# $\eta(1405)$

$I^G(J^{PC}) = 0^+(0^{-+})$

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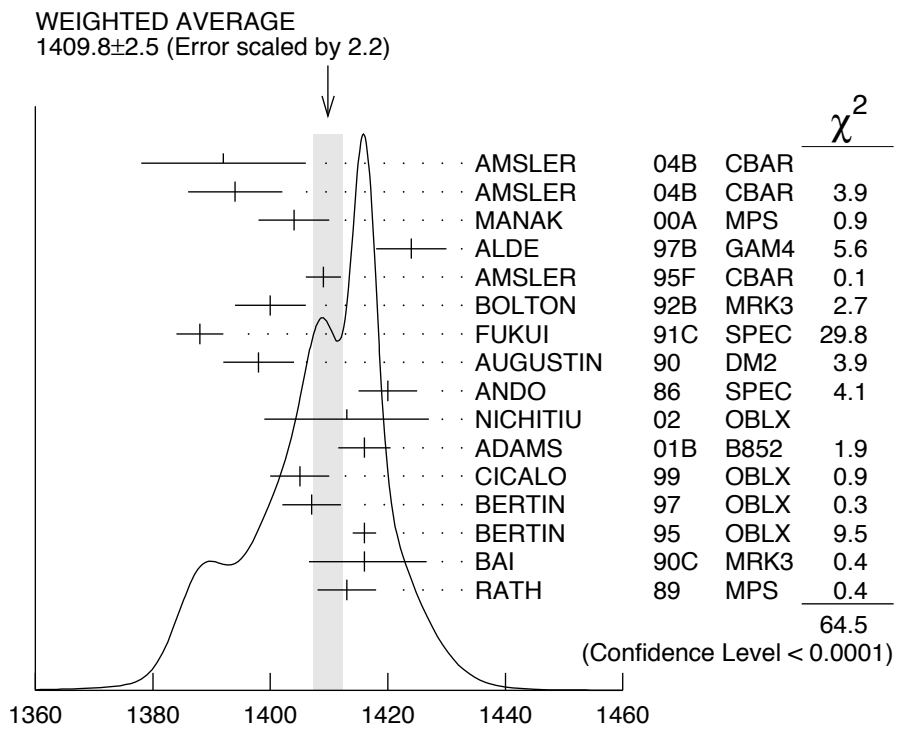
## $\eta(1405)$ MASS

| *VALUE* (MeV) | *DOCUMENT ID* |
|---|---|

**1409.8±2.5 OUR AVERAGE** Includes data from the 2 datablocks that follow this one. Error includes scale factor of 2.2. See the ideogram below.




## $\eta\pi\pi$ MODE

| *VALUE* (MeV) | *EVTS* | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|---|

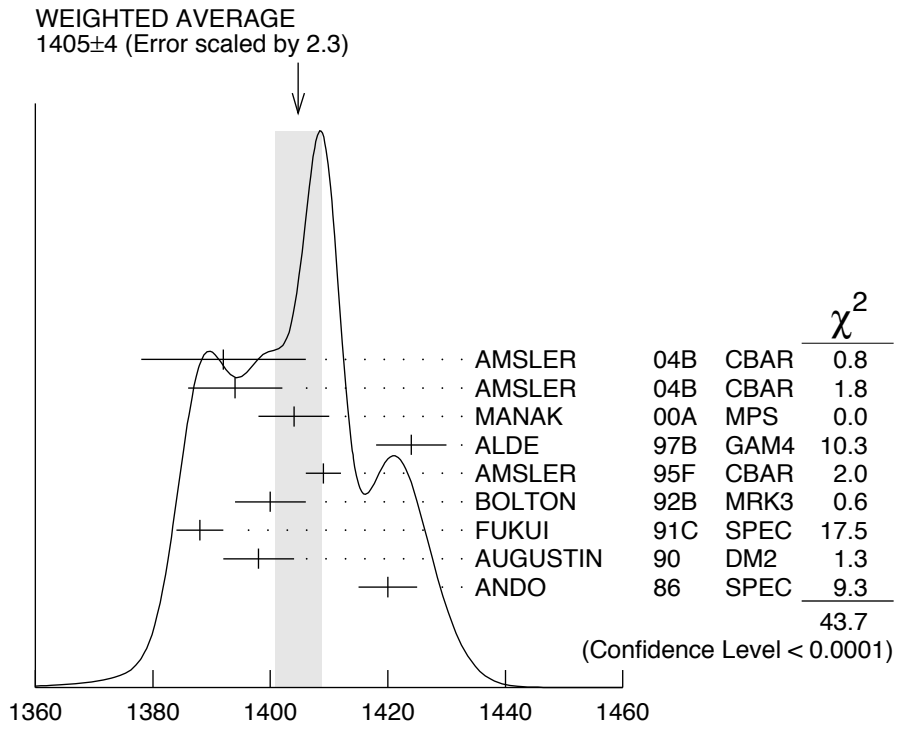
The data in this block is included in the average printed for a previous datablock.

