$a_2(1700)$

$I^G(J^{PC}) = 1^-(2^{++})$

$a_2(1700)$ T-MATRIX POLE $\sqrt{s}$

Note that $\Gamma = -2\ \mathrm{Im}(\sqrt{s})$.

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
(1630–1780) − *i* (60–250) OUR ESTIMATE				
$(1686 \pm 22^{+19}_{-7}) - i\,(211 \pm 38^{+32}_{-29})$	[1] KOPF	21	RVUE	0.9 $p\overline{p} \to \pi^0\pi^0\eta$, $\pi^0\eta\eta$, $\pi^0 K^+ K^-$ and 191 $\pi^- p \to \pi^-\pi^-\pi^+ p$
$(1638.9 \pm 2.3^{+57.4}_{-0.1}) - i(112.0 \pm 1.3^{+0.9}_{-24.2})$	[2] ALBRECHT	20	RVUE	0.9 $\overline{p}p \to \pi^0\pi^0\eta$, $\pi^0\eta\eta$, $\pi^0 K^+ K^-$
$(1722 \pm 15 \pm 67) - i(124 \pm 9 \pm 32)$	[3] RODAS	19	RVUE	191 $\pi^- p \to \eta'\pi^- p$
$(1698 \pm 44) - i\,(133 \pm 28)$	AMSLER	02	CBAR	0.9 $\overline{p}p \to \pi^0\eta\eta$

[1] Based on combined fit of Crystal Barrel and $\pi\pi$ scattering data (ALBRECHT 20), and COMPASS data (ADOLPH 15), using a coupled-channel model of $\eta\pi$, $\eta'\pi$ and $K\overline{K}$ systems.
[2] Based on 2 poles, 2 channels ($\pi\eta$, $K\overline{K}$).
[3] The coupled-channel analysis of both the $\eta\pi$ and $\eta'\pi$ systems using ADOLPH 15 data.

$a_2(1700)$ MASS

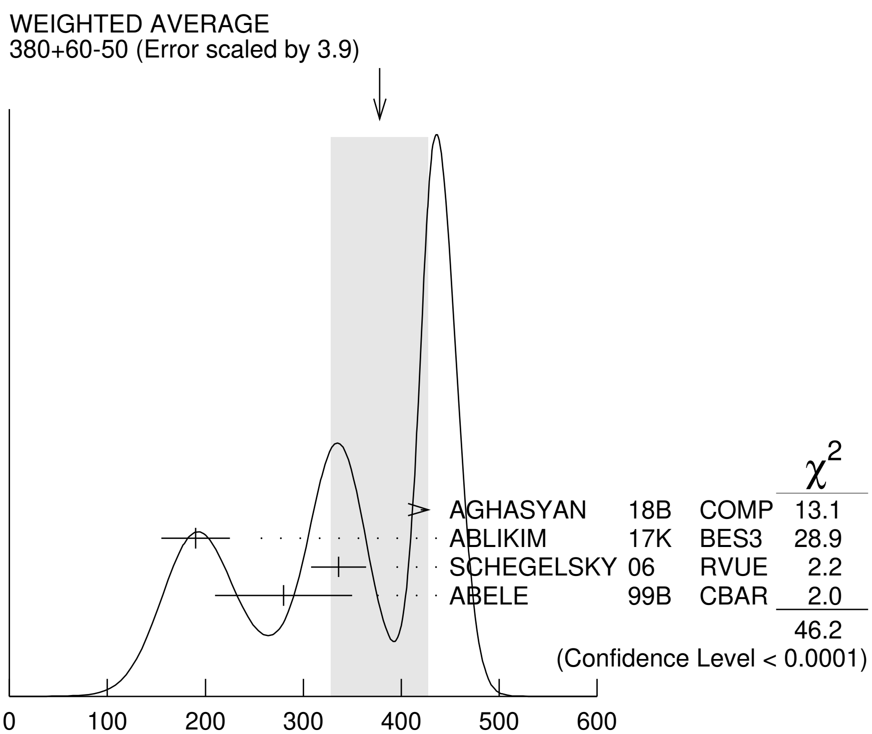
VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1706±14 OUR AVERAGE	Error includes scale factor of 1.2.				
1681^{+22}_{-35}	46M	[1,2] AGHASYAN	18B	COMP	190 $\pi^- p \to \pi^-\pi^+\pi^- p$
1726±12±25		[2] ABLIKIM	17K	BES3	$\psi(2S) \to \gamma\eta\pi^+\pi^-$
1722± 9±15	18k	[3] SCHEGELSKY	06	RVUE	$\gamma\gamma \to \pi^+\pi^-\pi^0$
1660±40		[2] ABELE	99B	CBAR	1.94 $\overline{p}p \to \pi^0\eta\eta$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1720±10±60		[4] JACKURA	18	RVUE	$\pi^- p \to \eta\pi^- p$
1675±25		ANISOVICH	09	RVUE	0.0 $\overline{p}p$, πN
1702± 7	80k	[5] UMAN	06	E835	5.2 $\overline{p}p \to \eta\eta\pi^0$
1721±13±44	145k	LU	05	B852	18 $\pi^- p \to \omega\pi^-\pi^0 p$
1737± 5± 7		ABE	04	BELL	10.6 $e^+e^- \to e^+e^- K^+K^-$
1767±14	221	[6] ACCIARRI	01H	L3	$\gamma\gamma \to K^0_S K^0_S$, E^{ee}_{cm}= 91, 183–209 GeV
∼ 1775		[7] GRYGOREV	99	SPEC	40 $\pi^- p \to K^0_S K^0_S n$
1752±21± 4		ACCIARRI	97T	L3	$\gamma\gamma \to \pi^+\pi^-\pi^0$

