# $a_2(1320)$

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

## $a_2$(1320) MASS

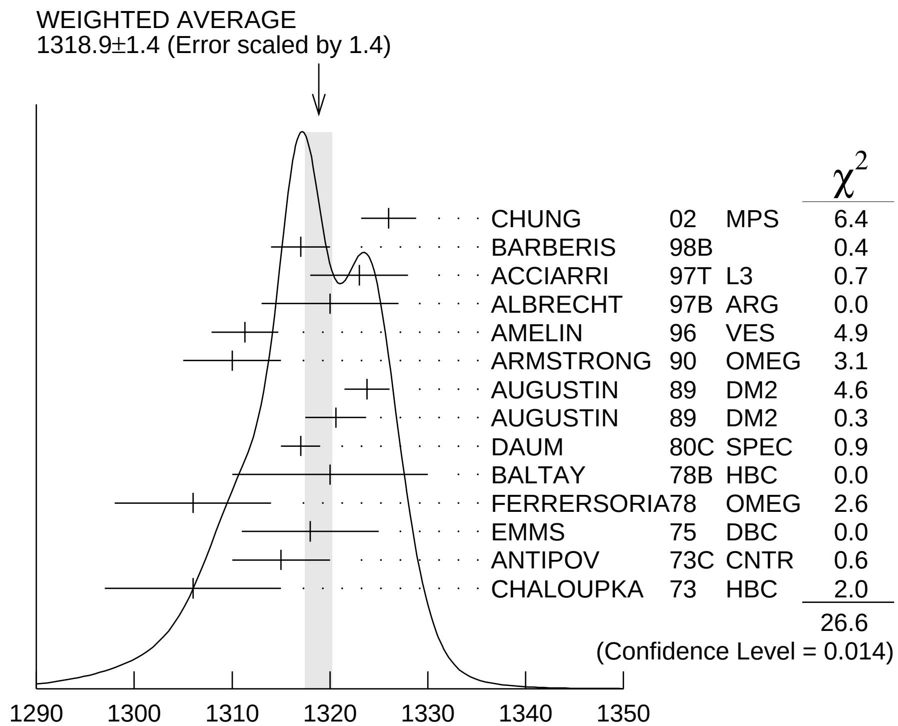
| VALUE (MeV) | DOCUMENT ID |
|---|---|
| **1318.3±0.6 OUR AVERAGE** Includes data from the 4 datablocks that follow this one. Error includes scale factor of 1.2. | |

### $3\pi$ MODE

The data in this block is included in the average printed for a previous datablock.

| VALUE (MeV) | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| **1318.9± 1.4 OUR AVERAGE** Error includes scale factor of 1.4. See the ideogram below. | | | | | | |
| 1326 ± 2 ±2 | | CHUNG | 02 | MPS | | 18.3 $\pi^- p \to \pi^+\pi^-\pi^- p$ |
| 1317 ± 3 | | BARBERIS | 98B | | | 450 $pp \to p_f \pi^+\pi^-\pi^0 p_s$ |
| 1323 ± 4 ±3 | | ACCIARRI | 97T | L3 | | $e^+e^- \to e^+e^-\pi^+\pi^-\pi^0$ |
| 1320 ± 7 | | ALBRECHT | 97B | ARG | | $e^+e^- \to e^+e^-\pi^+\pi^-\pi^0$ |
| 1311.3± 1.6±3.0 | 72400 | AMELIN | 96 | VES | | 36 $\pi^- p \to \pi^+\pi^-\pi^0 n$ |
| 1310 ± 5 | | ARMSTRONG | 90 | OMEG | 0 | 300.0$pp \to pp\pi^+\pi^-\pi^0$ |
| 1323.8± 2.3 | 4022 | AUGUSTIN | 89 | DM2 | ± | $J/\psi \to \rho^\pm a_2^\mp$ |
| 1320.6± 3.1 | 3562 | AUGUSTIN | 89 | DM2 | 0 | $J/\psi \to \rho^0 a_2^0$ |
| 1317 ± 2 | 25000 | [1] DAUM | 80C | SPEC | − | 63,94 $\pi^- p \to 3\pi p$ |
| 1320 ±10 | 1097 | [1] BALTAY | 78B | HBC | +0 | 15 $\pi^+ p \to p 4\pi$ |
| 1306 ± 8 | | FERRERSORIA | 78 | OMEG | − | 9 $\pi^- p \to p 3\pi$ |
| 1318 ± 7 | 1600 | [1] EMMS | 75 | DBC | 0 | 4 $\pi^+ n \to p(3\pi)^0$ |
| 1315 ± 5 | | [1] ANTIPOV | 73C | CNTR | − | 25,40 $\pi^- p \to p\eta\pi^-$ |
| 1306 ± 9 | 1580 | CHALOUPKA | 73 | HBC | − | 3.9 $\pi^- p$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | | |
| 1305 ±14 | | CONDO | 93 | SHF | | $\gamma p \to \eta\pi^+\pi^+\pi^-$ |
| 1310 ± 2 | | [1] EVANGELISTA | 81 | OMEG | − | 12 $\pi^- p \to 3\pi p$ |
| 1343 ±11 | 490 | BALTAY | 78B | HBC | 0 | 15 $\pi^+ p \to \Delta 3\pi$ |
| 1309 ± 5 | 5000 | BINNIE | 71 | MMS | − | $\pi^- p$ near $a_2$ threshold |
| 1299 ± 6 | 28000 | BOWEN | 71 | MMS | − | 5 $\pi^- p$ |
| 1300 ± 6 | 24000 | BOWEN | 71 | MMS | + | 5 $\pi^+ p$ |
| 1309 ± 4 | 17000 | BOWEN | 71 | MMS | − | 7 $\pi^- p$ |
| 1306 ± 4 | 941 | ALSTON-... | 70 | HBC | + | 7.0 $\pi^+ p \to 3\pi p$ |

