$a_1(1260)$

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

See also our review under the $a_1(1260)$ in PDG 06, Journal of Physics **G33** 1 (2006).

a_1(1260) T-MATRIX POLE $\sqrt{s}$

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

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
$(1209^{+13}_{-10}) - i(288^{+45}_{-12})$ OUR ESTIMATE			
$(1209 \pm 4^{+12}_{-9}) - i\ (288 \pm 6^{+45}_{-10})$	MIKHASENKO 18	RVUE	$\tau^- \to \pi^-\pi^+\pi^-\nu_\tau$

a_1(1260) MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1230 ±40 OUR ESTIMATE				
1299 $^{+12}_{-28}$	46M	[1] AGHASYAN 18B	COMP	190 $\pi^- p \to \pi^-\pi^+\pi^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1195.05 ± 1.05 ± 6.33	894k	AAIJ 18AI	LHCB	$D^0 \to K^\mp\pi^\pm\pi^\pm\pi^\mp$
1225 ± 9 ± 20	7k	[2] DARGENT 17	RVUE	$D^0 \to \pi^-\pi^+\pi^-\pi^+$
1255 ± 6 $^{+7}_{-17}$	420k	[3] ALEKSEEV 10	COMP	190 $\pi^- Pb \to \pi^-\pi^-\pi^+ Pb'$
1243 ± 12 ± 20		[4] AUBERT 07AU	BABR	10.6 $e^+e^- \to \rho^0\rho^\pm\pi^\mp\gamma$
1230–1270	6360	[5] LINK 07A	FOCS	$D^0 \to \pi^-\pi^+\pi^-\pi^+$
1203 ± 3		[6] GOMEZ-DUM.. 04	RVUE	$\tau^+ \to \pi^+\pi^+\pi^-\nu_\tau$
1330 ± 24	90k	SALVINI 04	OBLX	$\overline{p}p \to 2\pi^+2\pi^-$
1331 ± 10 ± 3	37k	[7] ASNER 00	CLE2	10.6 $e^+e^- \to \tau^+\tau^-$, $\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$
1255 ± 7 ± 6	5904	[8] ABREU 98G	DLPH	e^+e^-
1207 ± 5 ± 8	5904	[9] ABREU 98G	DLPH	e^+e^-
1196 ± 4 ± 5	5904	[10,11] ABREU 98G	DLPH	e^+e^-
1240 ± 10		BARBERIS 98B		450 $pp \to p_f\pi^+\pi^-\pi^0 p_s$
1262 ± 9 ± 7		[8,12] ACKERSTAFF 97R	OPAL	E^{ee}_{cm}= 88–94, $\tau \to 3\pi\nu$
1210 ± 7 ± 2		[9,12] ACKERSTAFF 97R	OPAL	E^{ee}_{cm}= 88–94, $\tau \to 3\pi\nu$
1211 ± 7 $^{+50}_{-0}$		[9] ALBRECHT 93C	ARG	$\tau^+ \to \pi^+\pi^+\pi^-\nu$
1121 ± 8		[13] ANDO 92	SPEC	8 $\pi^- p \to \pi^+\pi^-\pi^0 n$
1242 ± 37		[14] IVANOV 91	RVUE	$\tau \to \pi^+\pi^+\pi^-\nu$
1260 ± 14		[15] IVANOV 91	RVUE	$\tau \to \pi^+\pi^+\pi^-\nu$
1250 ± 9		[16] IVANOV 91	RVUE	$\tau \to \pi^+\pi^+\pi^-\nu$
1208 ± 15		ARMSTRONG 90	OMEG	300.0 $pp \to pp\pi^+\pi^-\pi^0$

1220	±15		[17] ISGUR	89	RVUE	$\tau^+ \to \pi^+\pi^+\pi^-\nu$
1260	±25		[18] 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		[17] 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		[19] DANKOWY...	81	SPEC	$8.45\ \pi^- p \to n 3\pi$
1280	±30		[19] DAUM	81B	CNTR	$63,94\ \pi^- p \to p 3\pi$
1041	±13		[20] GAVILLET	77	HBC	$4.2\ K^- p \to \Sigma 3\pi$

