NODE=M010

# $a_1(1260)$

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

NODE=M010

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

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

NODE=M010PP

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

NODE=M010PP

NODE=M010PP

| 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 | $\tau^- \to \pi^-\pi^+\pi^-\nu_\tau$ |

→ UNCHECKED ←

## $a_1$(1260) MASS

NODE=M010M

NODE=M010M

| VALUE (MeV) | EVTS | DOCUMENT ID | | TECN | COMMENT | |
|---|---|---|---|---|---|---|
| **1230 ±40 OUR ESTIMATE** | | | | | | → UNCHECKED ← |
| **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 | $\bar{p}p \to 2\pi^+ 2\pi^-$ | |
| 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 | $e^+e^-$ | OCCUR=2 |
| 1196 ± 4 ± 5 | 5904 | [10,11] ABREU | 98G | DLPH | $e^+e^-$ | OCCUR=3 |
| 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, $\tau \to 3\pi\nu$ | OCCUR=2 |
| 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 | $\tau \to \pi^+\pi^+\pi^-\nu$ | OCCUR=2 |
| 1250 ± 9 | | [16] IVANOV | 91 | RVUE | $\tau \to \pi^+\pi^+\pi^-\nu$ | OCCUR=3 |
| 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 | $\tau^+ \to \pi^+\pi^0\pi^0\nu$ | OCCUR=2 |
| 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. NODE=M010M;LINKAGE=Q
[2] Reanalysis of CLEO data using Breit-Wigner parameterization. NODE=M010M;LINKAGE=V
[3] Superseded by AGHASYAN 2018B. NODE=M010M;LINKAGE=R
[4] The $\rho^{\pm}\pi^{\mp}$ state can be also due to the $\pi(1300)$. NODE=M010M;LINKAGE=AU
[5] Using the Breit-Wigner parameterization; strong correlation between mass and width. NODE=M010M;LINKAGE=LI
[6] Using the data of BARATE 98R. NODE=M010M;LINKAGE=GO
[7] From a fit to the $3\pi$ mass spectrum including the $K\overline{K}^*(892)$ threshold. NODE=M010M;LINKAGE=B6
[8] Uses the model of KUHN 90. NODE=M010M;LINKAGE=KS
[9] Uses the model of ISGUR 89. NODE=M010M;LINKAGE=IM
[10] Includes the effect of a possible $a_1'$ state. NODE=M010M;LINKAGE=A1
[11] Uses the model of FEINDT 90. NODE=M010M;LINKAGE=F1
[12] Supersedes AKERS 95P. NODE=M010M;LINKAGE=X
[13] Average and spread of values using 2 variants of the model of BOWLER 75. NODE=M010M;LINKAGE=P
[14] Reanalysis of RUCKSTUHL 86. NODE=M010M;LINKAGE=I
[15] Reanalysis of SCHMIDKE 86. NODE=M010M;LINKAGE=L
[16] Reanalysis of ALBRECHT 86B. NODE=M010M;LINKAGE=M
[17] From a combined reanalysis of ALBRECHT 86B, SCHMIDKE 86, and RUCKSTUHL 86. NODE=M010M;LINKAGE=K
[18] From a combined reanalysis of ALBRECHT 86B and DAUM 81B. NODE=M010M;LINKAGE=G
[19] Uses the model of BOWLER 75. NODE=M010M;LINKAGE=D
[20] Produced in $K^-$ backward scattering. NODE=M010M;LINKAGE=F

