$a_1(1260)$

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

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$a_1(1260)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
1230±40 OUR ESTIMATE						
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1203± 3		[1] GOMEZ DUMM	04	RVUE		$\tau^+ \to \pi^+\pi^+\pi^-\nu_\tau$
1331±10± 3	37k	[2] ASNER	00	CLE2		10.6 $e^+e^- \to \tau^+\tau^-, \tau^- \to \pi^-\pi^0\pi^0\nu_\tau$
1255± 7± 6	5904	[3] ABREU	98G	DLPH		e^+e^-
1207± 5± 8	5904	[4] ABREU	98G	DLPH		e^+e^-
1196± 4± 5	5904	[5,6] ABREU	98G	DLPH		e^+e^-
1240±10		BARBERIS	98B			450 $pp \to p_f\pi^+\pi^-\pi^0 p_s$
1262± 9± 7		[3,7] ACKERSTAFF	97R	OPAL		E^{ee}_{cm}= 88–94, $\tau \to 3\pi\nu$
1210± 7± 2		[4,7] ACKERSTAFF	97R	OPAL		E^{ee}_{cm}= 88–94, $\tau \to 3\pi\nu$
1211± 7^{+50}_{-0}		[4] ALBRECHT	93C	ARG		$\tau^+ \to \pi^+\pi^+\pi^-\nu$
1121± 8		[8] ANDO	92	SPEC		8 $\pi^- p \to \pi^+\pi^-\pi^0 n$
1242±37		[9] IVANOV	91	RVUE		$\tau \to \pi^+\pi^+\pi^-\nu$
1260±14		[10] IVANOV	91	RVUE		$\tau \to \pi^+\pi^+\pi^-\nu$
1250± 9		[11] IVANOV	91	RVUE		$\tau \to \pi^+\pi^+\pi^-\nu$
1208±15		ARMSTRONG	90	OMEG	0	300.0$pp \to pp\pi^+\pi^-\pi^0$
1220±15		[12] ISGUR	89	RVUE		$\tau^+ \to \pi^+\pi^+\pi^-\nu$
1260±25		[13] BOWLER	88	RVUE		
1166±18±11		BAND	87	MAC		$\tau^+ \to \pi^+\pi^+\pi^-\nu$
1164±41±23		BAND	87	MAC		$\tau^+ \to \pi^+\pi^0\pi^0\nu$
1250±40		[12] TORNQVIST	87	RVUE		
1046±11		ALBRECHT	86B	ARG		$\tau^+ \to \pi^+\pi^+\pi^-\nu$
1056±20±15		RUCKSTUHL	86	DLCO		$\tau^+ \to \pi^+\pi^+\pi^-\nu$
1194±14±10		SCHMIDKE	86	MRK2		$\tau^+ \to \pi^+\pi^+\pi^-\nu$
1255±23		BELLINI	85	SPEC		40 $\pi^- A \to \pi^-\pi^+\pi^- A$
1240±80		[14] DANKOWY...	81	SPEC	0	8.45 $\pi^- p \to n3\pi$
1280±30		[14] DAUM	81B	CNTR		63,94 $\pi^- p \to p3\pi$
1041±13		[15] GAVILLET	77	HBC	+	4.2 $K^- p \to \Sigma 3\pi$

[1] Using the data of BARATE 98R.
[2] From a fit to the 3π mass spectrum including the $K\overline{K}^*(892)$ threshold.
[3] Uses the model of KUHN 90.
[4] Uses the model of ISGUR 89.
[5] Includes the effect of a possible a_1' state.
[6] Uses the model of FEINDT 90.

[7] Supersedes AKERS 95P.
[8] Average and spread of values using 2 variants of the model of BOWLER 75.
[9] Reanalysis of RUCKSTUHL 86.
[10] Reanalysis of SCHMIDKE 86.
[11] Reanalysis of ALBRECHT 86B.
[12] From a combined reanalysis of ALBRECHT 86B, SCHMIDKE 86, and RUCKSTUHL 86.
[13] From a combined reanalysis of ALBRECHT 86B and DAUM 81B.
[14] Uses the model of BOWLER 75.
[15] Produced in K^- backward scattering.