[1] Statistical error negligible.
[2] Reanalysis of CLEO data using Breit-Wigner parameterization.
[3] Superseded by AGHASYAN 2018B.
[4] The $\rho^\pm\pi^\mp$ state can be also due to the $\pi(1300)$.
[5] Using the Breit-Wigner parameterization; strong correlation between mass and width.
[6] Using the data of BARATE 98R.
[7] From a fit to the 3π mass spectrum including the $K\overline{K}^*(892)$ threshold.
[8] Uses the model of KUHN 90.
[9] Uses the model of ISGUR 89.
[10] Includes the effect of a possible a_1' state.
[11] Uses the model of FEINDT 90.
[12] Supersedes AKERS 95P.
[13] Average and spread of values using 2 variants of the model of BOWLER 75.
[14] Reanalysis of RUCKSTUHL 86.
[15] Reanalysis of SCHMIDKE 86.
[16] Reanalysis of ALBRECHT 86B.
[17] From a combined reanalysis of ALBRECHT 86B, SCHMIDKE 86, and RUCKSTUHL 86.
[18] From a combined reanalysis of ALBRECHT 86B and DAUM 81B.
[19] Uses the model of BOWLER 75.
[20] Produced in K^- backward scattering.

a_1(1260) WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
250 to 600 OUR ESTIMATE					
380 ± 80	46M	[1] AGHASYAN	18B	COMP	$190\ \pi^- p \to \pi^-\pi^+\pi^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
422.01 ± 2.10 ± 12.72	894k	AAIJ	18AI	LHCB	$D^0 \to K^\mp\pi^\pm\pi^\pm\pi^\mp$
430 ± 24 ± 31		[2] DARGENT	17	RVUE	$D^0 \to \pi^-\pi^+\pi^-\pi^+$
367 ± 9 $^{+28}_{-25}$	420k	[3] ALEKSEEV	10	COMP	$190\ \pi^- Pb \to \pi^-\pi^-\pi^+ Pb'$
410 ± 31 ± 30		[4] AUBERT	07AU	BABR	$10.6\ e^+e^- \to \rho^0\rho^\pm\pi^\mp\gamma$
520–680	6360	[5] LINK	07A	FOCS	$D^0 \to \pi^-\pi^+\pi^-\pi^+$
480 ± 20		[6] GOMEZ-DUM..	04	RVUE	$\tau^+ \to \pi^+\pi^+\pi^-\nu_\tau$
580 ± 41	90k	SALVINI	04	OBLX	$\overline{p}p \to 2\pi^+ 2\pi^-$
460 ± 85	205	[7] DRUTSKOY	02	BELL	$B \to D^{(*)} K^- K^{*0}$

