

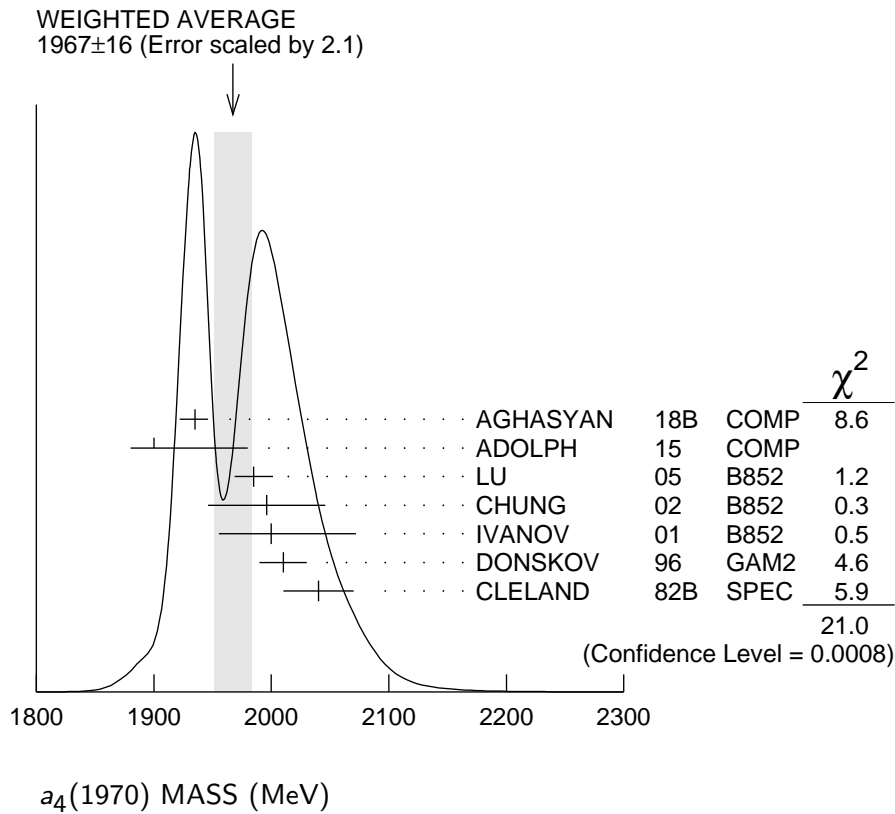
$a_4(1970)$

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

was $a_4(2040)$ **$a_4(1970)$ MASS**

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
1967 ± 16 OUR AVERAGE		Error includes scale factor of 2.1. See the ideogram below.			
1935 ⁺¹¹ ₋₁₃	46M	¹ AGHASYAN	18B	COMP	190 $\pi^- p \rightarrow \pi^- \pi^+ \pi^- p$
1900 ⁺⁸⁰ ₋₂₀		ADOLPH	15	COMP	191 $\pi^- p \rightarrow \eta^{(\prime)} \pi^- p$
1985 ± 10 ± 13	145k	LU	05	B852	18 $\pi^- p \rightarrow \omega \pi^- \pi^0 p$
1996 ± 25 ± 43		CHUNG	02	B852	18.3 $\pi^- p \rightarrow 3\pi p$
2000 ± 40 ⁺⁶⁰ ₋₂₀		IVANOV	01	B852	18 $\pi^- p \rightarrow \eta' \pi^- p$
2010 ± 20		² DONSKOV	96	GAM2 0	38 $\pi^- p \rightarrow \eta \pi^0 n$
2040 ± 30		³ CLELAND	82B	SPEC ±	50 $\pi p \rightarrow K_S^0 K^\pm p$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
1885 ± 13 ⁺⁵⁰ ₋₂	420k	⁴ ALEKSEEV	10	COMP	190 $\pi^- Pb \rightarrow \pi^- \pi^- \pi^+ Pb'$
2004 ± 6	80k	⁵ UMAN	06	E835	5.2 $\bar{p} p \rightarrow \eta \eta \pi^0$
2005 ⁺²⁵ ₋₄₅		⁶ ANISOVICH	01F	SPEC	2.0 $\bar{p} p \rightarrow 3\pi^0, \pi^0 \eta, \pi^0 \eta'$
1944 ± 8 ± 50		⁷ AMELIN	99	VES	37 $\pi^- A \rightarrow \omega \pi^- \pi^0 A^*$
1903 ± 10		⁸ BALDI	78	SPEC -	10 $\pi^- p \rightarrow p K_S^0 K^-$
2030 ± 50		⁹ CORDEN	78C	OMEG 0	15 $\pi^- p \rightarrow 3\pi n$

¹ Statistical error negligible.² From a simultaneous fit to the G_+ and G_0 wave intensities.³ From an amplitude analysis.⁴ Superseded by AGHASYAN 2018B.⁵ Statistical error only.⁶ From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.⁷ May be a different state.⁸ From a fit to the Y_8^0 moment. Limited by phase space.⁹ $J^P = 4^+$ is favored, though $J^P = 2^+$ cannot be excluded.