[1] From a fit to $J^P = 2^+$ $\rho\pi$ partial wave.




$a_2$(1320) mass, $3\pi$ mode (MeV)

## $K^\pm K^0_S$ MODE

| *VALUE* (MeV) | *EVTS* | *DOCUMENT ID* | *TECN* | *CHG* | *COMMENT* |
|---|---|---|---|---|---|
| The data in this block is included in the average printed for a previous datablock. | | | | | |
| **1318.1± 0.7 OUR AVERAGE** | | | | | |
| 1319 ± 5 | 4700 | [2,3] CLELAND | 82B SPEC | + | 50 $\pi^+ p \to K^0_S K^+ p$ |
| 1324 ± 6 | 5200 | [2,3] CLELAND | 82B SPEC | − | 50 $\pi^- p \to K^0_S K^- p$ |
| 1320 ± 2 | 4000 | CHABAUD | 80 SPEC | − | 17 $\pi^-$ A $\to K^0_S K^-$ A |
| 1312 ± 4 | 11000 | CHABAUD | 78 SPEC | − | 9.8 $\pi^- p \to K^- K^0_S p$ |
| 1316 ± 2 | 4730 | CHABAUD | 78 SPEC | − | 18.8 $\pi^- p \to K^- K^0_S p$ |
| 1318 ± 1 | | [2,4] MARTIN | 78D SPEC | − | 10 $\pi^- p \to K^0_S K^- p$ |
| 1320 ± 2 | 2724 | MARGULIE | 76 SPEC | − | 23 $\pi^- p \to K^- K^0_S p$ |
| 1313 ± 4 | 730 | FOLEY | 72 CNTR | − | 20.3 $\pi^- p \to K^- K^0_S p$ |
| 1319 ± 3 | 1500 | [4] GRAYER | 71 ASPK | − | 17.2 $\pi^- p \to K^- K^0_S p$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| 1330 ±11 | 1000 | [2,3] CLELAND | 82B SPEC | + | 30 $\pi^+ p \to K^0_S K^+ p$ |
| 1324 ± 5 | 350 | HYAMS | 78 ASPK | + | 12.7 $\pi^+ p \to K^+ K^0_S p$ |

[2] From a fit to $J^P = 2^+$ partial wave.
[3] Number of events evaluated by us.
[4] Systematic error in mass scale subtracted.

### $\eta\pi$ MODE

The data in this block is included in the average printed for a previous datablock.

