

a₁(1640)

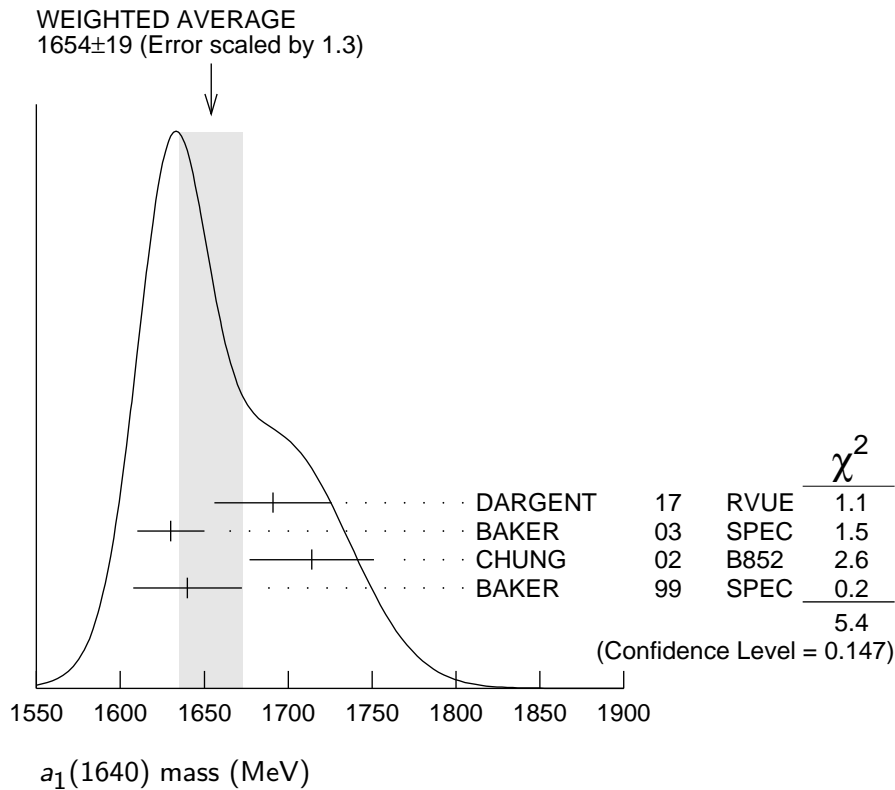
$$I^G(J^{PC}) = 1^-(1^{++})$$

OMITTED FROM SUMMARY TABLE

Seen in the amplitude analysis of the $3\pi^0$ system produced in $\bar{p}p \rightarrow 4\pi^0$. Possibly seen in the study of the hadronic structure in decay $\tau \rightarrow 3\pi\nu_\tau$ (ABREU 98G and ASNER 00). Needs confirmation.

a₁(1640) MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1654±19 OUR AVERAGE		Error includes scale factor of 1.3. See the ideogram below.		
1691±18±30		DARGENT	17	RVUE $D^0 \rightarrow \pi^- \pi^+ \pi^- \pi^+$
1630±20	35280	¹ 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 Using the a₁(1260) mass and width results of BOWLER 88.

$a_1(1640)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
240 ± 27 OUR AVERAGE		Error includes scale factor of 1.2.		
$171 \pm 33 \pm 40$		DARGENT	17	RVUE $D^0 \rightarrow \pi^- \pi^+ \pi^- \pi^+$
225 ± 30	35280	² BAKER	03	SPEC $\bar{p}p \rightarrow \omega \pi^+ \pi^- \pi^0$
$308 \pm 37 \pm 62$		CHUNG	02	B852 $18.3 \pi^- p \rightarrow \pi^+ \pi^- \pi^- p$
$300 \pm 22 \pm 40$		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 $40 \pi^- A \rightarrow \pi^- \pi^+ \pi^- A$

²Using 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 $\rho \pi S\text{-wave}$	seen
Γ_5 $\rho \pi D\text{-wave}$	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

VALUE	DOCUMENT ID	TECN	COMMENT	Γ_2/Γ_3
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● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●

0.24 ± 0.07	BAKER	99	SPEC $1.94 \bar{p}p \rightarrow 4\pi^0$	
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VALUE	DOCUMENT ID	TECN	COMMENT	Γ_5/Γ
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● ● ● 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 $36 \pi^- A \rightarrow \pi^+ \pi^- \pi^- A$	

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_6/Γ
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● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●

seen	35280	³ BAKER	03	SPEC $\bar{p}p \rightarrow \omega \pi^+ \pi^- \pi^0$	
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VALUE	DOCUMENT ID	TECN	COMMENT	Γ_7/Γ
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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
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
not seen	KUHN	04	B852	18 $\pi^- p \rightarrow \eta \pi^+ \pi^- \pi^- p$

³ Assuming the $\omega\rho$ mechanism for the $\omega\pi\pi$ state.

$a_1(1640)$ REFERENCES

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.		