$a_4(1970)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
324^{+15}_{-18}					OUR AVERAGE
333^{+16}_{-21}	46M	¹ AGHASYAN	18B	COMP	190 $\pi^- p \rightarrow \pi^- \pi^+ \pi^- p$
300^{+80}_{-100}		ADOLPH	15	COMP	191 $\pi^- p \rightarrow \eta^{(\prime)} \pi^- p$
$231 \pm 30 \pm 46$	145k	LU	05	B852	18 $\pi^- p \rightarrow \omega \pi^- \pi^0 p$
$298 \pm 81 \pm 85$		CHUNG	02	B852	18.3 $\pi^- p \rightarrow 3\pi p$
$350 \pm 100^{+70}_{-50}$		IVANOV	01	B852	18 $\pi^- p \rightarrow \eta' \pi^- p$
370 ± 80		² DONSKOV	96	GAM2 0	38 $\pi^- p \rightarrow \eta \pi^0 n$
380 ± 150		³ CLELAND	82B	SPEC \pm	50 $\pi p \rightarrow K_S^0 K^\pm p$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
$294 \pm 25^{+46}_{-19}$	420k	⁴ ALEKSEEV	10	COMP	190 $\pi^- Pb \rightarrow \pi^- \pi^- \pi^+ Pb'$
401 ± 16	80k	⁵ UMAN	06	E835	5.2 $\bar{p} p \rightarrow \eta \eta \pi^0$
180 ± 30		⁶ ANISOVICH	01F	SPEC	2.0 $\bar{p} p \rightarrow 3\pi^0, \pi^0 \eta, \pi^0 \eta'$

$324 \pm 26 \pm 75$	⁷ AMELIN	99	VES	$37 \pi^- A \rightarrow \omega \pi^- \pi^0 A^*$
166 ± 43	⁸ BALDI	78	SPEC	$10 \pi^- p \rightarrow p K_S^0 K^-$
510 ± 200	⁹ CORDEN	78C	OMEG 0	$15 \pi^- p \rightarrow 3\pi n$

¹ Statistical error negligible.

² From a simultaneous fit to the G_+ and G_0 wave intensities.

³ From an amplitude analysis.

⁴ Superseded by AGHASYAN 2018B.

⁵ Statistical error only.

⁶ From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.

⁷ May be a different state.

⁸ From a fit to the Y_8^0 moment. Limited by phase space.

⁹ $J^P = 4^+$ is favored, though $J^P = 2^+$ cannot be excluded.

$a_4(1970)$ 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

$a_4(1970)$ 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>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	

$1.7^{+0.9}_{-0.8}$ OUR AVERAGE Error includes scale factor of 3.7.

$2.9^{+0.6}_{-0.4}$	46M	¹ AGHASYAN	18B	COMP	190 $\pi^- p \rightarrow \pi^- \pi^+ \pi^- p$
$1.1 \pm 0.2 \pm 0.2$		CHUNG	02	B852	$18.3 \pi^- p \rightarrow 3\pi p$

¹ Statistical error negligible.

$\Gamma(\eta\pi)/\Gamma_{\text{total}}$					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>COMMENT</u>	
0.23±0.07	ADOLPH	15	COMP	191 $\pi^- p \rightarrow \eta^{(\prime)} \pi^- p$

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

$a_4(1970)$ REFERENCES

AGHASYAN	18B	PR D98 092003	M. Aghasyan <i>et al.</i>	(COMPASS Collab.)
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.)
ANISOVICH	99C	Translated from YAF 62 487.	A.V. Anisovich <i>et al.</i>	
ANISOVICH	99E	PL B452 173	A.V. Anisovich <i>et al.</i>	
DONSKOV	96	PAN 59 982	S.V. Donskov <i>et al.</i>	(GAMS Collab.) IGJPC
CLELAND	82B	Translated from YAF 59 1027.	W.E. Cleland <i>et al.</i>	(DURH, GEVA, LAUS+)
BALDI	78	NP B208 228	R. Baldi <i>et al.</i>	(GEVA) JP
CORDEN	78C	PL 74B 413	M.J. Corden <i>et al.</i>	(BIRM, RHEL, TELA+) JP
		NP B136 77		