**1405± 4 OUR AVERAGE** Error includes scale factor of 2.3. See the ideogram below.

| | | | | | |
|---|---|---|---|---|---|
| 1392±14 | 900 ± 375 | AMSLER | 04B | CBAR | 0 $\overline{p}p \rightarrow \pi^+\pi^-\pi^+\pi^-\eta$ |
| 1394± 8 | 6.6 ± 2.0k | AMSLER | 04B | CBAR | 0 $\overline{p}p \rightarrow \pi^+\pi^-\pi^0\pi^0\eta$ |
| 1404± 6 | 9082 | MANAK | 00A | MPS | 18 $\pi^- p \rightarrow \eta\pi^+\pi^- n$ |
| 1424± 6 | 2200 | ALDE | 97B | GAM4 | 100 $\pi^- p \rightarrow \eta\pi^0\pi^0 n$ |
| 1409± 3 | | AMSLER | 95F | CBAR | 0 $\overline{p}p \rightarrow \pi^+\pi^-\pi^0\pi^0\eta$ |
| 1400± 6 | | [1] BOLTON | 92B | MRK3 | $J/\psi \rightarrow \gamma\eta\pi^+\pi^-$ |
| 1388± 4 | | FUKUI | 91C | SPEC | 8.95 $\pi^- p \rightarrow \eta\pi^+\pi^- n$ |
| 1398± 6 | 261 | [2] AUGUSTIN | 90 | DM2 | $J/\psi \rightarrow \gamma\eta\pi^+\pi^-$ |
| 1420± 5 | | ANDO | 86 | SPEC | 8 $\pi^- p \rightarrow \eta\pi^+\pi^- n$ |

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

1385± 7 BAI 99 BES $J/\psi \rightarrow \gamma\eta\pi^+\pi^-$




$\eta(1405)$ mass, $\eta\pi\pi$ mode (MeV)

## $K\overline{K}\pi$ MODE ($a_0(980)\pi$ or direct $K\overline{K}\pi$)

| *VALUE* (MeV) | *EVTS* | *DOCUMENT ID* | *TECN* | *COMMENT* |
|---|---|---|---|---|

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

**1413.9± 1.7 OUR AVERAGE** Error includes scale factor of 1.1.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1413 | ±14 | 3651 | [3] NICHITIU | 02 | OBLX | | |
| 1416 | ± 4 ±2 | 20k | ADAMS | 01B | B852 | 18 GeV $\pi^- p \rightarrow K^+ K^- \pi^0 n$ | |
| 1405 | ± 5 | | [4] CICALO | 99 | OBLX | 0 $\overline{p}p \rightarrow K^\pm K^0_S \pi^\mp \pi^+ \pi^-$ | |
| 1407 | ± 5 | | [4] BERTIN | 97 | OBLX | 0 $\overline{p}p \rightarrow K^\pm (K^0) \pi^\mp \pi^+ \pi^-$ | |
| 1416 | ± 2 | | [4] BERTIN | 95 | OBLX | 0 $\overline{p}p \rightarrow K\overline{K}\pi\pi\pi$ | |
| 1416 | ± 8 $^{+7}_{-5}$ | 700 | [5] BAI | 90C | MRK3 | $J/\psi \rightarrow \gamma K^0_S K^\pm \pi^\mp$ | |
| 1413 | ± 5 | | [5] RATH | 89 | MPS | 21.4 $\pi^- p \rightarrow n K^0_S K^0_S \pi^0$ | |

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

| | | | | | | |
|---|---|---|---|---|---|---|
| 1459 | ± 5 | [6] AUGUSTIN | 92 | DM2 | $J/\psi \rightarrow \gamma K\overline{K}\pi$ | |

## $\pi\pi\gamma$ MODE

| *VALUE* (MeV) | *EVTS* | *DOCUMENT ID* | *TECN* | *COMMENT* |
|---|---|---|---|---|
| **1390±12** | 235 ± 91 | AMSLER | 04B CBAR | 0 $\overline{p}p \rightarrow \pi^+\pi^-\pi^+\pi^-\gamma$ |