## $a_1(1260)$ WIDTH

NODE=M010W

| VALUE (MeV) | EVTS | DOCUMENT ID | TECN | COMMENT | |
|---|---|---|---|---|---|
| | | | | | NODE=M010W |
| **250 to 600 OUR ESTIMATE** | | | | | → UNCHECKED ← |
| **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 | $e^+e^-$ | OCCUR=2 |
| 425 ± 14 ± 8 | 5904 | [13,14] ABREU 98G | DLPH | $e^+e^-$ | OCCUR=3 |
| 400 ± 35 | | BARBERIS 98B | | 450 $pp \to p_f \pi^+\pi^-\pi^0 p_s$ | |
| 621 ± 32 ± 58 | | [11,15] ACKERSTAFF 97R | OPAL | $E^{ee}_{cm}$= 88–94, $\tau \to 3\pi\nu$ | |
| 457 ± 15 ± 17 | | [12,15] ACKERSTAFF 97R | OPAL | $E^{ee}_{cm}$= 88–94, $\tau \to 3\pi\nu$ | OCCUR=2 |
| 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 $\pi^- p \to \pi^+\pi^-\pi^0 n$ | OCCUR=3 |
| 465 $^{+228}_{-143}$ | | [17] IVANOV 91 | RVUE | $\tau \to \pi^+\pi^+\pi^-\nu$ | |
| 298 $^{+40}_{-34}$ | | [18] IVANOV 91 | RVUE | $\tau \to \pi^+\pi^+\pi^-\nu$ | OCCUR=2 |
| 488 ± 32 | | [19] IVANOV 91 | RVUE | $\tau \to \pi^+\pi^+\pi^-\nu$ | OCCUR=3 |
| 430 ± 50 | | ARMSTRONG 90 | OMEG | 300.0$pp \to pp\pi^+\pi^-\pi^0$ | |
| 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 | $\tau^+ \to \pi^+ \pi^0 \pi^0 \nu$ | OCCUR=2 |
| 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. NODE=M010W;LINKAGE=Q
[2] Reanalysis of CLEO data using Breit-Wigner parameterization. NODE=M010W;LINKAGE=V
[3] Superseded by AGHASYAN 2018B. NODE=M010W;LINKAGE=R
[4] The $\rho^\pm \pi^\mp$ state can be also due to the $\pi(1300)$. NODE=M010W;LINKAGE=AU
[5] Using the Breit-Wigner parameterization; strong correlation between mass and width. NODE=M010W;LINKAGE=LI
[6] Using the data of BARATE 98R. NODE=M010W;LINKAGE=GO
[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. NODE=M010W;LINKAGE=DR
[8] From a fit to the $3\pi$ mass spectrum including the $K\overline{K}^*(892)$ threshold. NODE=M010W;LINKAGE=B6
[9] Using the $a_1(1260)$ mass of 1230 MeV. NODE=M010W;LINKAGE=WE
[10] From AKHMETSHIN 99E and ASNER 00 data using the $a_1(1260)$ mass of 1230 MeV. NODE=M010W;LINKAGE=WB
[11] Uses the model of KUHN 90. NODE=M010W;LINKAGE=KS
[12] Uses the model of ISGUR 89. NODE=M010W;LINKAGE=IM
[13] Includes the effect of a possible $a_1'$ state. NODE=M010W;LINKAGE=A1
[14] Uses the model of FEINDT 90. NODE=M010W;LINKAGE=F1
[15] Supersedes AKERS 95P. NODE=M010W;LINKAGE=X
[16] Average and spread of values using 2 variants of the model of BOWLER 75. NODE=M010W;LINKAGE=P
[17] Reanalysis of RUCKSTUHL 86. NODE=M010W;LINKAGE=I
[18] Reanalysis of SCHMIDKE 86. NODE=M010W;LINKAGE=L
[19] Reanalysis of ALBRECHT 86B. NODE=M010W;LINKAGE=M
[20] From a combined reanalysis of ALBRECHT 86B, SCHMIDKE 86, and RUCKSTUHL 86. NODE=M010W;LINKAGE=K
[21] From a combined reanalysis of ALBRECHT 86B and DAUM 81B. NODE=M010W;LINKAGE=G
[22] Uses the model of BOWLER 75. NODE=M010W;LINKAGE=D
[23] Produced in $K^-$ backward scattering. NODE=M010W;LINKAGE=F

