$$\boxed{\pi(1800)} \qquad I^G(J^{PC}) = 1^-(0^{-+})$$

See also minireview under non-$q\overline{q}$ candidates in PDG 06, Journal of Physics, G **33** 1 (2006).

$\pi(1800)$ MASS

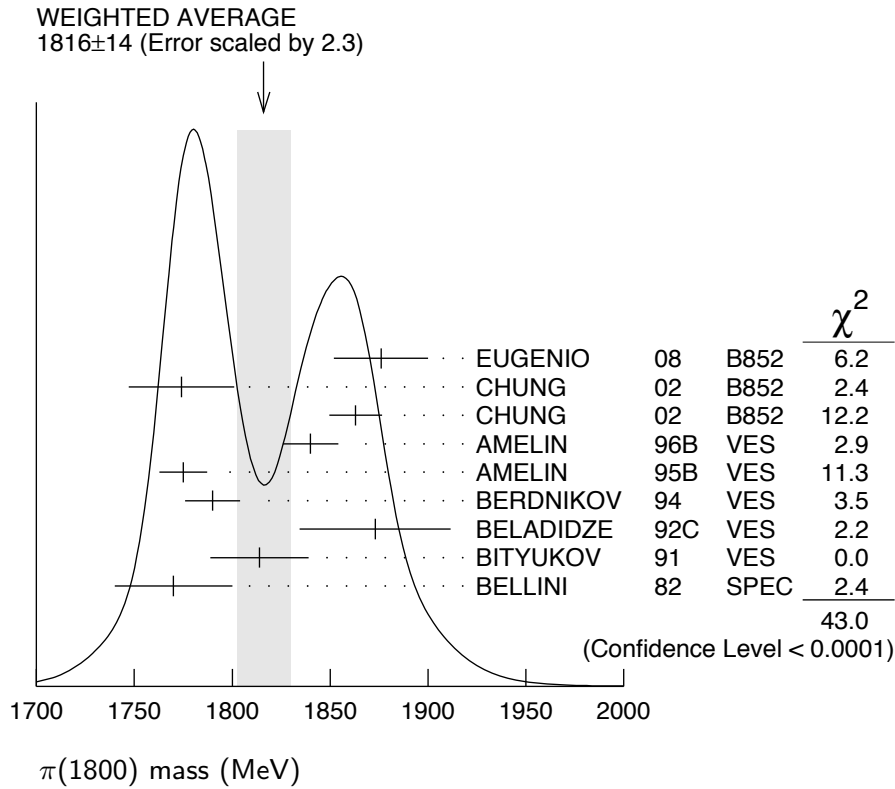| VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
1816±14 OUR AVERAGE		Error includes scale factor of 2.3. See the ideogram below.				
1876±18±16	4k	[1] EUGENIO	08	B852	–	18 $\pi^- p \to \eta\eta\pi^- p$
1774±18±20		[2] CHUNG	02	B852		18.3 $\pi^- p \to$ $\pi^+\pi^-\pi^- p$
1863± 9±10		[3] CHUNG	02	B852		18.3 $\pi^- p \to$ $\pi^+\pi^-\pi^- p$
1840±10±10	1200	AMELIN	96B	VES	–	37 $\pi^- A \to \eta\eta\pi^- A$
1775± 7±10		[4] AMELIN	95B	VES	–	36 $\pi^- A \to \pi^+\pi^-\pi^- A$
1790±14		[5] BERDNIKOV	94	VES	–	37 $\pi^- A \to$ $K^+ K^- \pi^- A$
1873±33±20		BELADIDZE	92C	VES	–	36 $\pi^- Be \to \pi^- \eta'\eta Be$
1814±10±23	426 ± 57	BITYUKOV	91	VES	–	36 $\pi^- C \to \pi^- \eta\eta C$
1770±30	1100	BELLINI	82	SPEC	–	40 $\pi^- A \to 3\pi A$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1737± 5±15		AMELIN	99	VES		37 $\pi^- A \to \omega\pi^-\pi^0 A^*$

[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 $J^{PC} = 0^{-+}$ $K_0^*(1430) K^-$ and $f_0(980)\pi^-$ waves.