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

| | | | | | |
|---|---|---|---|---|---|
| 1424±10±11 | 547 | BAI | 04J | BES2 | $J/\psi \rightarrow \gamma\gamma\pi^+\pi^-$ |
| 1401±18 | | [7,8] AUGUSTIN | 90 | DM2 | $J/\psi \rightarrow \pi^+\pi^-\gamma\gamma$ |
| 1432± 8 | | [8] COFFMAN | 90 | MRK3 | $J/\psi \rightarrow \pi^+\pi^- 2\gamma$ |

### $4\pi$ MODE

| *VALUE* (MeV) | *EVTS* | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| $1420 \pm 20$ | | BUGG | 95 | MRK3 | $J/\psi \to \gamma\pi^+\pi^-\pi^+\pi^-$ |
| $1489 \pm 12$ | 3270 | [9] BISELLO | 89B | DM2 | $J/\psi \to 4\pi\gamma$ |

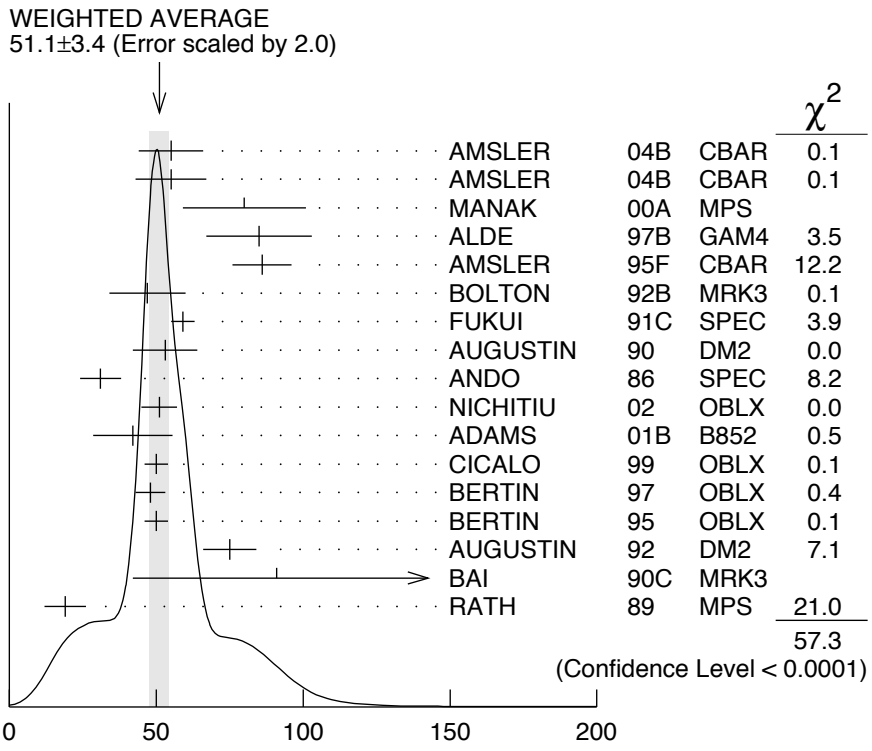
### $K\overline{K}\pi$ MODE (unresolved)

| *VALUE* (MeV) | *EVTS* | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| $1437.6 \pm 3.2$ | $249 \pm 35$ | [10,11] ABLIKIM | 08E | BES2 | $J/\psi \to \omega K^0_S K^+\pi^- +$ c.c. |
| $1445.9 \pm 5.7$ | $62 \pm 18$ | [10,11] ABLIKIM | 08E | BES2 | $J/\psi \to \omega K^+ K^-\pi^0$ |
| $1442 \pm 10$ | 410 | [10] BAI | 98C | BES | $J/\psi \to \gamma K^+ K^-\pi^0$ |
| $1445 \pm 8$ | 693 | [10] AUGUSTIN | 90 | DM2 | $J/\psi \to \gamma K^0_S K^\pm\pi^\mp$ |
| $1433 \pm 8$ | 296 | [10] AUGUSTIN | 90 | DM2 | $J/\psi \to \gamma K^+ K^-\pi^0$ |
| $1413 \pm 8$ | 500 | [10] DUCH | 89 | ASTE | $\overline{p}p \to \pi^+\pi^- K^\pm\pi^\mp K^0$ |
| $1453 \pm 7$ | 170 | [10] RATH | 89 | MPS | 21.4 $\pi^- p \to K^0_S K^0_S \pi^0 n$ |
| $1419 \pm 1$ | 8800 | [10] BIRMAN | 88 | MPS | 8 $\pi^- p \to K^+\overline{K}^0\pi^- n$ |
| $1424 \pm 3$ | 620 | [10] REEVES | 86 | SPEC | 6.6 $p\overline{p} \to K\overline{K}\pi$X |
| $1421 \pm 2$ | | [10] CHUNG | 85 | SPEC | 8 $\pi^- p \to K\overline{K}\pi n$ |
| $1440 \, {}^{+20}_{-15}$ | 174 | [10] EDWARDS | 82E | CBAL | $J/\psi \to \gamma K^+ K^-\pi^0$ |
| $1440 \, {}^{+10}_{-15}$ | | [10] SCHARRE | 80 | MRK2 | $J/\psi \to \gamma K^0_S K^\pm\pi^\mp$ |
| $1425 \pm 7$ | 800 | [10,12] BAILLON | 67 | HBC | 0 $\overline{p}p \to K\overline{K}\pi\pi\pi$ |