| VALUE (MeV) | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| **1317.7±1.4 OUR AVERAGE** | | | | | | |
| 1308 ±9 | | BARBERIS | 00H | | | 450 $pp \to p_f \eta\pi^0 p_s$ |
| 1316 ±9 | | BARBERIS | 00H | | | 450 $pp \to \Delta_f^{++}\eta\pi^- p_s$ |
| 1317 ±1 ±2 | | THOMPSON | 97 | MPS | | 18 $\pi^- p \to \eta\pi^- p$ |
| 1315 ±5 ±2 | | [5] AMSLER | 94D | CBAR | | 0.0 $\overline{p}p \to \pi^0\pi^0\eta$ |
| 1325.1±5.1 | | AOYAGI | 93 | BKEI | | $\pi^- p \to \eta\pi^- p$ |
| 1317.7±1.4±2.0 | | BELADIDZE | 93 | VES | | $37\pi^- N \to \eta\pi^- N$ |
| 1323 ±8 | 1000 | [6] KEY | 73 | OSPK | − | 6 $\pi^- p \to p\pi^-\eta$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | | |
| 1324 ±5 | | ARMSTRONG | 93C | E760 | 0 | $\overline{p}p \to \pi^0\eta\eta \to 6\gamma$ |
| 1336.2±1.7 | 2561 | DELFOSSE | 81 | SPEC | + | $\pi^\pm p \to p\pi^\pm\eta$ |
| 1330.7±2.4 | 1653 | DELFOSSE | 81 | SPEC | − | $\pi^\pm p \to p\pi^\pm\eta$ |
| 1324 ±8 | 6200 | [6,7] CONFORTO | 73 | OSPK | − | 6 $\pi^- p \to p\mathrm{MM}^-$ |

[5] The systematic error of 2 MeV corresponds to the spread of solutions.
[6] Error includes 5 MeV systematic mass-scale error.
[7] Missing mass with enriched MMS $= \eta\pi^-$, $\eta = 2\gamma$.

### $\eta'\pi$ MODE

The data in this block is included in the average printed for a previous datablock.

| VALUE (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **1322 ± 7 OUR AVERAGE** | | | | |
| 1318 ± 8 $^{+3}_{-5}$ | IVANOV | 01 | MPS | 18 $\pi^- p \to \eta'\pi^- p$ |
| 1327.0±10.7 | BELADIDZE | 93 | VES | $37\pi^- N \to \eta'\pi^- N$ |

## $a_2(1320)$ WIDTH

### $3\pi$ MODE

| VALUE (MeV) | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| **104.7± 1.9 OUR AVERAGE** | | | | | | |
| 108 ± 3 ±15 | | CHUNG | 02 | MPS | | 18.3 $\pi^- p \to \pi^+\pi^-\pi^- p$ |
| 120 ±10 | | BARBERIS | 98B | | | 450 $pp \to p_f\pi^+\pi^-\pi^0 p_s$ |
| 105 ±10 ±11 | | ACCIARRI | 97T | L3 | | $e^+e^- \to e^+e^-\pi^+\pi^-\pi^0$ |
| 120 ±10 | | ALBRECHT | 97B | ARG | | $e^+e^- \to e^+e^-\pi^+\pi^-\pi^0$ |
| 103.0± 6.0± 3.3 | 72400 | AMELIN | 96 | VES | | 36 $\pi^- p \to \pi^+\pi^-\pi^0 n$ |
| 120 ±10 | | ARMSTRONG | 90 | OMEG | 0 | 300.0$pp \to pp\pi^+\pi^-\pi^0$ |

| | | | | | | |
|---|---|---|---|---|---|---|
| 107.0± 9.7 | 4022 | AUGUSTIN | 89 | DM2 | ± | $J/\psi \to \rho^{\pm} a_2^{\mp}$ |
| 118.5±12.5 | 3562 | AUGUSTIN | 89 | DM2 | 0 | $J/\psi \to \rho^0 a_2^0$ |
| 97 ± 5 | | [8] EVANGELISTA | 81 | OMEG | − | 12 $\pi^- p \to 3\pi p$ |
| 96 ± 9 | 25000 | [8] DAUM | 80C | SPEC | − | 63,94 $\pi^- p \to 3\pi p$ |
| 110 ±15 | 1097 | [8] BALTAY | 78B | HBC | +0 | 15 $\pi^+ p \to p 4\pi$ |
| 112 ±18 | 1600 | [8] EMMS | 75 | DBC | 0 | 4 $\pi^+ n \to p(3\pi)^0$ |
| 122 ±14 | 1200 | [8,9] WAGNER | 75 | HBC | 0 | 7 $\pi^+ p \to \Delta^{++}(3\pi)^0$ |
| 115 ±15 | | [8] ANTIPOV | 73C | CNTR | − | 25,40 $\pi^- p \to p\eta\pi^-$ |
| 99 ±15 | 1580 | CHALOUPKA | 73 | HBC | − | 3.9 $\pi^- p$ |
| 105 ± 5 | 28000 | BOWEN | 71 | MMS | − | 5 $\pi^- p$ |
| 99 ± 5 | 24000 | BOWEN | 71 | MMS | + | 5 $\pi^+ p$ |
| 103 ± 5 | 17000 | BOWEN | 71 | MMS | − | 7 $\pi^- p$ |