WEIGHTED AVERAGE
1816±14 (Error scaled by 2.3)

			χ^2
EUGENIO	08	B852	6.2
CHUNG	02	B852	2.4
CHUNG	02	B852	12.2
AMELIN	96B	VES	2.9
AMELIN	95B	VES	11.3
BERDNIKOV	94	VES	3.5
BELADIDZE	92C	VES	2.2
BITYUKOV	91	VES	0.0
BELLINI	82	SPEC	2.4
			43.0

(Confidence Level < 0.0001)

1700   1750   1800   1850   1900   1950   2000

$\pi(1800)$ mass (MeV)

$\pi(1800)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
208±12 OUR AVERAGE						
221±26±38	4k	[6] EUGENIO	08	B852	−	18 $\pi^- p \to \eta\eta\pi^- p$
223±48±50		[7] CHUNG	02	B852		18.3 $\pi^- p \to$ $\pi^+\pi^-\pi^- p$
191±21±20		[8] CHUNG	02	B852		18.3 $\pi^- p \to$ $\pi^+\pi^-\pi^- p$
210±30±30	1200	AMELIN	96B	VES	−	37 $\pi^- A \to \eta\eta\pi^- A$
190±15±15		[9] AMELIN	95B	VES	−	36 $\pi^- A \to \pi^+\pi^-\pi^- A$
210±70		[10] BERDNIKOV	94	VES	−	37 $\pi^- A \to$ $K^+ K^- \pi^- A$
225±35±20		BELADIDZE	92C	VES	−	36 $\pi^- Be \to \pi^- \eta'\eta Be$
205±18±32	426 ± 57	BITYUKOV	91	VES	−	36 $\pi^- C \to \pi^- \eta\eta C$
310±50	1100	BELLINI	82	SPEC	−	40 $\pi^- A \to 3\pi A$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
259±19± 6		AMELIN	99	VES		37 $\pi^- A \to \omega\pi^-\pi^0 A^*$

[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)
Γ_1	$\pi^+\pi^-\pi^-$	seen
Γ_2	$f_0(600)\pi^-$	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

$\Gamma\big(f_0(980)\pi^-\big)/\Gamma\big(f_0(600)\pi^-\big)$ $\qquad\qquad\Gamma_3/\Gamma_2$

VALUE	DOCUMENT ID		TECN	COMMENT
0.44±0.08±0.38	[11] CHUNG	02	B852	18.3 $\pi^- p \to \pi^+\pi^-\pi^- p$

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

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

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

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

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

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

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

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

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

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 $\pi^- p \to \pi^+\pi^-\pi^- p$
<0.14	90	AMELIN	95B	VES	$-$	36 $\pi^- A \to \pi^+\pi^-\pi^- A$

$\Gamma(\eta\eta\pi^-)/\Gamma(\pi^+\pi^-\pi^-)$ Γ_7/Γ_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	[12]	AMELIN	96B	VES	–	$37\ \pi^- A \to \eta\eta\pi^- A$

$\Gamma(a_2(1320)\eta)/\Gamma_{total}$ Γ_9/Γ

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

$\Gamma(f_2(1270)\pi)/\Gamma_{total}$ Γ_{10}/Γ

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

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

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

$\Gamma(f_0(1500)\pi^-)/\Gamma(a_0(980)\eta)$ Γ_{12}/Γ_8

VALUE	EVTS		DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •							
$0.48\ \pm0.17$	4k	[12,13]	EUGENIO	08	B852	–	$18\ \pi^- p \to \eta\eta\pi^- p$
$0.030^{+0.014}_{-0.011}$		[12]	ANISOVICH	01B	SPEC	0	$0.6–1.94\ p\overline{p} \to \eta\eta\pi^0\pi^0$
$0.08\ \pm0.03$	1200	[12,14]	AMELIN	96B	VES	–	$37\ \pi^- A \to \eta\eta\pi^- A$

$\Gamma(\eta\eta'(958)\pi^-)/\Gamma(\eta\eta\pi^-)$ 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	–	$36\ \pi^- Be \to \pi^-\eta'\eta Be$
$0.3\ \pm0.1$	426 ± 57	[12]	BITYUKOV	91	VES	–	$36\ \pi^- C \to \pi^-\eta\eta C$

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

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

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

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

[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

EUGENIO	08	PL B660 466	P. Eugenio *et al.*	(BNL E852 Collab.)
PDG	06	JPG 33 1	W.-M. Yao *et al.*	(PDG Collab.)
CHUNG	02	PR D65 072001	S.U. Chung *et al.*	(BNL E852 Collab.)
ANISOVICH	01B	PL B500 222	A.V. Anisovich *et al.*	
AMELIN	99	PAN 62 445	D.V. Amelin *et al.*	(VES Collab.)
		Translated from YAF 62 487.		
AMELIN	96B	PAN 59 976	D.V. Amelin *et al.*	(SERP, TBIL) IGJPC
		Translated from YAF 59 1021.		
AMELIN	95B	PL B356 595	D.V. Amelin *et al.*	(SERP, TBIL)
BERDNIKOV	94	PL B337 219	E.B. Berdnikov *et al.*	(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 *et al.*	(SERP, TBIL)
BELLINI	82	PRL 48 1697	G. Bellini *et al.*	(MILA, BGNA, JINR)