

$a_4(1970)$

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

NODE=M017

 $a_4(1970)$ MASS

NODE=M017M

NODE=M017M

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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 ALDE	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⁴ Superseded by AGHASYAN 2018B.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.

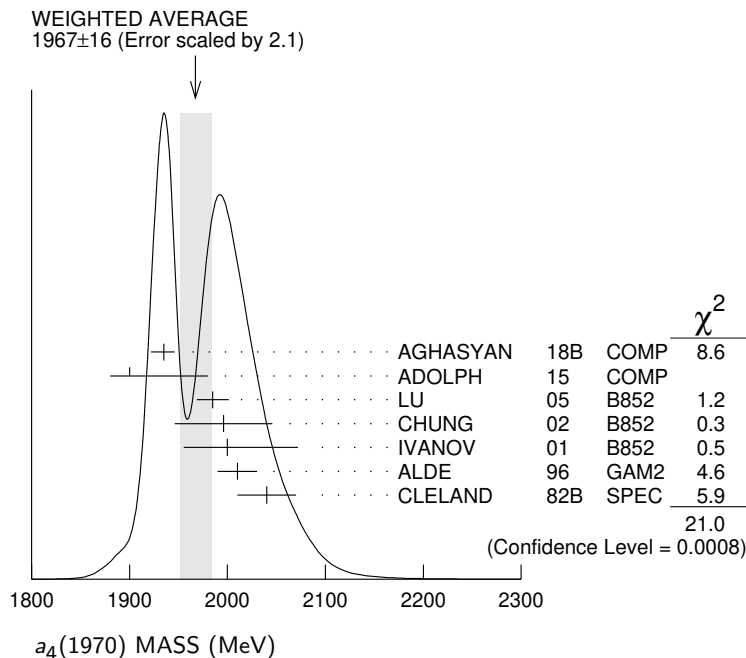
⁶ From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.

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.

NODE=M017M;LINKAGE=B
 NODE=M017M;LINKAGE=A
 NODE=M017M;LINKAGE=C
 NODE=M017M;LINKAGE=D
 NODE=M017M;LINKAGE=ST
 NODE=M017M;LINKAGE=AN
 NODE=M017M;LINKAGE=DM
 NODE=M017M;LINKAGE=Y
 NODE=M017M;LINKAGE=M

 **$a_4(1970)$ WIDTH**

NODE=M017W

VALUE (MeV)	EVTs	DOCUMENT ID	TECN	CHG	COMMENT
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NODE=M017W

324⁺₋₁₈ OUR AVERAGE

333 ⁺ ₋₂₁	46M	¹ AGHASYAN	18B	COMP	190 $\pi^- p \rightarrow \pi^- \pi^+ \pi^- p$
300 ⁺ ₋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 ⁺ ₋₅₀		IVANOV	01	B852	18 $\pi^- p \rightarrow \eta' \pi^- p$
370 $\pm$ 80		² ALDE	96	GAM2 0	38 $\pi^- p \rightarrow \eta \pi^0 n$
380 $\pm$ 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 ⁺ ₋₁₉	420k	⁴ ALEKSEEV	10	COMP	190 $\pi^- Pb \rightarrow \pi^- \pi^- \pi^+ Pb'$
401 $\pm$ 16	80k	⁵ UMAN	06	E835	5.2 $\bar{p} p \rightarrow \eta \eta \pi^0$
180 $\pm$ 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 $\pm$ 43		⁸ BALDI	78	SPEC $-$	10 $\pi^- p \rightarrow p K_S^0 K^-$
510 $\pm$ 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.

NODE=M017W;LINKAGE=B

NODE=M017W;LINKAGE=A

NODE=M017W;LINKAGE=C

NODE=M017W;LINKAGE=D

NODE=M017W;LINKAGE=ST

NODE=M017W;LINKAGE=AN

NODE=M017W;LINKAGE=DM

NODE=M017W;LINKAGE=Y

NODE=M017W;LINKAGE=M

 $a_4(1970)$ DECAY MODES

NODE=M017215;NODE=M017

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

DESIG=1

DESIG=2

DESIG=5;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$ DESIG=6;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$ DESIG=7;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$

DESIG=8

DESIG=3

DESIG=4;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$ **$a_4(1970)$ BRANCHING RATIOS**

NODE=M017220

$\Gamma(K\bar{K})/\Gamma_{\text{total}}$					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 $\pi^- p \rightarrow K_S^0 K^- p$

NODE=M017R1

NODE=M017R1

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

NODE=M017R2

NODE=M017R2

$\Gamma(\rho\pi)/\Gamma(f_2(1270)\pi)$					Γ_3/Γ_4
VALUE	EVTs	DOCUMENT ID	TECN	COMMENT	

NODE=M017R4

NODE=M017R4

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

2.9 ⁺ _{-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.

NODE=M017R4;LINKAGE=A

$\Gamma(\eta\pi)/\Gamma_{\text{total}}$						Γ_7/Γ
VALUE		DOCUMENT ID	TECN	CHG	COMMENT	
seen		ALDE	96	GAM2	0	$38 \pi^- p \rightarrow \eta \pi^0 n$
$\Gamma(\eta'(958)\pi)/\Gamma(\eta\pi)$						Γ_8/Γ_7
VALUE		DOCUMENT ID	TECN		COMMENT	
0.23±0.07		ADOLPH	15	COMP	191 $\pi^- p \rightarrow \eta^{(\prime)} \pi^- p$	
$\Gamma(\omega\rho)/\Gamma_{\text{total}}$						Γ_6/Γ
VALUE	EVTS	DOCUMENT ID	TECN		COMMENT	
seen	145k	LU	05	B852	$18 \pi^- p \rightarrow \omega \pi^- \pi^0 p$	

NODE=M017R3
NODE=M017R3

NODE=M017R01
NODE=M017R01

NODE=M017R5
NODE=M017R5

a₄(1970) REFERENCES

NODE=M017

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.)
		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>	
ALDE	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

REFID=59471
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