$a_1(1260)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
250 to 600 OUR ESTIMATE						
• • • We do not use the following data for averages, fits, limits, etc. • • •						
480 ± 20		[16] GOMEZ DUMM	04	RVUE		$\tau^+ \to \pi^+\pi^+\pi^-\nu_\tau$
460 ± 85	205	[17] DRUTSKOY	02	BELL		$B \to D^{(*)} K^- K^{*0}$
814 ± 36 ± 13	37k	[18] ASNER	00	CLE2		10.6 $e^+e^- \to \tau^+\tau^-$, $\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$
450 ± 50	22k	[19] AKHMETSHIN	99E	CMD2		1.05–1.38 $e^+e^- \to \pi^+\pi^-\pi^0\pi^0$
570 ± 10		[20] BONDAR	99	RVUE		$e^+e^- \to 4\pi$, $\tau \to 3\pi\nu_\tau$
587 ± 27 ± 21	5904	[21] ABREU	98G	DLPH		e^+e^-
478 ± 3 ± 15	5904	[22] ABREU	98G	DLPH		e^+e^-
425 ± 14 ± 8	5904	[23,24] ABREU	98G	DLPH		e^+e^-
400 ± 35		BARBERIS	98B			450 $pp \to p_f \pi^+\pi^-\pi^0 p_s$
621 ± 32 ± 58		[21,25] ACKERSTAFF	97R	OPAL		E_{cm}^{ee} = 88–94, $\tau \to 3\pi\nu$
457 ± 15 ± 17		[22,25] ACKERSTAFF	97R	OPAL		E_{cm}^{ee} = 88–94, $\tau \to 3\pi\nu$
446 ± 21 $^{+140}_{-0}$		[22] ALBRECHT	93C	ARG		$\tau^+ \to \pi^+\pi^+\pi^-\nu$
239 ± 11		ANDO	92	SPEC		8 $\pi^- p \to \pi^+\pi^-\pi^0 n$
266 ± 13 ± 4		[26] ANDO	92	SPEC		8 $\pi^- p \to \pi^+\pi^-\pi^0 n$
465 $^{+228}_{-143}$		[27] IVANOV	91	RVUE		$\tau \to \pi^+\pi^+\pi^-\nu$
298 $^{+40}_{-34}$		[28] IVANOV	91	RVUE		$\tau \to \pi^+\pi^+\pi^-\nu$
488 ± 32		[29] IVANOV	91	RVUE		$\tau \to \pi^+\pi^+\pi^-\nu$
430 ± 50		ARMSTRONG	90	OMEG	0	300.0 $pp \to pp\pi^+\pi^-\pi^0$
420 ± 40		[30] ISGUR	89	RVUE		$\tau^+ \to \pi^+\pi^+\pi^-\nu$
396 ± 43		[31] BOWLER	88	RVUE		
405 ± 75 ± 25		BAND	87	MAC		$\tau^+ \to \pi^+\pi^+\pi^-\nu$
419 ± 108 ± 57		BAND	87	MAC		$\tau^+ \to \pi^+\pi^0\pi^0\nu$
521 ± 27		ALBRECHT	86B	ARG		$\tau^+ \to \pi^+\pi^+\pi^-\nu$

$476^{+132}_{-120} \pm 54$	RUCKSTUHL	86	DLCO		$\tau^+ \to \pi^+\pi^+\pi^-\nu$
$462 \pm 56 \pm 30$	SCHMIDKE	86	MRK2		$\tau^+ \to \pi^+\pi^+\pi^-\nu$
292 ± 40	BELLINI	85	SPEC		40 $\pi^- A \to \pi^-\pi^+\pi^- A$
380 ± 100	[32] DANKOWY...	81	SPEC	0	8.45 $\pi^- p \to n3\pi$
300 ± 50	[32] DAUM	81B	CNTR		63,94 $\pi^- p \to p3\pi$
230 ± 50	[33] GAVILLET	77	HBC	+	4.2 $K^- p \to \Sigma 3\pi$

