Citation: W.-M. Yao *et al.* (Particle Data Group), J. Phys. G **33**, 1 (2006) and 2007 partial update for edition 2008 (URL: http://pdg.lbl.gov)

$a_4(2040)$

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

$a_4(2040)$ MASS

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
2001±10 OUR AVERAGE						
1985±10±13	145k	LU	05	B852		18 $\pi^- p \rightarrow \omega\pi^-\pi^0 p$
1996±25±43		CHUNG	02	B852		18.3 $\pi^- p \rightarrow 3\pi p$
$2000\pm40^{+60}_{-20}$		IVANOV	01	B852		18 $\pi^- p \rightarrow \eta'\pi^- p$
1944± 8±50		[1] AMELIN	99	VES		37 $\pi^- A \rightarrow \omega\pi^-\pi^0 A^*$
2005±25		ANISOVICH	99E	SPEC		
2010±20		[2] DONSKOV	96	GAM2	0	38 $\pi^- p \rightarrow \eta\pi^0 n$
2040±30		[3] CLELAND	82B	SPEC	±	50 $\pi p \rightarrow K^0_S K^\pm p$
2030±50		[4] 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	[5] UMAN	06	E835		5.2 $\overline{p}p \rightarrow \eta\eta\pi^0$
2005^{+25}_{-45}		ANISOVICH	01F	SPEC		2.0 $\overline{p}p \rightarrow 3\pi^0$, $\pi^0\eta$, $\pi^0\eta'$
1903±10		[6] BALDI	78	SPEC	−	10 $\pi^- p \rightarrow p K^0_S K^-$

[1] May be a different state.
[2] From a simultaneous fit to the G_+ and G_0 wave intensities.
[3] From an amplitude analysis.
[4] $J^P = 4^+$ is favored, though $J^P = 2^+$ cannot be excluded.
[5] Statistical error only.
[6] From a fit to the Y^0_8 moment. Limited by phase space.

$a_4(2040)$ WIDTH

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
313± 31 OUR AVERAGE						
231± 30±46	145k	LU	05	B852		18 $\pi^- p \rightarrow \omega\pi^-\pi^0 p$
298± 81±85		CHUNG	02	B852		18.3 $\pi^- p \rightarrow 3\pi p$
$350\pm100^{+70}_{-50}$		IVANOV	01	B852		18 $\pi^- p \rightarrow \eta'\pi^- p$
324± 26±75		[7] AMELIN	99	VES		37 $\pi^- A \rightarrow \omega\pi^-\pi^0 A^*$
360± 80		ANISOVICH	99E	SPEC		
370± 80		[8] DONSKOV	96	GAM2	0	38 $\pi^- p \rightarrow \eta\pi^0 n$
380±150		[9] CLELAND	82B	SPEC	±	50 $\pi p \rightarrow K^0_S K^\pm p$
510±200		[10] 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	[11] UMAN	06	E835		5.2 $\overline{p}p \rightarrow \eta\eta\pi^0$
180± 30		ANISOVICH	01F	SPEC		2.0 $\overline{p}p \rightarrow 3\pi^0$, $\pi^0\eta$, $\pi^0\eta'$
166± 43		[12] BALDI	78	SPEC	−	10 $\pi^- p \rightarrow p K^0_S K^-$

[7] May be a different state.
[8] From a simultaneous fit to the G_+ and G_0 wave intensities.
[9] From an amplitude analysis.
[10] $J^P = 4^+$ is favored, though $J^P = 2^+$ cannot be excluded.
[11] Statistical error only.
[12] From a fit to the Y^0_8 moment. Limited by phase space.

a_4(2040) DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$K\overline{K}$	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	$\eta\pi^0$	seen
Γ_8	$\eta'(958)\pi$	seen

a_4(2040) BRANCHING RATIOS

$\Gamma(K\overline{K})/\Gamma_{total}$ — Γ_1/Γ

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
seen	BALDI	78	SPEC	$\pm$	10 $\pi^- p \to K^0_S K^- p$

$\Gamma(\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_2/Γ

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
seen	CORDEN	78C	OMEG	0	15 $\pi^- p \to 3\pi n$

$\Gamma(\rho\pi)/\Gamma(f_2(1270)\pi)$ — Γ_3/Γ_4

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
1.1±0.2 ±0.2	CHUNG	02	B852	18.3 $\pi^- p \to 3\pi p$

$\Gamma(\eta\pi^0)/\Gamma_{total}$ — Γ_7/Γ

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
seen	DONSKOV	96	GAM2	0	38 $\pi^- p \to \eta\pi^0 n$

$\Gamma(\omega\rho)/\Gamma_{total}$ — Γ_6/Γ

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
seen	145k	LU	05	B852	18 $\pi^- p \to \omega\pi^-\pi^0 p$

$a_4(2040)$ REFERENCES

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

OTHER RELATED PAPERS

DZIERBA	06	PR D73 072001	A.R. Dzierba *et al.*	(BNL E852 Collab.)
DELFOSSE	81	NP B183 349	A. Delfosse *et al.*	(GEVA, LAUS)