## $a_1(1260)$ DECAY MODES

NODE=M010215;NODE=M010

| | Mode | Fraction ($\Gamma_i/\Gamma$) | |
|---|---|---|---|
| $\Gamma_1$ | $3\pi$ | seen | DESIG=17;OUR EST;→ UNCHECKED ← |
| $\Gamma_2$ | $(\rho\pi)_{S-\text{wave}}$, $\rho \to \pi\pi$ | seen | DESIG=7;OUR EST;→ UNCHECKED ← |
| $\Gamma_3$ | $(\rho\pi)_{D-\text{wave}}$, $\rho \to \pi\pi$ | seen | DESIG=8;OUR EST;→ UNCHECKED ← |
| $\Gamma_4$ | $(\rho(1450)\pi)_{S-\text{wave}}$, $\rho \to \pi\pi$ | seen | DESIG=9;OUR EST;→ UNCHECKED ← |
| $\Gamma_5$ | $(\rho(1450)\pi)_{D-\text{wave}}$, $\rho \to \pi\pi$ | seen | DESIG=10;OUR EST;→ UNCHECKED ← |
| $\Gamma_6$ | $f_0(500)\pi$, $f_0 \to \pi\pi$ | seen | DESIG=16;OUR EST;→ UNCHECKED ← |
| $\Gamma_7$ | $f_0(980)\pi$, $f_0 \to \pi\pi$ | seen | DESIG=11 |
| $\Gamma_8$ | $f_0(1370)\pi$, $f_0 \to \pi\pi$ | seen | DESIG=12;OUR EST;→ UNCHECKED ← |
| $\Gamma_9$ | $f_2(1270)\pi$, $f_2 \to \pi\pi$ | seen | DESIG=13;OUR EST;→ UNCHECKED ← |
| $\Gamma_{10}$ | $\pi^+\pi^-\pi^0$ | seen | DESIG=22 |
| $\Gamma_{11}$ | $\pi^0\pi^0\pi^0$ | not seen | DESIG=23;OUR EST;→ UNCHECKED ← |
| $\Gamma_{12}$ | $K K \pi$ | seen | DESIG=18;OUR EST;→ UNCHECKED ← |
| $\Gamma_{13}$ | $K^*(892) K$ | seen | DESIG=14;OUR EST;→ UNCHECKED ← |
| $\Gamma_{14}$ | $\pi\gamma$ | seen | DESIG=4;OUR EST;→ UNCHECKED ← |

## $a_1(1260)$ PARTIAL WIDTHS

NODE=M010220

### $\Gamma(\pi\gamma)$ $\Gamma_{14}$

NODE=M010W4
NODE=M010W4

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

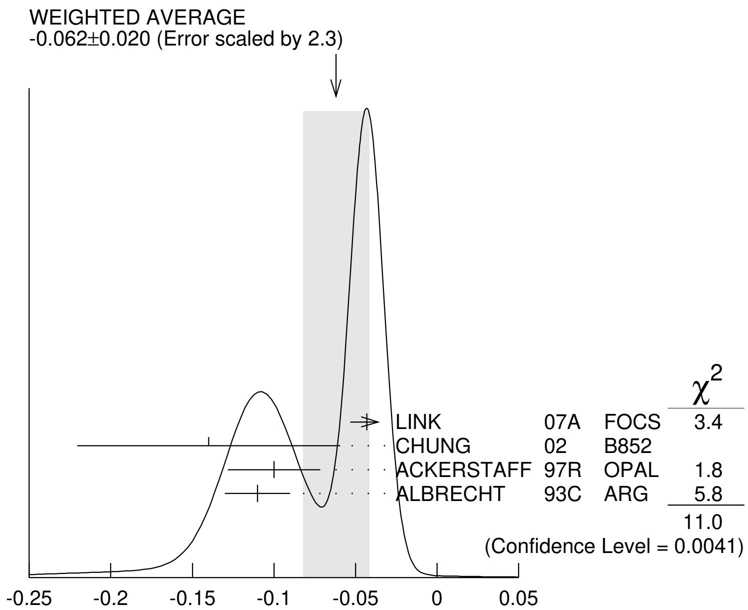
## $D$-wave/$S$-wave AMPLITUDE RATIO IN DECAY OF $a_1(1260) \to \rho\pi$

NODE=M010DS

NODE=M010DS

| 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. NODE=M010DS;LINKAGE=C
[2] Uses the model of ISGUR 89. NODE=M010DS;LINKAGE=IM
[3] Supersedes AKERS 95P. NODE=M010DS;LINKAGE=X