814	± 36	± 13	37k	[8]	ASNER	00	CLE2	10.6 $e^+ e^- \to \tau^+ \tau^-$, $\tau^- \to \pi^- \pi^0 \pi^0 \nu_\tau$
450	± 50		22k	[9]	AKHMETSHIN	99E	CMD2	1.05–1.38 $e^+ e^- \to \pi^+ \pi^- \pi^0 \pi^0$
570	± 10			[10]	BONDAR	99	RVUE	$e^+ e^- \to 4\pi$, $\tau \to 3\pi \nu_\tau$
587	± 27	± 21	5904	[11]	ABREU	98G	DLPH	$e^+ e^-$
478	± 3	± 15	5904	[12]	ABREU	98G	DLPH	$e^+ e^-$
425	± 14	± 8	5904	[13,14]	ABREU	98G	DLPH	$e^+ e^-$
400	± 35				BARBERIS	98B		450 $p p \to p_f \pi^+ \pi^- \pi^0 p_s$
621	± 32	± 58		[11,15]	ACKERSTAFF	97R	OPAL	$E^{ee}_{\rm cm}$= 88–94, $\tau \to 3\pi \nu$
457	± 15	± 17		[12,15]	ACKERSTAFF	97R	OPAL	$E^{ee}_{\rm cm}$= 88–94, $\tau \to 3\pi \nu$
446	± 21	$^{+140}_{-\ \ 0}$		[12]	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		[16]	ANDO	92	SPEC	8 $\pi^- p \to \pi^+ \pi^- \pi^0 n$
465	$^{+228}_{-143}$			[17]	IVANOV	91	RVUE	$\tau \to \pi^+ \pi^+ \pi^- \nu$
298	$^{+\ 40}_{-\ 34}$			[18]	IVANOV	91	RVUE	$\tau \to \pi^+ \pi^+ \pi^- \nu$
488	± 32			[19]	IVANOV	91	RVUE	$\tau \to \pi^+ \pi^+ \pi^- \nu$
430	± 50				ARMSTRONG	90	OMEG	300.0$p p \to p p \pi^+ \pi^- \pi^0$
420	± 40			[20]	ISGUR	89	RVUE	$\tau^+ \to \pi^+ \pi^+ \pi^- \nu$
396	± 43			[21]	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	$^{+132}_{-120}$	± 54			RUCKSTUHL	86	DLCO	$\tau^+ \to \pi^+ \pi^+ \pi^- \nu$
462	± 56	± 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			[22]	DANKOWY...	81	SPEC	8.45 $\pi^- p \to n 3\pi$
300	± 50			[22]	DAUM	81B	CNTR	63,94 $\pi^- p \to p 3\pi$
230	± 50			[23]	GAVILLET	77	HBC	4.2 $K^- p \to \Sigma 3\pi$

[1] Statistical error negligible.
[2] Reanalysis of CLEO data using Breit-Wigner parameterization.
[3] Superseded by AGHASYAN 2018B.
[4] The $\rho^\pm \pi^\mp$ state can be also due to the $\pi(1300)$.
[5] Using the Breit-Wigner parameterization; strong correlation between mass and width.
[6] Using the data of BARATE 98R.
[7] 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.
[8] From a fit to the 3π mass spectrum including the $K \overline{K}^*(892)$ threshold.
[9] Using the $a_1(1260)$ mass of 1230 MeV.
[10] From AKHMETSHIN 99E and ASNER 00 data using the $a_1(1260)$ mass of 1230 MeV.

[11] Uses the model of KUHN 90.
[12] Uses the model of ISGUR 89.
[13] Includes the effect of a possible a_1' state.
[14] Uses the model of FEINDT 90.
[15] Supersedes AKERS 95P.
[16] Average and spread of values using 2 variants of the model of BOWLER 75.
[17] Reanalysis of RUCKSTUHL 86.
[18] Reanalysis of SCHMIDKE 86.
[19] Reanalysis of ALBRECHT 86B.
[20] From a combined reanalysis of ALBRECHT 86B, SCHMIDKE 86, and RUCKSTUHL 86.
[21] From a combined reanalysis of ALBRECHT 86B and DAUM 81B.
[22] Uses the model of BOWLER 75.
[23] Produced in K^- backward scattering.

$a_1(1260)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	3π	seen
Γ_2	$(\rho\pi)_{S-\text{wave}}$, $\rho \to \pi\pi$	seen
Γ_3	$(\rho\pi)_{D-\text{wave}}$, $\rho \to \pi\pi$	seen
Γ_4	$(\rho(1450)\pi)_{S-\text{wave}}$, $\rho \to \pi\pi$	seen
Γ_5	$(\rho(1450)\pi)_{D-\text{wave}}$, $\rho \to \pi\pi$	seen
Γ_6	$f_0(500)\pi$, $f_0 \to \pi\pi$	seen
Γ_7	$f_0(980)\pi$, $f_0 \to \pi\pi$	seen
Γ_8	$f_0(1370)\pi$, $f_0 \to \pi\pi$	seen
Γ_9	$f_2(1270)\pi$, $f_2 \to \pi\pi$	seen
Γ_{10}	$\pi^+\pi^-\pi^0$	seen
Γ_{11}	$\pi^0\pi^0\pi^0$	not seen
Γ_{12}	$K\overline{K}\pi$	seen
Γ_{13}	$K^*(892)\overline{K}$	seen
Γ_{14}	$\pi\gamma$	seen