[1] Statistical error negligible.
[2] Breit-Wigner mass.
[3] From analysis of L3 data at 183–209 GeV.
[4] Superseded by RODAS 19.
[5] Statistical error only.
[6] Spin 2 dominant, isospin not determined, could also be I=1.

[7] Possibly two $J^P = 2^+$ resonances with isospins 0 and 1.

$a_2(1700)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
380^{+60}_{-50} OUR AVERAGE		Error includes scale factor of 3.9. See the ideogram below.			
436^{+20}_{-16}	46M	[1,2] AGHASYAN	18B	COMP	190 $\pi^- p \to \pi^-\pi^+\pi^- p$
$190 \pm 18 \pm 30$		[2] ABLIKIM	17K	BES3	$\psi(2S) \to \gamma\eta\pi^+\pi^-$
$336 \pm 20 \pm 20$	18k	[3] SCHEGELSKY	06	RVUE	$\gamma\gamma \to \pi^+\pi^-\pi^0$
280 ± 70		[2] ABELE	99B	CBAR	1.94 $\overline{p}p \to \pi^0\eta\eta$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$280 \pm 10 \pm 70$		[4] JACKURA	18	RVUE	$\pi^- p \to \eta\pi^- p$
270^{+50}_{-20}		ANISOVICH	09	RVUE	0.0 $\overline{p}p$, πN
417 ± 19	80k	[5] UMAN	06	E835	5.2 $\overline{p}p \to \eta\eta\pi^0$
$279 \pm 49 \pm 66$	145k	LU	05	B852	18 $\pi^- p \to \omega\pi^-\pi^0 p$
$151 \pm 22 \pm 24$		ABE	04	BELL	10.6 $e^+e^- \to e^+e^- K^+K^-$
187 ± 60	221	[6] ACCIARRI	01H	L3	$\gamma\gamma \to K^0_S K^0_S$, E^{ee}_{cm}= 91, 183–209 GeV
$150 \pm 110 \pm 34$		ACCIARRI	97T	L3	$\gamma\gamma \to \pi^+\pi^-\pi^0$



$a_2(1700)$ width (MeV)

[1] Statistical error negligible.
[2] Breit-Wigner width.
[3] From analysis of L3 data at 183–209 GeV.
[4] Superseded by RODAS 19.

[5] Statistical error only.
[6] Spin 2 dominant, isospin not determined, could also be I=1.

$a_2(1700)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$\eta\pi$	(2.5±0.6) %
Γ_2	$\eta'\pi$	seen
Γ_3	$\gamma\gamma$	$(7.9\pm1.7)\times10^{-7}$
Γ_4	$\rho\pi$	seen
Γ_5	$f_2(1270)\pi$	seen
Γ_6	$K\overline{K}$	(1.3±0.8) %
Γ_7	$\omega\pi^-\pi^0$	seen
Γ_8	$\omega\rho$	seen

$a_2(1700)$ PARTIAL WIDTHS

$\Gamma(\eta\pi)$ — Γ_1

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
9.5±2.0	870	[1] SCHEGELSKY 06A	RVUE	$\gamma\gamma\to K^0_S K^0_S$

[1] From analysis of L3 data at 91 and 183–209 GeV, using $a_2(1700)$ mass of 1730 MeV and width of 340 MeV, and SU(3) relations.

$\Gamma(\gamma\gamma)$ — Γ_3

VALUE (keV)	EVTS	DOCUMENT ID	TECN	COMMENT
0.30±0.05	870	[1] SCHEGELSKY 06A	RVUE	$\gamma\gamma\to K^0_S K^0_S$

[1] From analysis of L3 data at 91 and 183–209 GeV, using $a_2(1700)$ mass of 1730 MeV and width of 340 MeV, and SU(3) relations.

$\Gamma(K\overline{K})$ — Γ_6

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
5.0±3.0	870	[1] SCHEGELSKY 06A	RVUE	$\gamma\gamma\to K^0_S K^0_S$

[1] From analysis of L3 data at 91 and 183–209 GeV, using $a_2(1700)$ mass of 1730 MeV and width of 340 MeV, and SU(3) relations.