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

## $a_1(1260)$ BRANCHING RATIOS

NODE=M010225

### $\Gamma((\rho\pi)_{S-\text{wave}},\ \rho\to\pi\pi)/\Gamma_{\text{total}}$ — $\Gamma_2/\Gamma$

NODE=M010R5
NODE=M010R5

| *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. NODE=M010R5;LINKAGE=B1

### $\Gamma((\rho\pi)_{D-\text{wave}},\ \rho\to\pi\pi)/\Gamma_{\text{total}}$ — $\Gamma_3/\Gamma$

NODE=M010R6
NODE=M010R6

| *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. NODE=M010R6;LINKAGE=B1

### $\Gamma((\rho(1450)\pi)_{S-\text{wave}},\ \rho\to\pi\pi)/\Gamma_{\text{total}}$ — $\Gamma_4/\Gamma$

NODE=M010R7
NODE=M010R7

| *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. NODE=M010R7;LINKAGE=B1
[2] Assuming for $\rho(1450)$ mass and width of 1370 and 386 MeV respectively. NODE=M010R7;LINKAGE=B2

### $\Gamma((\rho(1450)\pi)_{D-\text{wave}},\ \rho\to\pi\pi)/\Gamma_{\text{total}}$ — $\Gamma_5/\Gamma$

NODE=M010R8
NODE=M010R8

| *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. NODE=M010R8;LINKAGE=B1
[2] Assuming for $\rho(1450)$ mass and width of 1370 and 386 MeV respectively. NODE=M010R8;LINKAGE=B2

### $\Gamma(f_0(500)\pi,\ f_0 \to \pi\pi)/\Gamma_{total}$ — $\Gamma_6/\Gamma$

NODE=M010R9

| 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 $f_0(500)$ ($\sigma$) mass and width of 860 and 880 MeV respectively.

NODE=M010R9;LINKAGE=B1
NODE=M010R9;LINKAGE=B3

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

NODE=M010R4

| 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 | $\bar{p}p \to 2\pi^+2\pi^-$ |
| $\sim 0.3$ | 28k | AKHMETSHIN | 99E | CMD2 | 1.05–1.38 $e^+e^- \to \pi^+\pi^-\pi^+\pi^-$ |
| $0.003\pm0.003$ | | [1] LONGACRE | 82 | RVUE | |

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

NODE=M010R4;LINKAGE=E

### $\Gamma(f_0(980)\pi,\ f_0 \to \pi\pi)/\Gamma_{total}$ — $\Gamma_7/\Gamma$

NODE=M010R10

| 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.

NODE=M010R10;LINKAGE=A

### $\Gamma(f_0(1370)\pi,\ f_0 \to \pi\pi)/\Gamma_{total}$ — $\Gamma_8/\Gamma$

NODE=M010R11

| VALUE (units $10^{-2}$) | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| $7.40\pm2.71\pm1.26$ | 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.

NODE=M010R11;LINKAGE=B1
NODE=M010R11;LINKAGE=B4

### $\Gamma(f_2(1270)\pi,\ f_2 \to \pi\pi)/\Gamma_{total}$ — $\Gamma_9/\Gamma$

NODE=M010R12

| VALUE (units $10^{-2}$) | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| $1.19\pm0.49\pm0.17$ | 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.

NODE=M010R12;LINKAGE=B1
NODE=M010R12;LINKAGE=B5

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

NODE=M010R00

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

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

NODE=M010R15

| 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.

NODE=M010R15;LINKAGE=RB

### $\Gamma(K^*(892)K)/\Gamma_{total}$ $\Gamma_{13}/\Gamma$

NODE=M010R13
NODE=M010R13

| VALUE (units $10^{-2}$) | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| $2.2\pm0.5$ | 2255 | [1] COAN | 04 | CLEO | $\tau^- \to K^-\pi^-K^+\nu_\tau$ |
| 8 to 15 | 205 | [2] DRUTSKOY | 02 | BELL | $B \to D^{(*)}K^-K^{*0}$ |
| $3.3\pm0.5\pm0.1$ | 37k | [3] ASNER | 00 | CLE2 | $10.6\ e^+e^- \to \tau^+\tau^-$, $\tau^- \to \pi^-\pi^0\pi^0\nu_\tau$ |
| $2.6\pm0.3$ | | [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 ± 0.006 ± 0.009)% from BRIERE 03. NODE=M010R13;LINKAGE=CO