[16] Using the data of BARATE 98R.
[17] From a fit of the $K^- K^{*0}$ distribution assuming $m_{a_1} = 1230$ MeV and purely resonant production of the $K^- K^{*0}$ system.
[18] From a fit to the 3π mass spectrum including the $K\overline{K}^*(892)$ threshold.
[19] Using the $a_1(1260)$ mass of 1230 MeV.
[20] From AKHMETSHIN 99E and ASNER 00 data using the $a_1(1260)$ mass of 1230 MeV.
[21] Uses the model of KUHN 90.
[22] Uses the model of ISGUR 89.
[23] Includes the effect of a possible a_1' state.
[24] Uses the model of FEINDT 90.
[25] Supersedes AKERS 95P.
[26] Average and spread of values using 2 variants of the model of BOWLER 75.
[27] Reanalysis of RUCKSTUHL 86.
[28] Reanalysis of SCHMIDKE 86.
[29] Reanalysis of ALBRECHT 86B.
[30] From a combined reanalysis of ALBRECHT 86B, SCHMIDKE 86, and RUCKSTUHL 86.
[31] From a combined reanalysis of ALBRECHT 86B and DAUM 81B.
[32] Uses the model of BOWLER 75.
[33] Produced in K^- backward scattering.

$a_1(1260)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$\pi^+\pi^-\pi^0$	
Γ_2	$\pi^0\pi^0\pi^0$	
Γ_3	$(\rho\pi)_{S-\text{wave}}$	seen
Γ_4	$(\rho\pi)_{D-\text{wave}}$	seen
Γ_5	$(\rho(1450)\pi)_{S-\text{wave}}$	seen
Γ_6	$(\rho(1450)\pi)_{D-\text{wave}}$	seen
Γ_7	$\sigma\pi$	seen
Γ_8	$f_0(980)\pi$	not seen
Γ_9	$f_0(1370)\pi$	seen
Γ_{10}	$f_2(1270)\pi$	seen
Γ_{11}	$K\overline{K}^*(892)+$ c.c.	seen
Γ_{12}	$\pi\gamma$	seen

$a_1(1260)$ PARTIAL WIDTHS

$\Gamma(\pi\gamma)$ Γ_{12}

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
640±246	ZIELINSKI	84C	SPEC	200 π^+ Z → Z3π

D-wave/S-wave AMPLITUDE RATIO IN DECAY OF $a_1(1260) \to \rho\pi$

VALUE	DOCUMENT ID		TECN	COMMENT
−0.108±0.016 OUR AVERAGE				
−0.14 ±0.04 ±0.07	[36] CHUNG	02	E852	18.3 $\pi^- p \to \pi^+\pi^-\pi^- p$
−0.10 ±0.02 ±0.02	[34,35] ACKERSTAFF	97R	OPAL	$E_{\rm cm}^{ee}$ = 88–94, $\tau \to 3\pi\nu$
−0.11 ±0.02	[34] ALBRECHT	93C	ARG	$\tau^+ \to \pi^+\pi^+\pi^-\nu$

[34] Uses the model of ISGUR 89.
[35] Supersedes AKERS 95P.
[36] Deck-type background not subtracted.