$a_1(1260)$ PARTIAL WIDTHS

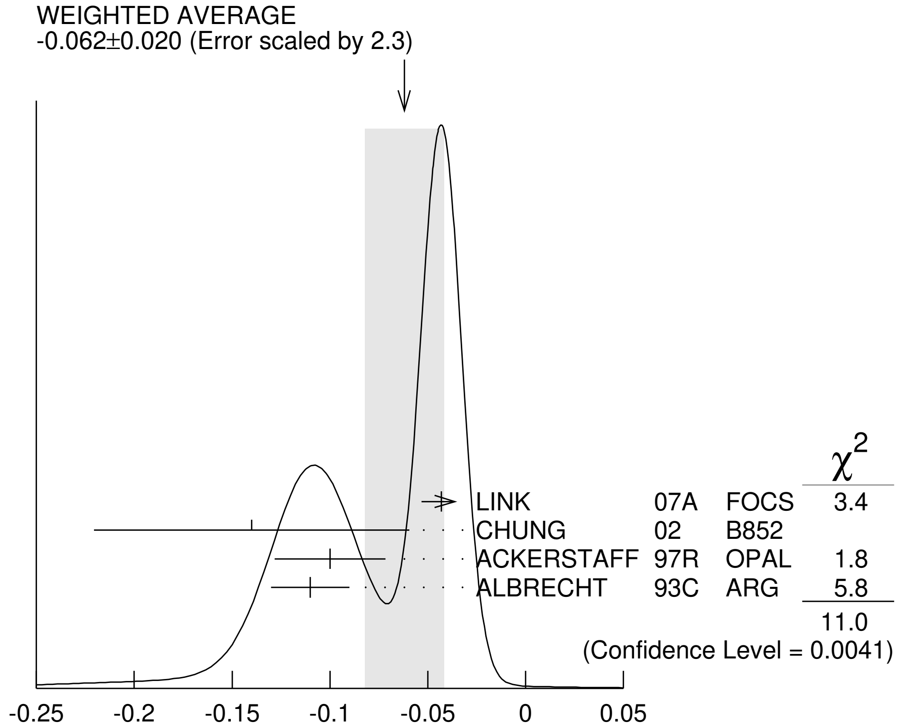
$\Gamma(\pi\gamma)$ **Γ_{14}**

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
640±246	ZIELINSKI	84C	SPEC	200 $\pi^+ Z \to Z 3\pi$

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

VALUE	DOCUMENT ID		TECN	COMMENT
−0.062±0.020 OUR AVERAGE	Error includes scale factor of 2.3. See the ideogram below.			
−0.043±0.009±0.005	LINK	07A	FOCS	$D^0 \to \pi^-\pi^+\pi^-\pi^+$
−0.14 ±0.04 ±0.07	[1] CHUNG	02	B852	18.3 $\pi^- p \to \pi^+\pi^-\pi^- p$
−0.10 ±0.02 ±0.02	[2,3] ACKERSTAFF	97R	OPAL	E^{ee}_{cm}= 88–94, $\tau \to 3\pi\nu$
−0.11 ±0.02	[2] ALBRECHT	93C	ARG	$\tau^+ \to \pi^+\pi^+\pi^-\nu$

[1] Deck-type background not subtracted.
[2] Uses the model of ISGUR 89.
[3] Supersedes AKERS 95P.



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

a_1(1260) BRANCHING RATIOS

$\Gamma((\rho\pi)_{S-\text{wave}},\ \rho\to\pi\pi)/\Gamma_{\text{total}}$ Γ_2/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	[1] ASNER	00	CLE2	10.6 $e^+e^- \to \tau^+\tau^-$, $\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$

[1] From a fit to the Dalitz plot.