[2] From a comparison to ALAM 94 assuming purely resonant production of the $K^-K^{*0}$ system. NODE=M010R13;LINKAGE=DR

[3] From a fit to the $3\pi$ mass spectrum including the $K\overline{K}^*(892)$ threshold. NODE=M010R13;LINKAGE=B6

[4] Assuming $a_1(1260)$ dominance and taking B($\tau \to a_1(1260)\nu_\tau$) from BUSKULIC 96. NODE=M010R13;LINKAGE=BA

## $a_1$(1260) REFERENCES

NODE=M010


| | | | | | |
|---|---|---|---|---|---|
| ALEXEEV | 21 | PRL 127 082501 | G.D. Alexeev *et al.* | (COMPASS Collab.) | REFID=62008 |
| AAIJ | 18AI | EPJ C78 443 | R. Aaij *et al.* | (LHCb Collab.) | REFID=59187 |
| AGHASYAN | 18B | PR D98 092003 | M. Aghasyan *et al.* | (COMPASS Collab.) | REFID=59471 |
| MIKHASENKO | 18 | PR D98 096021 | M. Mikhasenko *et al.* | (JPAC Collab.) | REFID=59487 |
| DARGENT | 17 | JHEP 1705 143 | P. dArgent *et al.* | (HEID, BRIS) | REFID=58121 |
| ACETI | 16 | PR D94 096015 | F. Aceti, L.R. Dai, E. Oset | (IFIC, LNUDA) | REFID=62015 |
| ADOLPH | 15C | PRL 115 082001 | C. Adolph *et al.* | (COMPASS Collab.) | REFID=56790 |
| MIKHASENKO | 15 | PR D91 094015 | M. Mikhasenko, B. Ketzer, A. Sarantsev | (BONN+) | REFID=56825 |
| ALEKSEEV | 10 | PRL 104 241803 | M.G. Alekseev *et al.* | (COMPASS Collab.) | REFID=53356 |
| AUBERT | 07AU | PR D76 092005 | B. Aubert *et al.* | (BABAR Collab.) | REFID=52049 |
| LINK | 07A | PR D75 052003 | J.M. Link *et al.* | (FNAL FOCUS Collab.) | REFID=51713 |
| PDG | 06 | JP G33 1 | W.-M. Yao *et al.* | (PDG Collab.) | REFID=51004 |
| COAN | 04 | PRL 92 232001 | T.E. Coan *et al.* | (CLEO Collab.) | REFID=49945 |
| GOMEZ-DUM... | 04 | PR D69 073002 | D. Gomez Dumm, A. Pich, J. Portoles | | REFID=49771 |
| SALVINI | 04 | EPJ C35 21 | P. Salvini *et al.* | (OBELIX Collab.) | REFID=53226 |
| BRIERE | 03 | PRL 90 181802 | R. A. Briere *et al.* | (CLEO Collab.) | REFID=49360 |
| CHUNG | 02 | PR D65 072001 | S.U. Chung *et al.* | (BNL E852 Collab.) | REFID=48837 |
| DRUTSKOY | 02 | PL B542 171 | A. Drutskoy *et al.* | (BELLE Collab.) | REFID=48780 |
| BARBERIS | 01 | PL B507 14 | D. Barberis *et al.* | | REFID=48324 |
| ASNER | 00 | PR D61 012002 | D.M. Asner *et al.* | (CLEO Collab.) | REFID=47339 |
| AKHMETSHIN | 99E | PL B466 392 | R.R. Akhmetshin *et al.* | (Novosibirsk CMD-2 Collab.) | REFID=47411 |
| BARATE | 99R | EPJ C11 599 | R. Barate *et al.* | (ALEPH Collab.) | REFID=47366 |
| BONDAR | 99 | PL B466 403 | A.E. Bondar *et al.* | (Novosibirsk CMD-2 Collab.) | REFID=47358 |
