

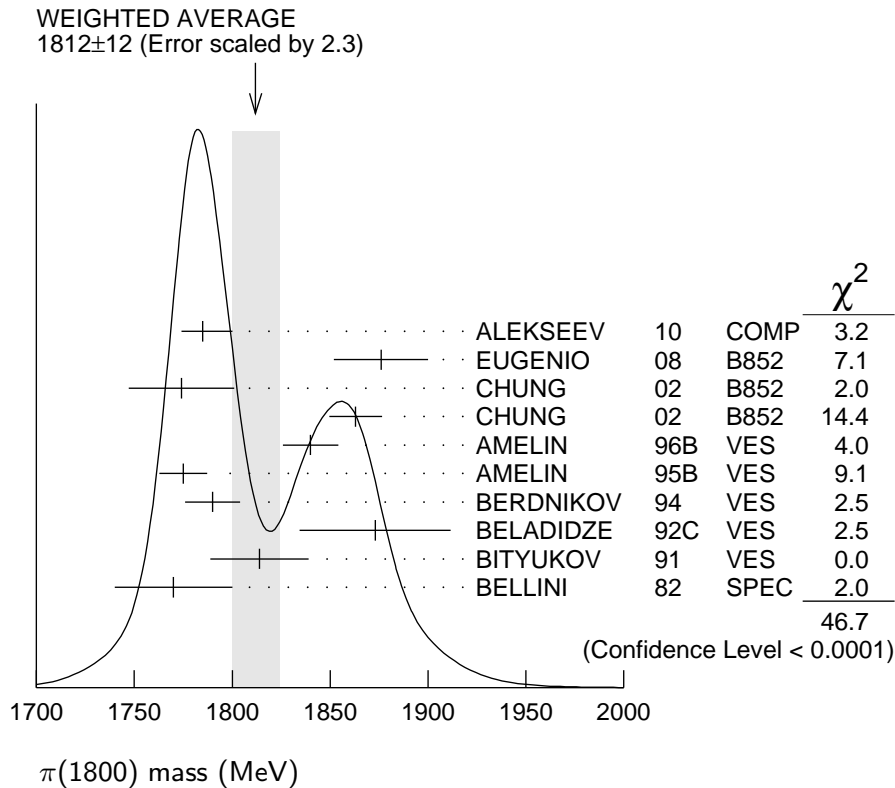
# π(1800)

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

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
<b>1812±12 OUR AVERAGE</b> Error includes scale factor of 2.3. See the ideogram below.					
1785 ± 9 <sup>+12</sup> <sub>-6</sub>	420k	ALEKSEEV	10	COMP	190 π <sup>-</sup> Pb → π <sup>-</sup> π <sup>-</sup> π <sup>+</sup> Pb'
1876 ± 18 ± 16	4k	<sup>1</sup> EUGENIO	08	B852 -	18 π <sup>-</sup> p → ηηπ <sup>-</sup> p
1774 ± 18 ± 20		<sup>2</sup> CHUNG	02	B852	18.3 π <sup>-</sup> p → π <sup>+</sup> π <sup>-</sup> π <sup>-</sup> p
1863 ± 9 ± 10		<sup>3</sup> CHUNG	02	B852	18.3 π <sup>-</sup> p → π <sup>+</sup> π <sup>-</sup> π <sup>-</sup> p
1840 ± 10 ± 10	1200	AMELIN	96B	VES -	37 π <sup>-</sup> A → ηηπ <sup>-</sup> A
1775 ± 7 ± 10		<sup>4</sup> AMELIN	95B	VES -	36 π <sup>-</sup> A → π <sup>+</sup> π <sup>-</sup> π <sup>-</sup> A
1790 ± 14		<sup>5</sup> BERDNIKOV	94	VES -	37 π <sup>-</sup> A → K <sup>+</sup> K <sup>-</sup> π <sup>-</sup> A
1873 ± 33 ± 20		BELADIDZE	92C	VES -	36 π <sup>-</sup> Be → π <sup>-</sup> η' η Be
1814 ± 10 ± 23	426 ± 57	BITYUKOV	91	VES -	36 π <sup>-</sup> C → π <sup>-</sup> ηηC
1770 ± 30	1100	BELLINI	82	SPEC -	40 π <sup>-</sup> A → 3πA
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
1737 ± 5 ± 15		AMELIN	99	VES	37 π <sup>-</sup> A → ω π <sup>-</sup> π <sup>0</sup> A*



