta \eta \pi^- A$
$190 \pm 15 \pm 15$		¹² AMELIN	95B	VES	36 $\pi^- A \rightarrow \pi^+ \pi^- \pi^- A$
210 ± 70		¹³ 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	BITYUKOV	91	VES	36 $\pi^- C \rightarrow \pi^- \eta \eta C$
310 ± 50	1.1k	BELLINI	82	SPEC	40 $\pi^- A \rightarrow 3\pi A$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
$208 \pm 22^{+21}_{-37}$	420k	¹⁴ ALEKSEEV	10	COMP	190 $\pi^- Pb \rightarrow \pi^- \pi^- \pi^+ Pb'$
$259 \pm 19 \pm 6$		AMELIN	99	VES	37 $\pi^- A \rightarrow \omega \pi^- \pi^0 A^*$

- ⁸Statistical error negligible.
⁹From a single-pole fit.
¹⁰In the $f_0(980)\pi$ wave.
¹¹In the $f_0(500)\pi$ wave.
¹²From a fit to $J^{PC} = 0^{-+} f_0(980)\pi, f_0(1370)\pi$ waves.
¹³From a fit to $J^{PC} = 0^{-+} K_0^*(1430)K^-$ and $f_0(980)\pi^-$ waves.
¹⁴Superseded by AGHASYAN 2018B.

$\pi(1800)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
$\Gamma_1 \quad \pi^+ \pi^- \pi^-$	seen
$\Gamma_2 \quad f_0(500)\pi^-$	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

$\Gamma(f_0(980)\pi^-)/\Gamma(f_0(500)\pi^-)$					Γ_3/Γ_2
VALUE	DOCUMENT ID	TECN	CHG	COMMENT	
0.44 ± 0.08 ± 0.38	¹⁵ 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	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.7 ± 1.3	¹⁶ AMELIN	95B	VES	– 36 $\pi^- A \rightarrow \pi^+ \pi^- \pi^- A$	

$\Gamma(f_0(1370)\pi^-)/\Gamma_{\text{total}}$					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 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$	

$$\Gamma(\rho\pi^-)/\Gamma_{\text{total}} \qquad \Gamma_6/\Gamma$$

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

$$\Gamma(\rho\pi^-)/\Gamma(f_0(980)\pi^-) \qquad \Gamma_6/\Gamma_3$$

VALUE	CL%	DOCUMENT ID	TECN	CHG	COMMENT
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• • • 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 $\pi^- A \rightarrow \pi^+ \pi^- \pi^- A$

$$\Gamma(\eta\eta\pi^-)/\Gamma(\pi^+\pi^-\pi^-) \qquad \Gamma_7/\Gamma_1$$

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	¹⁶ AMELIN	96B	VES	- 37 $\pi^- A \rightarrow \eta\eta\pi^- A$
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$$\Gamma(a_2(1320)\eta)/\Gamma_{\text{total}} \qquad \Gamma_9/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
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not seen EUGENIO 08 B852 18 $\pi^- p \rightarrow \eta\eta\pi^- p$

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

VALUE	DOCUMENT ID	TECN	COMMENT
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not seen EUGENIO 08 B852 18 $\pi^- p \rightarrow \eta\eta\pi^- p$

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

VALUE	DOCUMENT ID	TECN	COMMENT
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not seen EUGENIO 08 B852 18 $\pi^- p \rightarrow \eta\eta\pi^- p$

$$\Gamma(f_0(1500)\pi^-)/\Gamma(a_0(980)\eta) \qquad \Gamma_{12}/\Gamma_8$$

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	^{16,17} EUGENIO	08	B852	- 18 $\pi^- p \rightarrow \eta\eta\pi^- p$
0.030 ^{+0.014} _{-0.011}		¹⁶ ANISOVICH	01B	SPEC	0 0.6-1.94 $p\bar{p} \rightarrow \eta\eta\pi^0\pi^0$
0.08 ± 0.03	1200	^{16,18} AMELIN	96B	VES	- 37 $\pi^- A \rightarrow \eta\eta\pi^- A$

$$\Gamma(\eta\eta'(958)\pi^-)/\Gamma(\eta\eta\pi^-) \qquad \Gamma_{13}/\Gamma_7$$

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		¹⁶ BELADIDZE	92C	VES	- 36 $\pi^- \text{Be} \rightarrow \pi^- \eta' \eta \text{Be}$
0.3 ± 0.1	426 ± 57	¹⁶ BITYUKOV	91	VES	- 36 $\pi^- \text{C} \rightarrow \pi^- \eta \eta \text{C}$

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

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
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seen BERDNIKOV 94 VES - 37 $\pi^- A \rightarrow K^+ K^- \pi^- A$

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

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

¹⁵ Assuming that $f_0(980)$ decays only to $\pi\pi$.

¹⁶ Systematic errors not estimated.

¹⁷ From a single-pole fit.

¹⁸ Assuming that $f_0(1500)$ decays only to $\eta\eta$ and $a_0(980)$ decays only to $\eta\pi$.

 $\pi(1800)$ REFERENCES

AGHASYAN	18B	PR D98 092003	M. Aghasyan <i>et al.</i>	(COMPASS Collab.)
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.)
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	PAN 59 976	D.V. Amelin <i>et al.</i>	(SERP, TBIL) IGJPC
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+)
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)