• • • We do not use the following data for averages, fits, limits, etc. • • •

| | | | | | | |
|---|---|---|---|---|---|---|
| 120 ±40 | | CONDO | 93 | SHF | | $\gamma p \to \eta\pi^+\pi^+\pi^-$ |
| 115 ±14 | 490 | BALTAY | 78B | HBC | 0 | 15 $\pi^+ p \to \Delta 3\pi$ |
| 72 ±16 | 5000 | BINNIE | 71 | MMS | − | $\pi^- p$ near $a_2$ threshold |
| 79 ±12 | 941 | ALSTON-... | 70 | HBC | + | 7.0 $\pi^+ p \to 3\pi p$ |

[8] From a fit to $J^P = 2^+$ $\rho\pi$ partial wave.
[9] Width errors enlarged by us to $4\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.

## $K^{\pm} K^0_S$ AND $\eta\pi$ MODES

| VALUE (MeV) | DOCUMENT ID |
|---|---|
| **107 ±5 OUR ESTIMATE** | |
| **110.4±1.7 OUR AVERAGE** | Includes data from the 2 datablocks that follow this one. |

## $K^{\pm} K^0_S$ MODE

The data in this block is included in the average printed for a previous datablock.

| VALUE (MeV) | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| **109.8± 2.4 OUR AVERAGE** | | | | | | |
| 112 ±20 | 4700 | [10,11] CLELAND | 82B | SPEC | + | 50 $\pi^+ p \to K^0_S K^+ p$ |
| 120 ±25 | 5200 | [10,11] CLELAND | 82B | SPEC | − | 50 $\pi^- p \to K^0_S K^- p$ |
| 106 ± 4 | 4000 | CHABAUD | 80 | SPEC | − | 17 $\pi^-$ A $\to K^0_S K^-$ A |
| 126 ±11 | 11000 | CHABAUD | 78 | SPEC | − | 9.8 $\pi^- p \to K^- K^0_S p$ |
| 101 ± 8 | 4730 | CHABAUD | 78 | SPEC | − | 18.8 $\pi^- p \to K^- K^0_S p$ |
| 113 ± 4 | | [10,12] MARTIN | 78D | SPEC | − | 10 $\pi^- p \to K^0_S K^- p$ |
| 105 ± 8 | 2724 | [12] MARGULIE | 76 | SPEC | − | 23 $\pi^- p \to K^- K^0_S p$ |
| 113 ±19 | 730 | FOLEY | 72 | CNTR | − | 20.3 $\pi^- p \to K^- K^0_S p$ |
| 123 ±13 | 1500 | [12] GRAYER | 71 | ASPK | − | 17.2 $\pi^- p \to K^- K^0_S p$ |

• • • We do not use the following data for averages, fits, limits, etc. • • •

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 121 | ±51 | 1000 | [10,11] CLELAND | 82B | SPEC | + | 30 $\pi^+ p \to K^0_S K^+ p$ |
| 110 | ±18 | 350 | HYAMS | 78 | ASPK | + | 12.7 $\pi^+ p \to K^+ K^0_S p$ |

[10] From a fit to $J^P = 2^+$ partial wave.
[11] Number of events evaluated by us.
[12] Width errors enlarged by us to $4\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.

## $\eta\pi$ MODE

| VALUE (MeV) | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| The data in this block is included in the average printed for a previous datablock. | | | | | | |
| **111.1± 2.4 OUR AVERAGE** | | | | | | |
| 115 ±20 | | BARBERIS | 00H | | | 450 $pp \to p_f \eta\pi^0 p_s$ |
| 112 ±14 | | BARBERIS | 00H | | | 450 $pp \to \Delta^{++}_f \eta\pi^- p_s$ |
| 112 ± 3 ±2 | | [13] AMSLER | 94D | CBAR | | 0.0 $\overline{p}p \to \pi^0\pi^0\eta$ |
| 103 ± 6 ±3 | | BELADIDZE | 93 | VES | | $37\pi^- N \to \eta\pi^- N$ |
| 112.2± 5.7 | 2561 | DELFOSSE | 81 | SPEC | + | $\pi^\pm p \to p\pi^\pm\eta$ |
| 116.6± 7.7 | 1653 | DELFOSSE | 81 | SPEC | − | $\pi^\pm p \to p\pi^\pm\eta$ |
| 108 ± 9 | 1000 | KEY | 73 | OSPK | − | 6 $\pi^- p \to p\pi^-\eta$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | | |
| 127 ± 2 ±2 | | [14] THOMPSON | 97 | MPS | | 18 $\pi^- p \to \eta\pi^- p$ |
| 118 ±10 | | ARMSTRONG | 93C | E760 | 0 | $\overline{p}p \to \pi^0\eta\eta \to 6\gamma$ |
| 104 ± 9 | 6200 | [15] CONFORTO | 73 | OSPK | − | 6 $\pi^- p \to p MM^-$ |

