

$a_4(2040)$

$$I^G(J^{PC}) = 1^-(4^{++})$$

 $a_4(2040)$ MASS

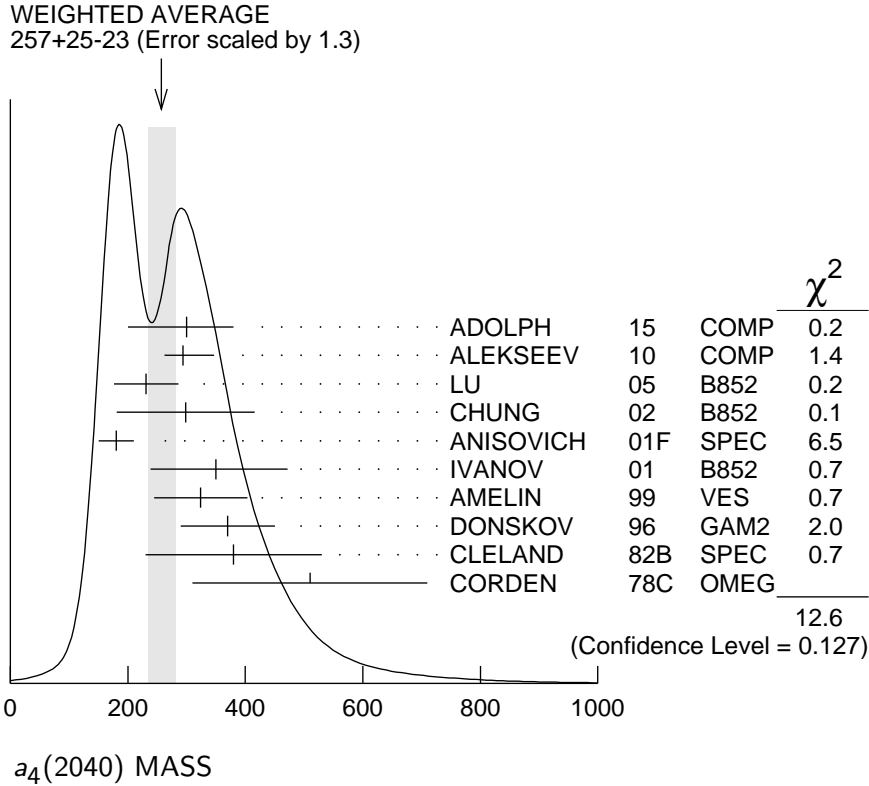
<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
1995^{+10}_{-8} OUR AVERAGE					Error includes scale factor of 1.1.
1900^{+80}_{-20}		ADOLPH	15	COMP	191 $\pi^- p \rightarrow \eta^{(\prime)} \pi^- p$
$1885 \pm 13^{+50}_{-2}$	420k	ALEKSEEV	10	COMP	190 $\pi^- Pb \rightarrow \pi^- \pi^- \pi^+ Pb'$
$1985 \pm 10 \pm 13$	145k	LU	05	B852	18 $\pi^- p \rightarrow \omega \pi^- \pi^0 p$
$1996 \pm 25 \pm 43$		CHUNG	02	B852	18.3 $\pi^- p \rightarrow 3\pi p$
2005^{+25}_{-45}		¹ ANISOVICH	01F	SPEC	2.0 $\bar{p} p \rightarrow 3\pi^0, \pi^0 \eta, \pi^0 \eta'$
$2000 \pm 40^{+60}_{-20}$		IVANOV	01	B852	18 $\pi^- p \rightarrow \eta' \pi^- p$
$1944 \pm 8 \pm 50$		² AMELIN	99	VES	37 $\pi^- A \rightarrow \omega \pi^- \pi^0 A^*$
2010 ± 20		³ DONSKOV	96	GAM2 0	38 $\pi^- p \rightarrow \eta \pi^0 n$
2040 ± 30		⁴ CLELAND	82B	SPEC \pm	50 $\pi p \rightarrow K_S^0 K^\pm p$
2030 ± 50		⁵ CORDEN	78C	OMEG 0	15 $\pi^- p \rightarrow 3\pi n$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
2004 ± 6	80k	⁶ UMAN	06	E835	5.2 $\bar{p} p \rightarrow \eta \eta \pi^0$
1903 ± 10		⁷ BALDI	78	SPEC $-$	10 $\pi^- p \rightarrow p K_S^0 K^-$
¹ From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.					
² May be a different state.					
³ From a simultaneous fit to the G_+ and G_0 wave intensities.					
⁴ From an amplitude analysis.					
⁵ $J^P = 4^+$ is favored, though $J^P = 2^+$ cannot be excluded.					
⁶ Statistical error only.					
⁷ From a fit to the Y_8^0 moment. Limited by phase space.					

