

π(1800)

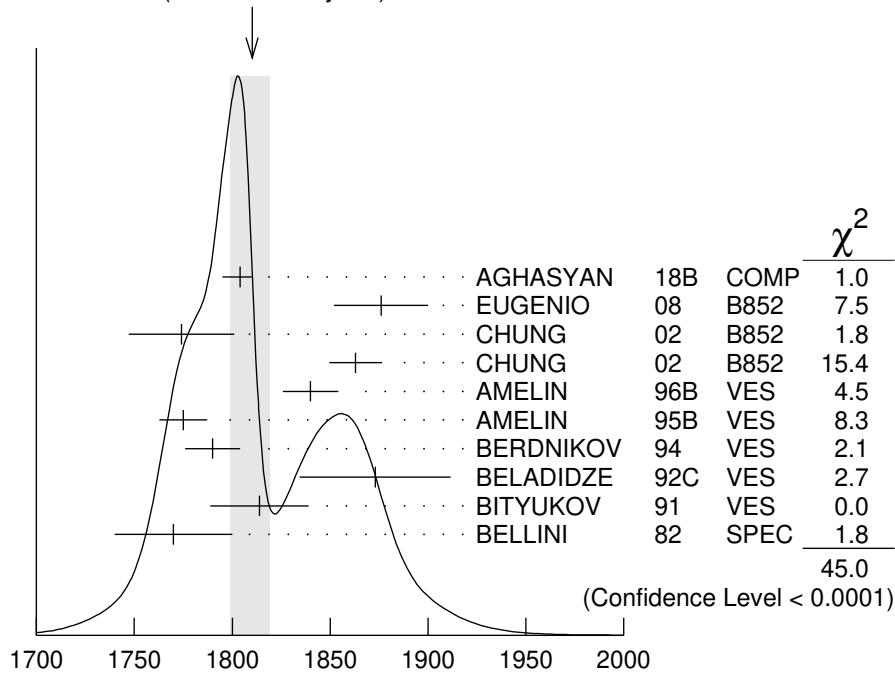
$$I^G(J^{PC}) = 1^-(0^{-+})$$

See the review on "Non- $q\bar{q}$ Mesons."

π(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 π ⁻ p → π ⁻ π ⁺ π ⁻ p
1876 ± 18 ± 16	4k	² EUGENIO	08	B852	- 18 π ⁻ p → ηηπ ⁻ p
1774 ± 18 ± 20		³ CHUNG	02	B852	18.3 π ⁻ p → π ⁺ π ⁻ π ⁻ p
1863 ± 9 ± 10		⁴ CHUNG	02	B852	18.3 π ⁻ p → π ⁺ π ⁻ π ⁻ p
1840 ± 10 ± 10	1.2k	AMELIN	96B	VES	- 37 π ⁻ A → ηηπ ⁻ A
1775 ± 7 ± 10		⁵ AMELIN	95B	VES	- 36 π ⁻ A → π ⁺ π ⁻ π ⁻ A
1790 ± 14		⁶ BERDNIKOV	94	VES	- 37 π ⁻ A → K ⁺ K ⁻ π ⁻ A
1873 ± 33 ± 20		BELADIDZE	92C	VES	- 36 π ⁻ Be → π ⁻ η' η Be
1814 ± 10 ± 23	426	BITYUKOV	91	VES	- 36 π ⁻ C → π ⁻ ηη C
1770 ± 30	1.1k	BELLINI	82	SPEC	- 40 π ⁻ A → 3π A
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
1785 ± 9 ⁺¹² ₋₆	420k	⁷ ALEKSEEV	10	COMP	190 π ⁻ Pb → π ⁻ π ⁻ π ⁺ Pb'
1737 ± 5 ± 15		AMELIN	99	VES	37 π ⁻ A → ω π ⁻ π ⁰ A*

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



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⁷ Superseded by AGHASYAN 2018B.
 $\pi(1800)$ mass (MeV)

$\pi(1800)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
215^{+8}_{-11} 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 $\pi^- A \rightarrow \omega \pi^- \pi^0 A^*$

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¹⁴ Superseded by AGHASYAN 2018B.

$\pi(1800)$ 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	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

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
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• • • We do not use the following data for averages, fits, limits, etc. • • •

1.7±1.3	¹⁶ AMELIN	95B	VES	–	36 $\pi^- A \rightarrow \pi^+ \pi^- \pi^- A$
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$\Gamma(f_0(1370)\pi^-)/\Gamma_{\text{total}}$ 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>
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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 $\pi^- A \rightarrow \pi^+ \pi^- \pi^- A$

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

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
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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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$\Gamma(a_2(1320)\eta)/\Gamma_{\text{total}}$ Γ_9/Γ

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
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
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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 $\pi^- A \rightarrow \eta\eta\pi^- A$

 $\Gamma(\eta\eta'(958)\pi^-)/\Gamma(\eta\eta\pi^-)$ 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	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 $\pi^- \text{C} \rightarrow \pi^- \eta \eta \text{C}$

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

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

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

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

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

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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.)
	Translated from YAF 62 487.		
AMELIN 96B	PAN 59 976	D.V. Amelin <i>et al.</i>	(SERP, TBIL) IGJPC
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AMELIN 95B	PL B356 595	D.V. Amelin <i>et al.</i>	(SERP, TBIL)
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BELADIDZE 92C	SJNP 55 1535	G.M. Beladidze, S.I. Bityukov, G.V. Borisov	(SERP+)
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