- <sup>1</sup> From a single-pole fit.  
<sup>2</sup> In the  $f_0(980)\pi$  wave.  
<sup>3</sup> In the  $f_0(500)\pi$  wave.  
<sup>4</sup> From a fit to  $J^{PC} = 0^{-+} f_0(980)\pi, f_0(1370)\pi$  waves.  
<sup>5</sup> 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
<b>208 ± 12 OUR AVERAGE</b>					
208 ± 22 <sup>+21</sup> <sub>-37</sub>	420k	ALEKSEEV	10	COMP	190 $\pi^- Pb \rightarrow \pi^- \pi^- \pi^+ Pb'$
221 ± 26 ± 38	4k	<sup>6</sup> EUGENIO	08	B852	- 18 $\pi^- p \rightarrow \eta \eta \pi^- p$
223 ± 48 ± 50		<sup>7</sup> CHUNG	02	B852	18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$
191 ± 21 ± 20		<sup>8</sup> 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		<sup>9</sup> AMELIN	95B	VES	- 36 $\pi^- A \rightarrow \pi^+ \pi^- \pi^- A$
210 ± 70		<sup>10</sup> 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  $\pi^- A \rightarrow \omega \pi^- \pi^0 A^*$

- <sup>6</sup> From a single-pole fit.  
<sup>7</sup> In the  $f_0(980)\pi$  wave.  
<sup>8</sup> In the  $f_0(500)\pi$  wave.  
<sup>9</sup> From a fit to  $J^{PC} = 0^{-+} f_0(980)\pi, f_0(1370)\pi$  waves.  
<sup>10</sup> From a fit to  $J^{PC} = 0^{-+} K_0^*(1430)K^-$  and  $f_0(980)\pi^-$  waves.

### $\pi(1800)$ DECAY MODES

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1$ $\pi^+ \pi^- \pi^-$	seen
$\Gamma_2$ $f_0(500)\pi^-$	seen
$\Gamma_3$ $f_0(980)\pi^-$	seen
$\Gamma_4$ $f_0(1370)\pi^-$	seen
$\Gamma_5$ $f_0(1500)\pi^-$	not seen
$\Gamma_6$ $\rho \pi^-$	not seen
$\Gamma_7$ $\eta \eta \pi^-$	seen
$\Gamma_8$ $a_0(980)\eta$	seen
$\Gamma_9$ $a_2(1320)\eta$	not seen

$\Gamma_{10}$	$f_2(1270)\pi$	not seen
$\Gamma_{11}$	$f_0(1370)\pi^-$	not seen
$\Gamma_{12}$	$f_0(1500)\pi^-$	seen
$\Gamma_{13}$	$\eta\eta'(958)\pi^-$	seen
$\Gamma_{14}$	$K_0^*(1430)K^-$	seen
$\Gamma_{15}$	$K^*(892)K^-$	not seen

### $\pi(1800)$ BRANCHING RATIOS

#### $\Gamma(f_0(980)\pi^-)/\Gamma(f_0(500)\pi^-)$ $\Gamma_3/\Gamma_2$

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

#### $\Gamma(f_0(980)\pi^-)/\Gamma(f_0(1370)\pi^-)$ $\Gamma_3/\Gamma_4$

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

#### $\Gamma(f_0(1370)\pi^-)/\Gamma_{\text{total}}$ $\Gamma_4/\Gamma$

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

#### $\Gamma(f_0(1500)\pi^-)/\Gamma_{\text{total}}$ $\Gamma_5/\Gamma$

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

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

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

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

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

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

VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.5±0.1	1200	<sup>12</sup> AMELIN	96B	VES	– 37 $\pi^- A \rightarrow \eta\eta\pi^- A$

#### $\Gamma(a_2(1320)\eta)/\Gamma_{\text{total}}$ $\Gamma_9/\Gamma$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
<b>not seen</b>	EUGENIO	08	B852	18 $\pi^- p \rightarrow \eta\eta\pi^- p$

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

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
<b>not seen</b>	EUGENIO	08	B852	18 $\pi^- p \rightarrow \eta\eta\pi^- p$

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

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
<b>not seen</b>	EUGENIO 08	B852		18 $\pi^- p \rightarrow \eta\eta\pi^- p$

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

VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.48 ± 0.17	4k <sup>12,13</sup>	EUGENIO 08	B852	–	18 $\pi^- p \rightarrow \eta\eta\pi^- p$
0.030 <sup>+0.014</sup> <sub>–0.011</sub>	<sup>12</sup>	ANISOVICH 01B	SPEC	0	0.6–1.94 $p\bar{p} \rightarrow \eta\eta\pi^0\pi^0$
0.08 ± 0.03	1200 <sup>12,14</sup>	AMELIN 96B	VES	–	37 $\pi^- A \rightarrow \eta\eta\pi^- A$

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

VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.29 ± 0.07	<sup>12</sup>	BELADIDZE 92C	VES	–	36 $\pi^- \text{Be} \rightarrow \pi^- \eta' \eta \text{Be}$
0.3 ± 0.1	426 ± 57	<sup>12</sup> BITYUKOV 91	VES	–	36 $\pi^- \text{C} \rightarrow \pi^- \eta \eta \text{C}$

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

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

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

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

<sup>11</sup> Assuming that  $f_0(980)$  decays only to  $\pi\pi$ .

<sup>12</sup> Systematic errors not estimated.

<sup>13</sup> From a single-pole fit.

<sup>14</sup> 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	PAN 59 976	D.V. Amelin <i>et al.</i>	(SERP, TBIL) IGJPC
		Translated from YAF 62 487.		
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+)
		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)