[13] The systematic error of 2 MeV corresponds to the spread of solutions.
[14] Resolution is not unfolded.
[15] Missing mass with enriched MMS = $\eta\pi^-$, $\eta = 2\gamma$.

## $\eta'\pi$ MODE

| VALUE (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **119±25 OUR AVERAGE** | | | | |
| 140±35±20 | IVANOV | 01 | MPS | 18 $\pi^- p \to \eta'\pi^- p$ |
| 106±32 | BELADIDZE | 93 | VES | $37\pi^- N \to \eta'\pi^- N$ |

## $a_2(1320)$ DECAY MODES

| | Mode | Fraction ($\Gamma_i/\Gamma$) | Scale factor/ Confidence level |
|---|---|---|---|
| $\Gamma_1$ | $\rho\pi$ | (70.1 ±2.7 ) % | S=1.2 |
| $\Gamma_2$ | $\eta\pi$ | (14.5 ±1.2 ) % | |
| $\Gamma_3$ | $\omega\pi\pi$ | (10.6 ±3.2 ) % | S=1.3 |
| $\Gamma_4$ | $K\overline{K}$ | ( 4.9 ±0.8 ) % | |
| $\Gamma_5$ | $\eta'(958)\pi$ | ( 5.3 ±0.9 ) $\times 10^{-3}$ | |
| $\Gamma_6$ | $\pi^\pm\gamma$ | ( 2.68±0.31) $\times 10^{-3}$ | |
| $\Gamma_7$ | $\gamma\gamma$ | ( 9.4 ±0.7 ) $\times 10^{-6}$ | |
| $\Gamma_8$ | $\pi^+\pi^-\pi^-$ | < 8 % | CL=90% |
| $\Gamma_9$ | $e^+e^-$ | < 6 $\times 10^{-9}$ | CL=90% |

## CONSTRAINED FIT INFORMATION

An overall fit to 5 branching ratios uses 18 measurements and one constraint to determine 4 parameters. The overall fit has a $\chi^2$ = 9.3 for 15 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\langle \delta x_i \delta x_j \rangle / (\delta x_i \cdot \delta x_j)$, in percent, from the fit to the branching fractions, $x_i \equiv \Gamma_i / \Gamma_{total}$. The fit constrains the $x_i$ whose labels appear in this array to sum to one.

| | | | |
|---|---|---|---|
| $x_2$ | 10 | | |
| $x_3$ | −89 | −46 | |
| $x_4$ | −1 | −2 | −24 |
| | $x_1$ | $x_2$ | $x_3$ |

## $a_2(1320)$ PARTIAL WIDTHS

### $\Gamma(\pi^{\pm}\gamma)$ — $\Gamma_6$

| VALUE (keV) | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| **287± 30 OUR AVERAGE** | | | | | | |
| 284± 25±25 | 7100 | MOLCHANOV | 01 | SELX | | 600 $\pi^- A \to \pi^+\pi^-\pi^- A$ |
| 295± 60 | | CIHANGIR | 82 | SPEC | + | 200 $\pi^+$A |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | | |
| 461±110 | | [18] MAY | 77 | SPEC | ± | 9.7 $\gamma$A |