| ABREU | 98G | PL B426 411 | P. Abreu *et al.* | (DELPHI Collab.) | REFID=45909 |
| BARATE | 98R | EPJ C4 409 | R. Barate *et al.* | (ALEPH Collab.) | REFID=46147 |
| BARBERIS | 98B | PL B422 399 | D. Barberis *et al.* | (WA 102 Collab.) | REFID=46345 |
| ACKERSTAFF | 97R | ZPHY C75 593 | K. Ackerstaff *et al.* | (OPAL Collab.) | REFID=45616 |
| BUSKULIC | 96 | ZPHY C70 579 | D. Buskulic *et al.* | (ALEPH Collab.) | REFID=44588 |
| AKERS | 95P | ZPHY C67 45 | R. Akers *et al.* | (OPAL Collab.) | REFID=44366 |
| ALAM | 94 | PR D50 43 | M.S. Alam *et al.* | (CLEO Collab.) | REFID=43738 |
| ALBRECHT | 93C | ZPHY C58 61 | H. Albrecht *et al.* | (ARGUS Collab.) | REFID=43310 |
| DECKER | 93A | ZPHY C58 445 | R. Decker *et al.* | | REFID=51577 |
| ANDO | 92 | PL B291 496 | A. Ando *et al.* | (KEK, KYOT, NIRS, SAGA+) | REFID=43171 |
| KUHN | 92 | ZPHY C56 661 | J.H. Kuhn, E. Mirkes | | REFID=51576 |
| IVANOV | 91 | ZPHY C49 563 | Y.P. Ivanov, A.A. Osipov, M.K. Volkov | (JINR) | REFID=41750 |
| ARMSTRONG | 90 | ZPHY C48 213 | T.A. Armstrong, M. Benayoun, W. Beusch | (WA76 Coll.) | REFID=41375 |
| FEINDT | 90 | ZPHY C48 681 | M. Feindt | (HAMB) | REFID=45912 |
| KUHN | 90 | ZPHY C48 445 | J.H. Kuhn *et al.* | (MPIM) | REFID=45862 |
| ISGUR | 89 | PR D39 1357 | N. Isgur, C. Morningstar, C. Reader | (TNTO) | REFID=40730 |
| BOWLER | 88 | PL B209 99 | M.G. Bowler | (OXF) | REFID=40578 |
| BAND | 87 | PL B198 297 | H.R. Band *et al.* | (MAC Collab.) | REFID=40263 |
| TORNQVIST | 87 | ZPHY C36 695 | N.A. Tornqvist | (HELS) | REFID=40030 |
| ALBRECHT | 86B | ZPHY C33 7 | H. Albrecht *et al.* | (ARGUS Collab.) | REFID=20884 |
| RUCKSTUHL | 86 | PRL 56 2132 | W. Ruckstuhl *et al.* | (DELCO Collab.) | REFID=10349 |
| SCHMIDKE | 86 | PRL 57 527 | W.B. Schmidke *et al.* | (Mark II Collab.) | REFID=10350 |
| BELLINI | 85 | SJNP 41 781 | D. Bellini *et al.* | | REFID=47490 |
| | | Translated from YAF 41 1223. | | | |
| ZIELINSKI | 84C | PRL 52 1195 | M. Zielinski *et al.* | (ROCH, MINN, FNAL) | REFID=20882 |
| LONGACRE | 82 | PR D26 82 | R.S. Longacre | (BNL) | REFID=20878 |
| DANKOWY... | 81 | PRL 46 580 | J.A. Dankowych *et al.* | (TNTO, BNL, CARL+) | REFID=20572 |
| DAUM | 81B | NP B182 269 | C. Daum *et al.* | (AMST, CERN, CRAC, MPIM+) | REFID=20872 |
| DAUM | 80 | PL 89B 281 | C. Daum *et al.* | (AMST, CERN, CRAC, MPIM+) JP | REFID=20868 |
| GAVILLET | 77 | PL 69B 119 | P. Gavillet *et al.* | (AMST, CERN, NIJM+) JP | REFID=20852 |
| BOWLER | 75 | NP B97 227 | M.G. Bowler *et al.* | (OXFTP, DARE) | REFID=20571 |