$a_1(1260)$ BRANCHING RATIOS

$\Gamma((\rho\pi)_{S-\text{wave}})/\Gamma_{\text{total}}$ Γ_3/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
60.19	37k	[37] ASNER	00	CLE2	10.6 $e^+e^- \to \tau^+\tau^-$, $\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$

$\Gamma((\rho\pi)_{D-\text{wave}})/\Gamma_{\text{total}}$ Γ_4/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.30±0.60±0.22	37k	[37] ASNER	00	CLE2	10.6 $e^+e^- \to \tau^+\tau^-$, $\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$

$\Gamma((\rho(1450)\pi)_{S-\text{wave}})/\Gamma_{\text{total}}$ Γ_5/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.56±0.84±0.32	37k	[37,38] ASNER	00	CLE2	10.6 $e^+e^- \to \tau^+\tau^-$, $\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$

$\Gamma((\rho(1450)\pi)_{D-\text{wave}})/\Gamma_{\text{total}}$ Γ_6/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2.04±1.20±0.28	37k	[37,38] ASNER	00	CLE2	10.6 $e^+e^- \to \tau^+\tau^-$, $\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$

$\Gamma(\sigma\pi)/\Gamma_{total}$ Γ_7/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen		CHUNG	02	E852	18.3 $\pi^- p \to \pi^+\pi^-\pi^- p$
$18.76 \pm 4.29 \pm 1.48$	37k	[37,39] ASNER	00	CLE2	10.6 $e^+e^- \to \tau^+\tau^-$, $\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$

$\Gamma(f_0(980)\pi)/\Gamma_{total}$ Γ_8/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
not seen	37k	ASNER	00	CLE2	10.6 $e^+e^- \to \tau^+\tau^-$, $\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$

$\Gamma(f_0(1370)\pi)/\Gamma_{total}$ Γ_9/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$7.40 \pm 2.71 \pm 1.26$	37k	[37,40] ASNER	00	CLE2	10.6 $e^+e^- \to \tau^+\tau^-$, $\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$

$\Gamma(f_2(1270)\pi)/\Gamma_{total}$ Γ_{10}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.19 \pm 0.49 \pm 0.17$	37k	[37,41] ASNER	00	CLE2	10.6 $e^+e^- \to \tau^+\tau^-$, $\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$

$\Gamma(K\overline{K}^*(892)+\text{c.c.})/\Gamma_{total}$ Γ_{11}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
8 to 15	205	[42] DRUTSKOY	02	BELL	$B \to D^{(*)} K^- K^{*0}$
$3.3 \pm 0.5 \pm 0.1$	37k	[43] ASNER	00	CLE2	10.6 $e^+e^- \to \tau^+\tau^-$, $\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$

$\Gamma(\sigma\pi)/\Gamma((\rho\pi)_{S-wave})$ Γ_7/Γ_3

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 0.3	28k	AKHMETSHIN	99E	CMD2	1.05–1.38 $e^+e^- \to \pi^+\pi^-\pi^+\pi^-$
0.003 ± 0.003		[44] LONGACRE	82	RVUE	

$\Gamma(\pi^0\pi^0\pi^0)/\Gamma(\pi^+\pi^-\pi^0)$ Γ_2/Γ_1

VALUE	CL%	DOCUMENT ID		COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.008	90	[45] BARBERIS	01	450 $pp \to p_f 3\pi^0 p_s$

[37] From a fit to the Dalitz plot.
[38] Assuming for $\rho(1450)$ mass and width of 1370 and 386 MeV respectively.
[39] Assuming for σ mass and width of 860 and 880 MeV respectively.
[40] Assuming for $f_0(1370)$ mass and width of 1186 and 350 MeV respectively.
[41] Assuming for $f_2(1270)$ mass and width of 1275 and 185 MeV respectively.
[42] From a comparison to ALAM 94 assuming purely resonant production of the $K^- K^{*0}$ system.
[43] From a fit to the 3π mass spectrum including the $K\overline{K}^*(892)$ threshold.
[44] Uses multichannel Aitchison-Bowler model (BOWLER 75). Uses data from GAVILLET 77, DAUM 80, and DANKOWYCH 81.
[45] Inconsistent with observations of $\sigma\pi$, $f_0(1370)\pi$, and $f_2(1270)\pi$ decay modes.

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ALBRECHT	93C	ZPHY C58 61	H. Albrecht *et al.*	(ARGUS Collab.)
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