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

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.30\pm0.60\pm0.22$	37k	[1] ASNER	00	CLE2	10.6 $e^+e^- \to \tau^+\tau^-$, $\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$

[1] From a fit to the Dalitz plot.

$\Gamma\big((\rho(1450)\pi)_{S-\text{wave}},\ \rho\to\pi\pi\big)/\Gamma_{\text{total}}$ — Γ_4/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.56\pm0.84\pm0.32$	37k	[1,2] ASNER	00	CLE2	10.6 $e^+e^-\to\tau^+\tau^-$, $\tau^-\to\pi^-\pi^0\pi^0\nu_\tau$

[1] From a fit to the Dalitz plot.
[2] Assuming for $\rho(1450)$ mass and width of 1370 and 386 MeV respectively.

$\Gamma\big((\rho(1450)\pi)_{D-\text{wave}},\ \rho\to\pi\pi\big)/\Gamma_{\text{total}}$ — Γ_5/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$2.04\pm1.20\pm0.28$	37k	[1,2] ASNER	00	CLE2	10.6 $e^+e^-\to\tau^+\tau^-$, $\tau^-\to\pi^-\pi^0\pi^0\nu_\tau$

[1] From a fit to the Dalitz plot.
[2] Assuming for $\rho(1450)$ mass and width of 1370 and 386 MeV respectively.

$\Gamma\big(f_0(500)\pi,\ f_0\to\pi\pi\big)/\Gamma_{\text{total}}$ — Γ_6/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen		CHUNG	02	B852	18.3 $\pi^-p\to\pi^+\pi^-\pi^-p$
$18.76\pm4.29\pm1.48$	37k	[1,2] ASNER	00	CLE2	10.6 $e^+e^-\to\tau^+\tau^-$, $\tau^-\to\pi^-\pi^0\pi^0\nu_\tau$

[1] From a fit to the Dalitz plot.
[2] Assuming for $f_0(500)$ (σ) mass and width of 860 and 880 MeV respectively.

$\Gamma\big(f_0(500)\pi,\ f_0\to\pi\pi\big)/\big[\Gamma\big((\rho\pi)_{S-\text{wave}},\ \rho\to\pi\pi\big)+\Gamma\big((\rho\pi)_{S-\text{wave}},\ \rho\to\pi\pi\big)\big]$ — $\Gamma_6/(\Gamma_2+\Gamma_2)$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.06\ \pm0.05$	90k	SALVINI	04	OBLX	$\overline{p}p\to 2\pi^+2\pi^-$
~ 0.3	28k	AKHMETSHIN	99E	CMD2	1.05–1.38 $e^+e^-\to\pi^+\pi^-\pi^+\pi^-$
0.003 ± 0.003		[1] LONGACRE	82	RVUE	

[1] Uses multichannel Aitchison-Bowler model (BOWLER 75). Uses data from GAVILLET 77, DAUM 80, and DANKOWYCH 81.

$\Gamma\big(f_0(980)\pi,\ f_0\to\pi\pi\big)/\Gamma_{\text{total}}$ — Γ_7/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
seen		[1] ALEXEEV	21	COMP	$\pi^-p\to\pi^-\pi^+\pi^-p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
not seen	37k	ASNER	00	CLE2	10.6 $e^+e^-\to\tau^+\tau^-$, $\tau^-\to\pi^-\pi^0\pi^0\nu_\tau$

[1] The $a_1(1260)^-\to f_0(980)\pi^-$ decay mode via the Triangle Singularity mechanism from MIKHASENKO 15 and ACETI 16 explains the $a_1(1420)^-$ signal observed by ADOLPH 15C.

$\Gamma(f_0(1370)\pi,\ f_0 \to \pi\pi)/\Gamma_{total}$ — Γ_8/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$7.40 \pm 2.71 \pm 1.26$	37k	[1,2] ASNER	00	CLE2	$10.6\ e^+e^- \to \tau^+\tau^-$, $\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$

[1] From a fit to the Dalitz plot.
[2] Assuming for $f_0(1370)$ mass and width of 1186 and 350 MeV respectively.

