

$a_1(1640)$

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

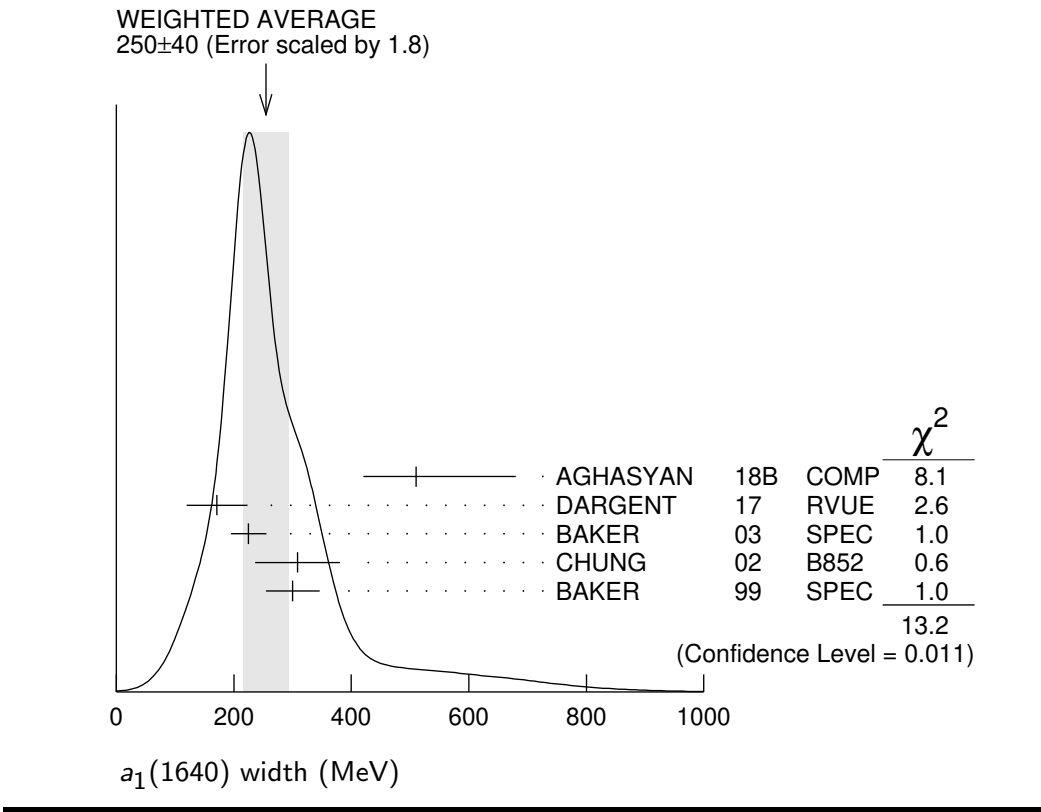
Possibly seen in the study of the hadronic structure in decay $\tau \rightarrow 3\pi\nu_\tau$ (ABREU 98G and ASNER 00).

$a_1(1640)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1655± 16 OUR AVERAGE		Error includes scale factor of 1.2.		
1700 ⁺ _{−130}	46M	¹ AGHASYAN	18B	COMP 190 $\pi^- p \rightarrow \pi^- \pi^+ \pi^- p$
1691± 18±30		DARGENT	17	RVUE $D^0 \rightarrow \pi^- \pi^+ \pi^- \pi^+$
1630± 20	35k	² BAKER	03	SPEC $\bar{p} p \rightarrow \omega \pi^+ \pi^- \pi^0$
1714± 9±36		CHUNG	02	B852 18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$
1640± 12±30		BAKER	99	SPEC 1.94 $\bar{p} p \rightarrow 4\pi^0$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1670± 90		BELLINI	85	SPEC 40 $\pi^- A \rightarrow \pi^- \pi^+ \pi^- A$
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
250± 40 OUR AVERAGE		Error includes scale factor of 1.8. See the ideogram below.		
510 ⁺ _{−90}	46M	¹ AGHASYAN	18B	COMP 190 $\pi^- p \rightarrow \pi^- \pi^+ \pi^- p$
171± 33±40		DARGENT	17	RVUE $D^0 \rightarrow \pi^- \pi^+ \pi^- \pi^+$
225± 30	35k	² BAKER	03	SPEC $\bar{p} p \rightarrow \omega \pi^+ \pi^- \pi^0$
308± 37±62		CHUNG	02	B852 18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$
300± 22±40		BAKER	99	SPEC 1.94 $\bar{p} p \rightarrow 4\pi^0$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
300±100		BELLINI	85	SPEC 40 $\pi^- A \rightarrow \pi^- \pi^+ \pi^- A$
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	$\rho\pi$ <i>S-wave</i>	seen
Γ_5	$\rho\pi$ <i>D-wave</i>	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
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
0.24±0.07	BAKER	99	SPEC	1.94 $\bar{p}p \rightarrow 4\pi^0$
$\Gamma(\rho\pi_{D\text{-wave}})/\Gamma_{\text{total}}$				Γ_5/Γ
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
● ● ● 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	EPTS	DOCUMENT ID	TECN	COMMENT	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen	35280	¹ BAKER	03	SPEC	$\bar{p}p \rightarrow \omega\pi^+\pi^-\pi^0$
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	$18\pi^-p \rightarrow \eta\pi^+\pi^-\pi^-p$
seen		LEE	94	MPS2	$18\pi^-p \rightarrow K^+\bar{K}^0\pi^-\pi^-p$

$\Gamma(a_1(1260)\eta)/\Gamma_{\text{total}}$					Γ_8/Γ
VALUE		DOCUMENT ID	TECN	COMMENT	
not seen		KUHN	04	B852	$18\pi^-p \rightarrow \eta\pi^+\pi^-\pi^-p$

$a_1(1640)$ REFERENCES

AGHASYAN	18B	PR D98 092003	M. Aghasyan <i>et al.</i>	(COMPASS Collab.)
DARGENT	17	JHEP 1705 143	P. dArgent <i>et al.</i>	(HEID, BRIS)
KUHN	04	PL B595 109	J. Kuhn <i>et al.</i>	(BNL E852 Collab.)
BAKER	03	PL B563 140	C.A. Baker <i>et al.</i>	
CHUNG	02	PR D65 072001	S.U. Chung <i>et al.</i>	(BNL E852 Collab.)
ASNER	00	PR D61 012002	D.M. Asner <i>et al.</i>	(CLEO Collab.)
BAKER	99	PL B449 114	C.A. Baker <i>et al.</i>	
ABREU	98G	PL B426 411	P. Abreu <i>et al.</i>	(DELPHI Collab.)
AMELIN	95B	PL B356 595	D.V. Amelin <i>et al.</i>	(SERP, TBIL)
LEE	94	PL B323 227	J.H. Lee <i>et al.</i>	(BNL, IND, KYUN, MASD+)
BOWLER	88	PL B209 99	M.G. Bowler	(OXF)
BELLINI	85	SJNP 41 781	D. Bellini <i>et al.</i>	
Translated from YAF 41 1223.				