$a_1(1640)$

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

Possibly seen in the study of the hadronic structure in decay $\tau \to 3\pi\nu_\tau$ (ABREU 98G and ASNER 00).

$a_1(1640)$ MASS

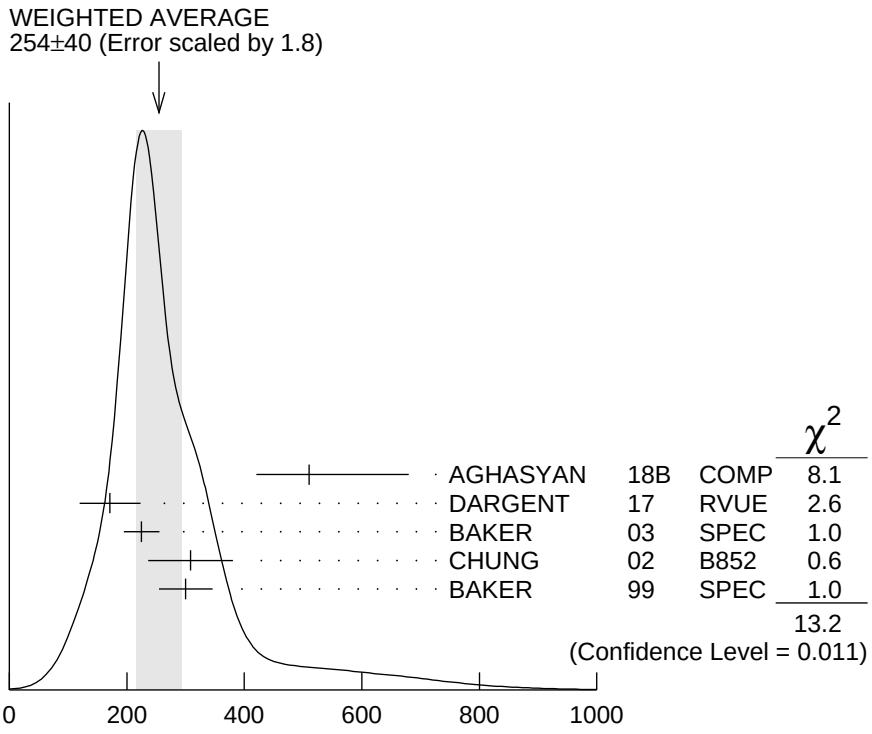
VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1655± 16 OUR AVERAGE		Error includes scale factor of 1.2.			
1700^{+35}_{-130}	46M	[1] AGHASYAN	18B	COMP	190 $\pi^- p \to \pi^-\pi^+\pi^- p$
1691± 18±30		DARGENT	17	RVUE	$D^0 \to \pi^-\pi^+\pi^-\pi^+$
1630± 20	35k	[2] BAKER	03	SPEC	$\overline{p}p \to \omega\pi^+\pi^-\pi^0$
1714± 9±36		CHUNG	02	B852	18.3 $\pi^- p \to \pi^+\pi^-\pi^- p$
1640± 12±30		BAKER	99	SPEC	1.94 $\overline{p}p \to 4\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1670± 90		BELLINI	85	SPEC	40 $\pi^- A \to \pi^-\pi^+\pi^- A$

[1] Statistical error negligible.
[2] Using the $a_1(1260)$ mass and width results of BOWLER 88.

$a_1(1640)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
254± 40 OUR AVERAGE		Error includes scale factor of 1.8. See the ideogram below.			
510^{+170}_{-90}	46M	[1] AGHASYAN	18B	COMP	190 $\pi^- p \to \pi^-\pi^+\pi^- p$
171± 33±40		DARGENT	17	RVUE	$D^0 \to \pi^-\pi^+\pi^-\pi^+$
225± 30	35k	[2] BAKER	03	SPEC	$\overline{p}p \to \omega\pi^+\pi^-\pi^0$
308± 37±62		CHUNG	02	B852	18.3 $\pi^- p \to \pi^+\pi^-\pi^- p$
300± 22±40		BAKER	99	SPEC	1.94 $\overline{p}p \to 4\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
300±100		BELLINI	85	SPEC	40 $\pi^- A \to \pi^-\pi^+\pi^- A$

[1] Statistical error negligible.
[2] Using the $a_1(1260)$ mass and width results of BOWLER 88.



$a_1(1640)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$\pi\pi\pi$	seen
Γ_2	$f_2(1270)\pi$	seen
Γ_3	$\sigma\pi$	seen
Γ_4	$\rho\pi$ $S-wave$	seen
Γ_5	$\rho\pi$ $D-wave$	seen
Γ_6	$\omega\pi\pi$	seen
Γ_7	$f_1(1285)\pi$	seen
Γ_8	$a_1(1260)\eta$	not seen

$a_1(1640)$ BRANCHING RATIOS

$\Gamma(f_2(1270)\pi)/\Gamma(\sigma\pi)$ Γ_2/Γ_3

VALUE	DOCUMENT ID		TECN	COMMENT
0.24±0.07	BAKER	99	SPEC	1.94 $\overline{p}p \rightarrow 4\pi^0$

$\Gamma(\rho\pi_{D-wave})/\Gamma_{total}$ Γ_5/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
seen	CHUNG	02	B852	18.3 $\pi^- p \rightarrow \pi^+\pi^-\pi^- p$
seen	AMELIN	95B	VES	36 $\pi^- A \rightarrow \pi^+\pi^-\pi^- A$

$\Gamma(\omega\pi\pi)/\Gamma_{\text{total}}$ Γ_6/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen	35280	[1] BAKER	03	SPEC	$\overline{p}p \to \omega\pi^+\pi^-\pi^0$

[1] Assuming the $\omega\rho$ mechanism for the $\omega\pi\pi$ state.

$\Gamma(f_1(1285)\pi)/\Gamma_{\text{total}}$ Γ_7/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen	KUHN	04	B852	$18\ \pi^- p \to \eta\pi^+\pi^-\pi^- p$
seen	LEE	94	MPS2	$18\ \pi^- p \to K^+\overline{K}^0\pi^-\pi^- p$

$\Gamma(a_1(1260)\eta)/\Gamma_{\text{total}}$ Γ_8/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
not seen	KUHN	04	B852	$18\ \pi^- p \to \eta\pi^+\pi^-\pi^- p$

$a_1(1640)$ REFERENCES

AGHASYAN	18B	PR D98 092003	M. Aghasyan *et al.*	(COMPASS Collab.)
DARGENT	17	JHEP 1705 143	P. dArgent *et al.*	(HEID, BRIS)
KUHN	04	PL B595 109	J. Kuhn *et al.*	(BNL E852 Collab.)
BAKER	03	PL B563 140	C.A. Baker *et al.*	
CHUNG	02	PR D65 072001	S.U. Chung *et al.*	(BNL E852 Collab.)
ASNER	00	PR D61 012002	D.M. Asner *et al.*	(CLEO Collab.)
BAKER	99	PL B449 114	C.A. Baker *et al.*	
ABREU	98G	PL B426 411	P. Abreu *et al.*	(DELPHI Collab.)
AMELIN	95B	PL B356 595	D.V. Amelin *et al.*	(SERP, TBIL)
LEE	94	PL B323 227	J.H. Lee *et al.*	(BNL, IND, KYUN, MASD+)
BOWLER	88	PL B209 99	M.G. Bowler	(OXF)
BELLINI	85	SJNP 41 781	D. Bellini *et al.*	

Translated from YAF 41 1223.