$\Gamma(f_2(1270)\pi,\ f_2 \to \pi\pi)/\Gamma_{total}$ — Γ_9/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.19 \pm 0.49 \pm 0.17$	37k	[1,2] ASNER	00	CLE2	$10.6\ e^+e^- \to \tau^+\tau^-$, $\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$

[1] From a fit to the Dalitz plot.
[2] Assuming for $f_2(1270)$ mass and width of 1275 and 185 MeV respectively.

$\Gamma(\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_{10}/Γ

VALUE	DOCUMENT ID		COMMENT
seen	BARBERIS	98B	$450\ pp \to p_f \pi^+\pi^-\pi^0 p_s$

$\Gamma(\pi^0\pi^0\pi^0)/\Gamma(\pi^+\pi^-\pi^0)$ — Γ_{11}/Γ_{10}

VALUE	CL%	DOCUMENT ID		COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.008	90	[1] BARBERIS	01	$450\ pp \to p_f 3\pi^0 p_s$

[1] Inconsistent with observations of $\sigma\pi$, $f_0(1370)\pi$, and $f_2(1270)\pi$ decay modes.

$\Gamma(K^*(892)K)/\Gamma_{total}$ — Γ_{13}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2.2 ± 0.5	2255	[1] COAN	04	CLEO	$\tau^- \to K^-\pi^-K^+\nu_\tau$
8 to 15	205	[2] DRUTSKOY	02	BELL	$B \to D^{(*)}K^-K^{*0}$
$3.3 \pm 0.5 \pm 0.1$	37k	[3] ASNER	00	CLE2	$10.6\ e^+e^- \to \tau^+\tau^-$, $\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$
2.6 ± 0.3		[4] BARATE	99R	ALEP	$\tau \to K\overline{K}\pi\nu_\tau$

[1] Using structure functions from KUHN 92 and DECKER 93A and B($\tau^- \to K^-\pi^-K^+\nu_\tau$) = $(0.155 \pm 0.006 \pm 0.009)$% from BRIERE 03.
[2] From a comparison to ALAM 94 assuming purely resonant production of the K^-K^{*0} system.
[3] From a fit to the 3π mass spectrum including the $K\overline{K}^*(892)$ threshold.
[4] Assuming $a_1(1260)$ dominance and taking B($\tau \to a_1(1260)\nu_\tau$) from BUSKULIC 96.