$a_2(1700)$ $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

$[\Gamma(\rho\pi)+\Gamma(f_2(1270)\pi)]\times\Gamma(\gamma\gamma)/\Gamma_{total}$ — $(\Gamma_4+\Gamma_5)\Gamma_3/\Gamma$

VALUE (keV)	EVTS	DOCUMENT ID	TECN	COMMENT
0.29±0.04±0.02		ACCIARRI 97T	L3	$\gamma\gamma\to\pi^+\pi^-\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.37^{+0.12}_{-0.08}\pm0.10$	18k	[1] SCHEGELSKY 06	RVUE	$\gamma\gamma\to\pi^+\pi^-\pi^0$

[1] From analysis of L3 data at 183–209 GeV.

$\Gamma(K\overline{K}) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_6\Gamma_3/\Gamma$

VALUE (eV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$20.6\pm 4.2\pm 4.6$	[1] ABE	04	BELL	10.6 $e^+e^- \to e^+e^-K^+K^-$
$49 \pm 11 \pm 13$	[2] ACCIARRI	01H	L3	$\gamma\gamma \to K^0_S K^0_S$, E^{ee}_{cm}= 91, 183–209 GeV

[1] Assuming spin 2.
[2] Spin 2 dominant, isospin not determined, could also be I=1.

$a_2(1700)$ BRANCHING RATIOS

$\Gamma(\rho\pi)/\Gamma(f_2(1270)\pi)$ Γ_4/Γ_5

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$3.4\pm0.4\pm0.1$	18k	[1] SCHEGELSKY	06	RVUE	$\gamma\gamma \to \pi^+\pi^-\pi^0$

[1] From analysis of L3 data at 183–209 GeV.

$\Gamma(K\overline{K})/\Gamma(\eta\pi)$ Γ_6/Γ_1

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.029\pm0.04\ ^{+0.011}_{-0.012}$	[1] KOPF	21	RVUE	0.9 $p\overline{p} \to \pi^0\pi^0\eta$, $\pi^0\eta\eta$, $\pi^0K^+K^-$ and 191 $\pi^-p \to \pi^-\pi^-\pi^+p$
$4.134\pm0.106^{+4.909}_{-2.988}$	[2] ALBRECHT	20	RVUE	0.9 $\overline{p}p \to \pi^0\pi^0\eta$, $\pi^0\eta\eta$, $\pi^0K^+K^-$

[1] From T-matrix pole based on combined fit of Crystal Barrel and $\pi\pi$ scattering data (ALBRECHT 20), and COMPASS data (ADOLPH 15), using a coupled-channel model of $\eta\pi$, $\eta'\pi$ and $K\overline{K}$ systems.
[2] Residues from T-matrix pole, 2 poles, 2 channels ($\pi\eta$, $K\overline{K}$).

$\Gamma(\eta'\pi)/\Gamma(\eta\pi)$ Γ_2/Γ_1

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.035\pm0.044^{+0.069}_{-0.012}$	[1] KOPF	21	RVUE	0.9 $p\overline{p} \to \pi^0\pi^0\eta$, $\pi^0\eta\eta$, $\pi^0K^+K^-$ and 191 $\pi^-p \to \pi^-\pi^-\pi^+p$

[1] From T-matrix pole based on combined fit of Crystal Barrel and $\pi\pi$ scattering data (ALBRECHT 20), and COMPASS data (ADOLPH 15), using a coupled-channel model of $\eta\pi$, $\eta'\pi$ and $K\overline{K}$ systems.

$a_2(1700)$ REFERENCES

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ALBRECHT	20	EPJ C80 453	M. Albrecht et al.	(Crystal Barrel Collab.)
RODAS	19	PRL 122 042002	A. Rodas et al.	(JPAC Collab.)
AGHASYAN	18B	PR D98 092003	M. Aghasyan et al.	(COMPASS Collab.)
JACKURA	18	PL B779 464	A. Jackura et al.	(JPAC and COMPASS Collab.)
ABLIKIM	17K	PR D95 032002	M. Ablikim et al.	(BESIII Collab.)
ADOLPH	15	PL B740 303	M. Adolph et al.	(COMPASS Collab.)
ANISOVICH	09	IJMP A24 2481	V.V. Anisovich, A.V. Sarantsev	(PNPI)
SCHEGELSKY	06	EPJ A27 199	V.A. Schegelsky et al.	

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UMAN	06	PR D73 052009	I. Uman *et al.*	(FNAL E835)
LU	05	PRL 94 032002	M. Lu *et al.*	(BNL E852 Collab.)
ABE	04	EPJ C32 323	K. Abe *et al.*	(BELLE Collab.)
AMSLER	02	EPJ C23 29	C. Amsler *et al.*	(Crystal Barrel Collab.)
ACCIARRI	01H	PL B501 173	M. Acciarri *et al.*	(L3 Collab.)
ABELE	99B	EPJ C8 67	A. Abele *et al.*	(Crystal Barrel Collab.)
GRYGOREV	99	PAN 62 470	V.K. Grygorev *et al.*	
		Translated from YAF 62 513.		
ACCIARRI	97T	PL B413 147	M. Acciarri *et al.*	(L3 Collab.)