### $\Gamma(\gamma\gamma)$ — $\Gamma_7$

| VALUE (keV) | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| **1.00±0.06 OUR AVERAGE** | | | | | | |
| 0.98±0.05±0.09 | | ACCIARRI | 97T | L3 | | $e^+e^- \to e^+e^-\pi^+\pi^-\pi^0$ |
| 0.96±0.03±0.13 | | ALBRECHT | 97B | ARG | | $e^+e^- \to e^+e^-\pi^+\pi^-\pi^0$ |
| 1.26±0.26±0.18 | 36 | BARU | 90 | MD1 | | $e^+e^- \to e^+e^-\pi^+\pi^-\pi^0$ |
| 1.00±0.07±0.15 | 415 | BEHREND | 90C | CELL | 0 | $e^+e^- \to e^+e^-\pi^+\pi^-\pi^0$ |
| 1.03±0.13±0.21 | | BUTLER | 90 | MRK2 | | $e^+e^- \to e^+e^-\pi^+\pi^-\pi^0$ |
| 1.01±0.14±0.22 | 85 | OEST | 90 | JADE | | $e^+e^- \to e^+e^-\pi^0\eta$ |
| 0.90±0.27±0.15 | 56 | [16] ALTHOFF | 86 | TASS | 0 | $e^+e^- \to e^+e^- 3\pi$ |
| 1.14±0.20±0.26 | | [17] ANTREASYAN | 86 | CBAL | 0 | $e^+e^- \to e^+e^-\pi^0\eta$ |
| 1.06±0.18±0.19 | | BERGER | 84C | PLUT | 0 | $e^+e^- \to e^+e^- 3\pi$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | | |
| $0.81\pm0.19^{+0.42}_{-0.11}$ | 35 | [16] BEHREND | 83B | CELL | 0 | $e^+e^- \to e^+e^- 3\pi$ |
| 0.77±0.18±0.27 | 22 | [17] EDWARDS | 82F | CBAL | 0 | $e^+e^- \to e^+e^-\pi^0\eta$ |

[16] From $\rho\pi$ decay mode.
[17] From $\eta\pi^0$ decay mode.

### $\Gamma(e^+e^-)$ $\Gamma_9$

| VALUE (eV) | CL% | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| **< 0.56** | 90 | ACHASOV | 00K | SND | $e^+e^- \rightarrow \pi^0\pi^0$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| <25 | 90 | VOROBYEV | 88 | ND | $e^+e^- \rightarrow \pi^0\eta$ |

[18] Assuming one-pion exchange.

## $a_2(1320)$ $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

### $\Gamma(K\overline{K}) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_4\Gamma_7/\Gamma$

| VALUE (keV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **0.126±0.007±0.028** | [19] ALBRECHT | 90G | ARG | $e^+e^- \rightarrow e^+e^-K^+K^-$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 0.081±0.006±0.027 | [20] ALBRECHT | 90G | ARG | $e^+e^- \rightarrow e^+e^-K^+K^-$ |

[19] Using an incoherent background.
[20] Using a coherent background.

## $a_2(1320)$ BRANCHING RATIOS

### $\Gamma(K\overline{K})/\Gamma(\rho\pi)$ $\Gamma_4/\Gamma_1$

| VALUE | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| **0.070±0.012 OUR FIT** | | | | | | |
| **0.078±0.017** | | CHABAUD | 78 | RVUE | | |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | | |
| 0.011±0.003 | | [21] BERTIN | 98B | OBLX | | 0.0 $\overline{p}p \rightarrow K^{\pm}K_S\pi^{\mp}$ |
| 0.056±0.014 | 50 | [22] CHALOUPKA | 73 | HBC | − | 3.9 $\pi^-p$ |
| 0.097±0.018 | 113 | [22] ALSTON-... | 71 | HBC | + | 7.0 $\pi^+p$ |
| 0.06 ±0.03 | | [22] ABRAMOVI... | 70B | HBC | − | 3.93 $\pi^-p$ |
| 0.054±0.022 | | [22] CHUNG | 68 | HBC | − | 3.2 $\pi^-p$ |

[21] Using $4\pi$ data from BERTIN 97D.
[22] Included in CHABAUD 78 review.

### $\Gamma(\eta\pi)/[\Gamma(\rho\pi)+\Gamma(\eta\pi)+\Gamma(K\overline{K})]$ $\Gamma_2/(\Gamma_1+\Gamma_2+\Gamma_4)$

| VALUE | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| **0.162±0.012 OUR FIT** | | | | | | |
| **0.140±0.028 OUR AVERAGE** | | | | | | |
| 0.13 ±0.04 | | ESPIGAT | 72 | HBC | ± | 0.0 $\overline{p}p$ |
| 0.15 ±0.04 | 34 | BARNHAM | 71 | HBC | + | 3.7 $\pi^+p$ |