$a_1(1260)$ REFERENCES

ALEXEEV	21	PRL 127 082501	G.D. Alexeev *et al.*	(COMPASS Collab.)
AAIJ	18AI	EPJ C78 443	R. Aaij *et al.*	(LHCb Collab.)
AGHASYAN	18B	PR D98 092003	M. Aghasyan *et al.*	(COMPASS Collab.)
MIKHASENKO	18	PR D98 096021	M. Mikhasenko *et al.*	(JPAC Collab.)
DARGENT	17	JHEP 1705 143	P. dArgent *et al.*	(HEID, BRIS)
ACETI	16	PR D94 096015	F. Aceti, L.R. Dai, E. Oset	(IFIC, LNUDA)
ADOLPH	15C	PRL 115 082001	C. Adolph *et al.*	(COMPASS Collab.)
MIKHASENKO	15	PR D91 094015	M. Mikhasenko, B. Ketzer, A. Sarantsev	(BONN+)
ALEKSEEV	10	PRL 104 241803	M.G. Alekseev *et al.*	(COMPASS Collab.)
AUBERT	07AU	PR D76 092005	B. Aubert *et al.*	(BABAR Collab.)
LINK	07A	PR D75 052003	J.M. Link *et al.*	(FNAL FOCUS Collab.)
PDG	06	JP G33 1	W.-M. Yao *et al.*	(PDG Collab.)
COAN	04	PRL 92 232001	T.E. Coan *et al.*	(CLEO Collab.)
GOMEZ-DUM...	04	PR D69 073002	D. Gomez Dumm, A. Pich, J. Portoles	
SALVINI	04	EPJ C35 21	P. Salvini *et al.*	(OBELIX Collab.)
BRIERE	03	PRL 90 181802	R. A. Briere *et al.*	(CLEO Collab.)
CHUNG	02	PR D65 072001	S.U. Chung *et al.*	(BNL E852 Collab.)
DRUTSKOY	02	PL B542 171	A. Drutskoy *et al.*	(BELLE Collab.)
BARBERIS	01	PL B507 14	D. Barberis *et al.*	
ASNER	00	PR D61 012002	D.M. Asner *et al.*	(CLEO Collab.)
AKHMETSHIN	99E	PL B466 392	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)
BARATE	99R	EPJ C11 599	R. Barate *et al.*	(ALEPH Collab.)
BONDAR	99	PL B466 403	A.E. Bondar *et al.*	(Novosibirsk CMD-2 Collab.)
ABREU	98G	PL B426 411	P. Abreu *et al.*	(DELPHI Collab.)
BARATE	98R	EPJ C4 409	R. Barate *et al.*	(ALEPH Collab.)
BARBERIS	98B	PL B422 399	D. Barberis *et al.*	(WA 102 Collab.)
ACKERSTAFF	97R	ZPHY C75 593	K. Ackerstaff *et al.*	(OPAL Collab.)
BUSKULIC	96	ZPHY C70 579	D. Buskulic *et al.*	(ALEPH Collab.)
AKERS	95P	ZPHY C67 45	R. Akers *et al.*	(OPAL Collab.)
ALAM	94	PR D50 43	M.S. Alam *et al.*	(CLEO Collab.)
ALBRECHT	93C	ZPHY C58 61	H. Albrecht *et al.*	(ARGUS Collab.)
DECKER	93A	ZPHY C58 445	R. Decker *et al.*	
ANDO	92	PL B291 496	A. Ando *et al.*	(KEK, KYOT, NIRS, SAGA+)
KUHN	92	ZPHY C56 661	J.H. Kuhn, E. Mirkes	
IVANOV	91	ZPHY C49 563	Y.P. Ivanov, A.A. Osipov, M.K. Volkov	(JINR)
ARMSTRONG	90	ZPHY C48 213	T.A. Armstrong, M. Benayoun, W. Beusch	(WA76 Coll.)
FEINDT	90	ZPHY C48 681	M. Feindt	(HAMB)
KUHN	90	ZPHY C48 445	J.H. Kuhn *et al.*	(MPIM)
ISGUR	89	PR D39 1357	N. Isgur, C. Morningstar, C. Reader	(TNTO)
BOWLER	88	PL B209 99	M.G. Bowler	(OXF)
BAND	87	PL B198 297	H.R. Band *et al.*	(MAC Collab.)
TORNQVIST	87	ZPHY C36 695	N.A. Tornqvist	(HELS)
ALBRECHT	86B	ZPHY C33 7	H. Albrecht *et al.*	(ARGUS Collab.)
RUCKSTUHL	86	PRL 56 2132	W. Ruckstuhl *et al.*	(DELCO Collab.)
SCHMIDKE	86	PRL 57 527	W.B. Schmidke *et al.*	(Mark II Collab.)
BELLINI	85	SJNP 41 781	D. Bellini *et al.*	
		Translated from YAF 41 1223.		
ZIELINSKI	84C	PRL 52 1195	M. Zielinski *et al.*	(ROCH, MINN, FNAL)
LONGACRE	82	PR D26 82	R.S. Longacre	(BNL)
DANKOWY...	81	PRL 46 580	J.A. Dankowych *et al.*	(TNTO, BNL, CARL+)
DAUM	81B	NP B182 269	C. Daum *et al.*	(AMST, CERN, CRAC, MPIM+)
DAUM	80	PL 89B 281	C. Daum *et al.*	(AMST, CERN, CRAC, MPIM+) JP
GAVILLET	77	PL 69B 119	P. Gavillet *et al.*	(AMST, CERN, NIJM+) JP
BOWLER	75	NP B97 227	M.G. Bowler *et al.*	(OXFTP, DARE)