 $a_4(2040)$ WIDTH

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
257^{+25}_{-23} OUR AVERAGE					Error includes scale factor of 1.3. See the ideogram below.
300^{+80}_{-100}		ADOLPH	15	COMP	191 $\pi^- p \rightarrow \eta^{(\prime)} \pi^- p$
$294 \pm 25^{+46}_{-19}$	420k	ALEKSEEV	10	COMP	190 $\pi^- Pb \rightarrow \pi^- \pi^- \pi^+ Pb'$
$231 \pm 30 \pm 46$	145k	LU	05	B852	18 $\pi^- p \rightarrow \omega \pi^- \pi^0 p$
$298 \pm 81 \pm 85$		CHUNG	02	B852	18.3 $\pi^- p \rightarrow 3\pi p$
180 ± 30		¹ ANISOVICH	01F	SPEC	2.0 $\bar{p} p \rightarrow 3\pi^0, \pi^0 \eta, \pi^0 \eta'$

$350 \pm 100^{+70}_{-50}$	IVANOV	01	B852	18	$\pi^- p \rightarrow \eta' \pi^- p$
$324 \pm 26 \pm 75$	² AMELIN	99	VES	37	$\pi^- A \rightarrow \omega \pi^- \pi^0 A^*$
370 ± 80	³ DONSKOV	96	GAM2 0	38	$\pi^- p \rightarrow \eta \pi^0 n$
380 ± 150	⁴ CLELAND	82B	SPEC \pm	50	$\pi p \rightarrow K_S^0 K^\pm p$
510 ± 200	⁵ CORDEN	78C	OMEG 0	15	$\pi^- p \rightarrow 3\pi n$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
401 ± 16	80k	⁶ UMAN	06	E835	5.2 $\bar{p} p \rightarrow \eta \eta \pi^0$
166 ± 43		⁷ BALDI	78	SPEC -	10 $\pi^- p \rightarrow p K_S^0 K^-$

- ¹ From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.
- ² May be a different state.
- ³ From a simultaneous fit to the G_+ and G_0 wave intensities.
- ⁴ From an amplitude analysis.
- ⁵ $J^P = 4^+$ is favored, though $J^P = 2^+$ cannot be excluded.
- ⁶ Statistical error only.
- ⁷ From a fit to the Y_8^0 moment. Limited by phase space.



$a_4(2040)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $K \bar{K}$	seen
Γ_2 $\pi^+ \pi^- \pi^0$	seen
Γ_3 $\rho \pi$	seen
Γ_4 $f_2(1270) \pi$	seen

Γ_5	$\omega\pi^-\pi^0$	seen
Γ_6	$\omega\rho$	seen
Γ_7	$\eta\pi$	seen
Γ_8	$\eta'(958)\pi$	seen

$a_4(2040)$ BRANCHING RATIOS

$\Gamma(K\bar{K})/\Gamma_{\text{total}}$					Γ_1/Γ
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>	
seen	BALDI	78	SPEC	\pm	$10\pi^-p \rightarrow K_S^0 K^- p$

$\Gamma(\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$					Γ_2/Γ
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>	
seen	CORDEN	78C	OMEG	0	$15\pi^-p \rightarrow 3\pi n$

$\Gamma(\rho\pi)/\Gamma(f_2(1270)\pi)$					Γ_3/Γ_4
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>	
$1.1 \pm 0.2 \pm 0.2$	CHUNG	02	B852		$18.3\pi^-p \rightarrow 3\pi p$

$\Gamma(\eta\pi)/\Gamma_{\text{total}}$					Γ_7/Γ
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>	
seen	DONSKOV	96	GAM2	0	$38\pi^-p \rightarrow \eta\pi^0 n$

$\Gamma(\eta'(958)\pi)/\Gamma(\eta\pi)$					Γ_8/Γ_7
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>	
0.23 ± 0.07	ADOLPH	15	COMP		$191\pi^-p \rightarrow \eta^{(\prime)}\pi^- p$

$\Gamma(\omega\rho)/\Gamma_{\text{total}}$	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_6/Γ
seen	145k	LU	05	B852	$18\pi^-p \rightarrow \omega\pi^-\pi^0 p$

$a_4(2040)$ REFERENCES

ADOLPH	15	PL B740 303	M. Adolph <i>et al.</i>	(COMPASS Collab.)
ALEKSEEV	10	PRL 104 241803	M.G. Alekseev <i>et al.</i>	(COMPASS Collab.)
UMAN	06	PR D73 052009	I. Uman <i>et al.</i>	(FNAL E835)
LU	05	PRL 94 032002	M. Lu <i>et al.</i>	(BNL E852 Collab.)
CHUNG	02	PR D65 072001	S.U. Chung <i>et al.</i>	(BNL E852 Collab.)
ANISOVICH	01F	PL B517 261	A.V. Anisovich <i>et al.</i>	
IVANOV	01	PRL 86 3977	E.I. Ivanov <i>et al.</i>	(BNL E852 Collab.)
AMELIN	99	PAN 62 445	D.V. Amelin <i>et al.</i>	(VES Collab.)
		Translated from YAF 62 487.		
ANISOVICH	99C	PL B452 173	A.V. Anisovich <i>et al.</i>	
ANISOVICH	99E	PL B452 187	A.V. Anisovich <i>et al.</i>	
DONSKOV	96	PAN 59 982	S.V. Donskov <i>et al.</i>	(GAMS Collab.) IGJPC
		Translated from YAF 59 1027.		
CLELAND	82B	NP B208 228	W.E. Cleland <i>et al.</i>	(DURH, GEVA, LAUS+)
BALDI	78	PL 74B 413	R. Baldi <i>et al.</i>	(GEVA) JP
CORDEN	78C	NP B136 77	M.J. Corden <i>et al.</i>	(BIRM, RHEL, TELA+) JP