

$a_1(1640)$

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

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

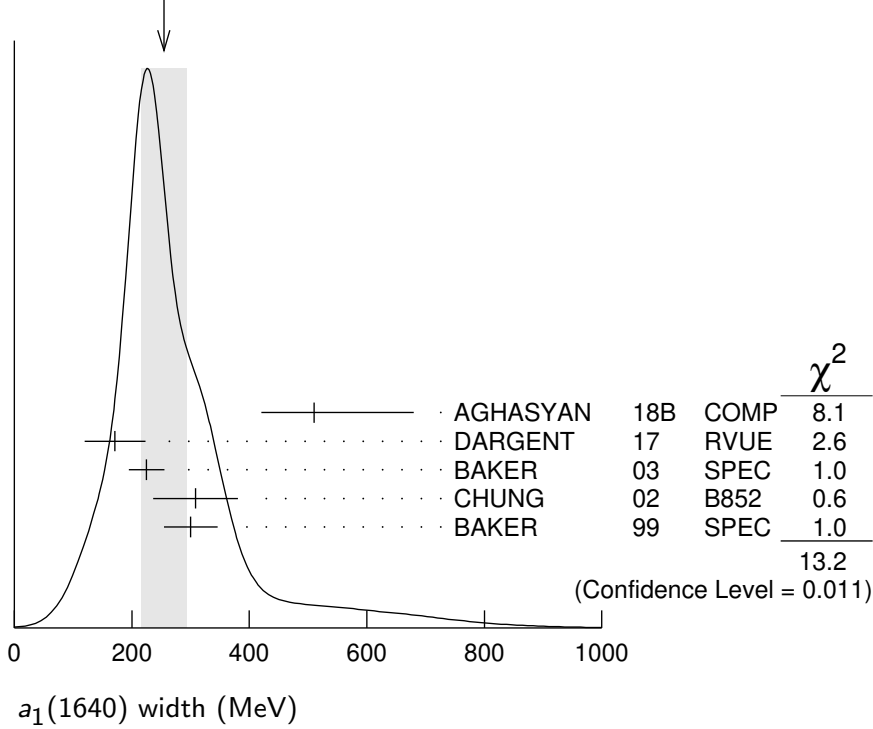
<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1655 ± 16 OUR AVERAGE		Error includes scale factor of 1.2.		
1700 ⁺³⁵ ₋₁₃₀	46M	¹ AGHASYAN	18B	COMP 190 $\pi^- p \rightarrow \pi^- \pi^+ \pi^- p$
1691 ± 18 ± 30		DARGENT	17	RVUE $D^0 \rightarrow \pi^- \pi^+ \pi^- \pi^+$
1630 ± 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**

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
254 ± 40 OUR AVERAGE		Error includes scale factor of 1.8. See the ideogram below.		
510 ⁺¹⁷⁰ ₋₉₀	46M	¹ AGHASYAN	18B	COMP 190 $\pi^- p \rightarrow \pi^- \pi^+ \pi^- p$
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.

WEIGHTED AVERAGE
 254 ± 40 (Error scaled by 1.8)



$a_1(1640)$ 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		
VALUE	DOCUMENT ID	TECN	COMMENT
0.24 ± 0.07	BAKER	99	SPEC $1.94 \bar{p}p \rightarrow 4\pi^0$

$\Gamma(\rho\pi$ <i>D-wave</i>)/ Γ_{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
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• • • We do not use the following data for averages, fits, limits, etc. • • •

seen	35280	¹ BAKER	03	SPEC $\bar{p}p \rightarrow \omega\pi^+\pi^-\pi^0$
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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
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• • • 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
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not seen	KUHN	04	B852	$18 \pi^- p \rightarrow \eta\pi^+\pi^-\pi^- p$
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 $a_1(1640)$ 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.