### $\Gamma(\eta\pi)/\Gamma(\rho\pi)$ — $\Gamma_2/\Gamma_1$

| VALUE | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| **0.207±0.018 OUR FIT** | | | | | | |
| **0.213±0.020 OUR AVERAGE** | | | | | | |
| 0.18 ±0.05 | | FORINO | 76 | HBC | | 11 $\pi^- p$ |
| 0.22 ±0.05 | 52 | ANTIPOV | 73 | CNTR | − | 40 $\pi^- p$ |
| 0.211±0.044 | 149 | CHALOUPKA | 73 | HBC | − | 3.9 $\pi^- p$ |
| 0.246±0.042 | 167 | ALSTON-... | 71 | HBC | + | 7.0 $\pi^+ p$ |
| 0.25 ±0.09 | 15 | BOECKMANN | 70 | HBC | + | 5.0 $\pi^+ p$ |
| 0.23 ±0.08 | 22 | ASCOLI | 68 | HBC | − | 5 $\pi^- p$ |
| 0.12 ±0.08 | | CHUNG | 68 | HBC | − | 3.2 $\pi^- p$ |
| 0.22 ±0.09 | | CONTE | 67 | HBC | − | 11.0 $\pi^- p$ |

### $\Gamma(\eta'(958)\pi)/\Gamma_{total}$ — $\Gamma_5/\Gamma$

| VALUE | CL% | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | | |
| <0.006 | 95 | ALDE | 92B | GAM2 | | 38,100 $\pi^- p \to \eta' \pi^0 n$ |
| <0.02 | 97 | BARNHAM | 71 | HBC | + | 3.7 $\pi^+ p$ |
| 0.004±0.004 | | BOESEBECK | 68 | HBC | + | 8 $\pi^+ p$ |

### $\Gamma(\eta'(958)\pi)/\Gamma(\rho\pi)$ — $\Gamma_5/\Gamma_1$

| VALUE | CL% | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | | |
| <0.011 | 90 | EISENSTEIN | 73 | HBC | − | 5 $\pi^- p$ |
| <0.04 | | ALSTON-... | 71 | HBC | + | 7.0 $\pi^+ p$ |
| $0.04\ ^{+0.03}_{-0.04}$ | | BOECKMANN | 70 | HBC | 0 | 5.0 $\pi^+ p$ |

### $\Gamma(K\overline{K})/[\Gamma(\rho\pi)+\Gamma(\eta\pi)+\Gamma(K\overline{K})]$ — $\Gamma_4/(\Gamma_1+\Gamma_2+\Gamma_4)$

| VALUE | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| **0.054±0.009 OUR FIT** | | | | | | |
| **0.048±0.012 OUR AVERAGE** | | | | | | |
| 0.05 ±0.02 | | TOET | 73 | HBC | + | 5 $\pi^+ p$ |
| 0.09 ±0.04 | | TOET | 73 | HBC | 0 | 5 $\pi^+ p$ |
| 0.03 ±0.02 | 8 | DAMERI | 72 | HBC | − | 11 $\pi^- p$ |
| 0.06 ±0.03 | 17 | BARNHAM | 71 | HBC | + | 3.7 $\pi^+ p$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | | |
| 0.020±0.004 | | [23] ESPIGAT | 72 | HBC | ± | 0.0 $\overline{p} p$ |

[23] Not averaged because of discrepancy between masses from $K\overline{K}$ and $\rho\pi$ modes.

### $\Gamma(\pi^+\pi^-\pi^-)/\Gamma(\rho\pi)$ — $\Gamma_8/\Gamma_1$

| VALUE | CL% | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| **<0.12** | 90 | ABRAMOVI... | 70B | HBC | − | 3.93 $\pi^- p$ |

### $\Gamma(\pi^{\pm}\gamma)/\Gamma_{\text{total}}$ $\Gamma_6/\Gamma$

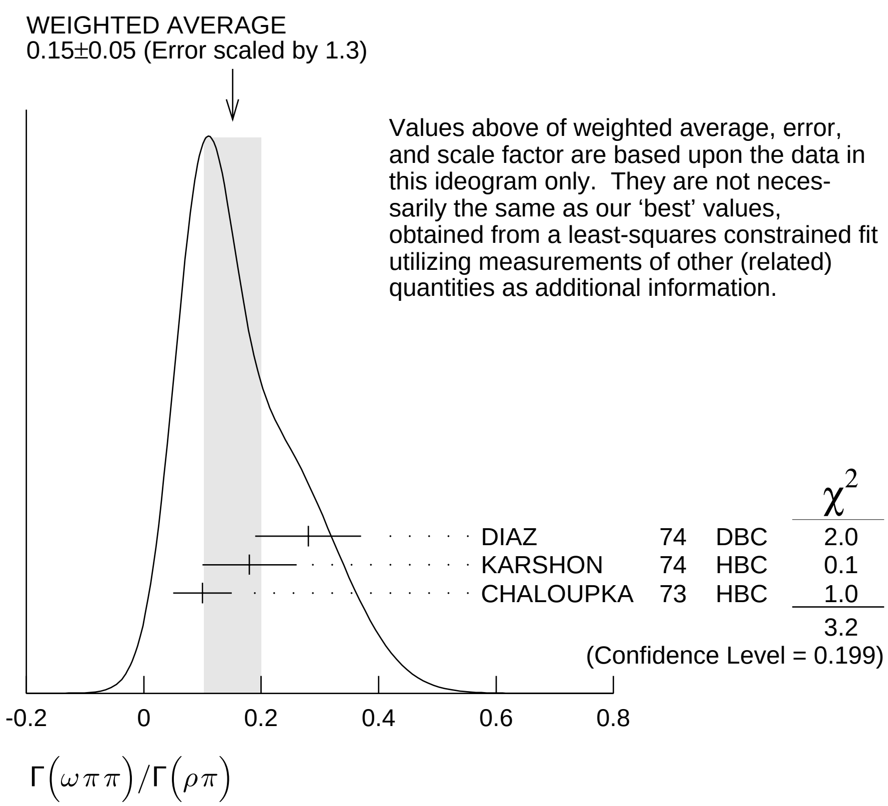
| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| $0.005^{+0.005}_{-0.003}$ | [24] EISENBERG | 72 | HBC | 4.3,5.25,7.5 $\gamma p$ |

[24] Pion-exchange model used in this estimation.

### $\Gamma(\omega\pi\pi)/\Gamma(\rho\pi)$ $\Gamma_3/\Gamma_1$

| VALUE | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| **0.15±0.05 OUR FIT** Error includes scale factor of 1.3. | | | | | | |
| **0.15±0.05 OUR AVERAGE** Error includes scale factor of 1.3. See the ideogram below. | | | | | | |
| 0.28±0.09 | 60 | DIAZ | 74 | DBC | 0 | 6 $\pi^+ n$ |
| 0.18±0.08 | | [25] KARSHON | 74 | HBC | | Avg. of above two |
| 0.10±0.05 | 279 | CHALOUPKA | 73 | HBC | $-$ | 3.9 $\pi^- p$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | | |
| 0.29±0.08 | 140 | [25] KARSHON | 74 | HBC | 0 | 4.9 $\pi^+ p$ |
| 0.10±0.04 | 60 | [25] KARSHON | 74 | HBC | $+$ | 4.9 $\pi^+ p$ |
| 0.19±0.08 | | DEFOIX | 73 | HBC | 0 | 0.7 $\overline{p}p$ |

[25] KARSHON 74 suggest an additional $I = 0$ state strongly coupled to $\omega\pi\pi$ which could explain discrepancies in branching ratios and masses. We use a central value and a systematic spread.



### $\Gamma(\eta'(958)\pi)/\Gamma(\eta\pi)$ $\Gamma_5/\Gamma_2$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **0.037±0.006 OUR AVERAGE** | | | | |
| 0.032±0.009 | ABELE | 97C | CBAR | 0.0 $\overline{p}p \rightarrow \pi^0\pi^0\eta'$ |
| 0.047±0.010±0.004 | [26] BELADIDZE | 93 | VES | $37\pi^- N \rightarrow a_2^- N$ |
| 0.034±0.008±0.005 | BELADIDZE | 92 | VES | $36\pi^- C \rightarrow a_2^- C$ |

[26] Using B($\eta' \rightarrow \pi^+\pi^-\eta$) = 0.441, B($\eta \rightarrow \gamma\gamma$) = 0.389 and B($\eta \rightarrow \pi^+\pi^-\pi^0$) = 0.236.

### $\Gamma(K\overline{K})/\Gamma(\eta\pi)$ $\Gamma_4/\Gamma_2$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 0.08±0.02 | [27] BERTIN | 98B | OBLX | 0.0 $\overline{p}p \rightarrow K^\pm K_S \pi^\mp$ |

[27] Using $\eta\pi\pi$ data from AMSLER 94D.

### $\Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_9/\Gamma$

| VALUE (units $10^{-9}$) | CL% | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| **<6** | 90 | ACHASOV | 00K | SND | $e^+e^- \rightarrow \pi^0\pi^0$ |

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