[1] From fit to the $a_0(980)\pi$ $0^{-+}$ partial wave.
[2] Best fit with a single Breit Wigner.
[3] Decaying dominantly directly to $K^+K^-\pi^0$.
[4] Decaying into $(K\overline{K})_S\pi$, $(K\pi)_S\overline{K}$, and $a_0(980)\pi$.
[5] From fit to the $a_0(980)\pi$ $0^{-+}$ partial wave. Cannot rule out a $a_0(980)\pi$ $1^{++}$ partial wave.
[6] Excluded from averaging because averaging would be meaningless.
[7] Best fit with a single Breit Wigner.
[8] This peak in the $\gamma\rho$ channel may not be related to the $\eta(1405)$.
[9] Estimated by us from various fits.
[10] These experiments identify only one pseudoscalar in the 1400–1500 range. Data could also refer to $\eta(1475)$.
[11] Systematic uncertainty not evaluated.
[12] From best fit of $0^{-+}$ partial wave , 50% $K^*(892)K$ , 50% $a_0(980)\pi$.

## $\eta(1405)$ WIDTH

| *VALUE* (MeV) | *DOCUMENT ID* |
|---|---|
| **51.1±3.4 OUR AVERAGE** Includes data from the 2 datablocks that follow this one. Error includes scale factor of 2.0. See the ideogram below. | |




$\eta(1405)$ width (MeV)

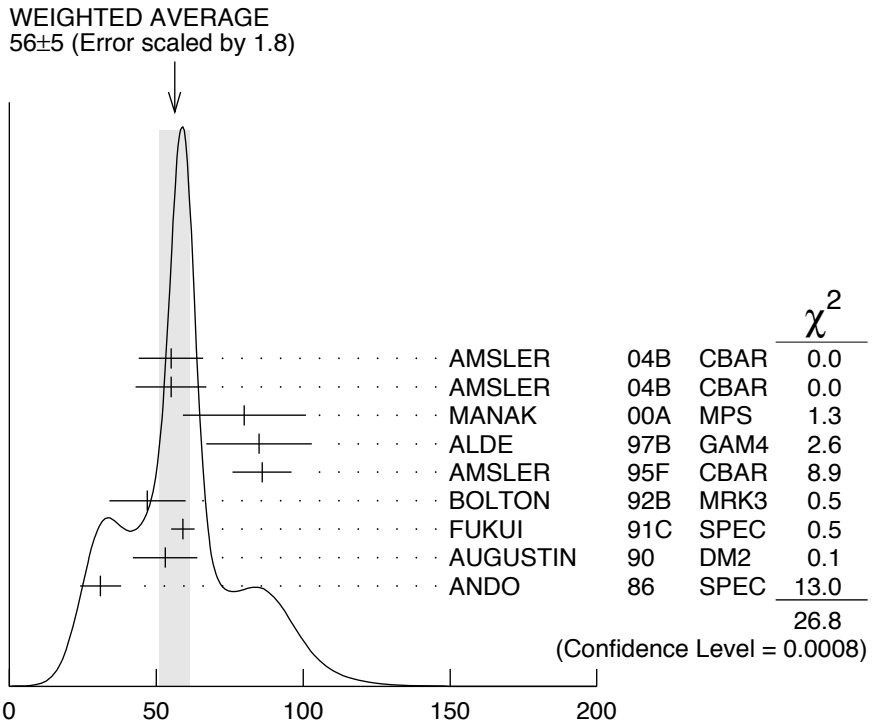
## $\eta\pi\pi$ MODE

| *VALUE* (MeV) | *EVTS* | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|---|

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

**56± 5 OUR AVERAGE** Error includes scale factor of 1.8. See the ideogram below.

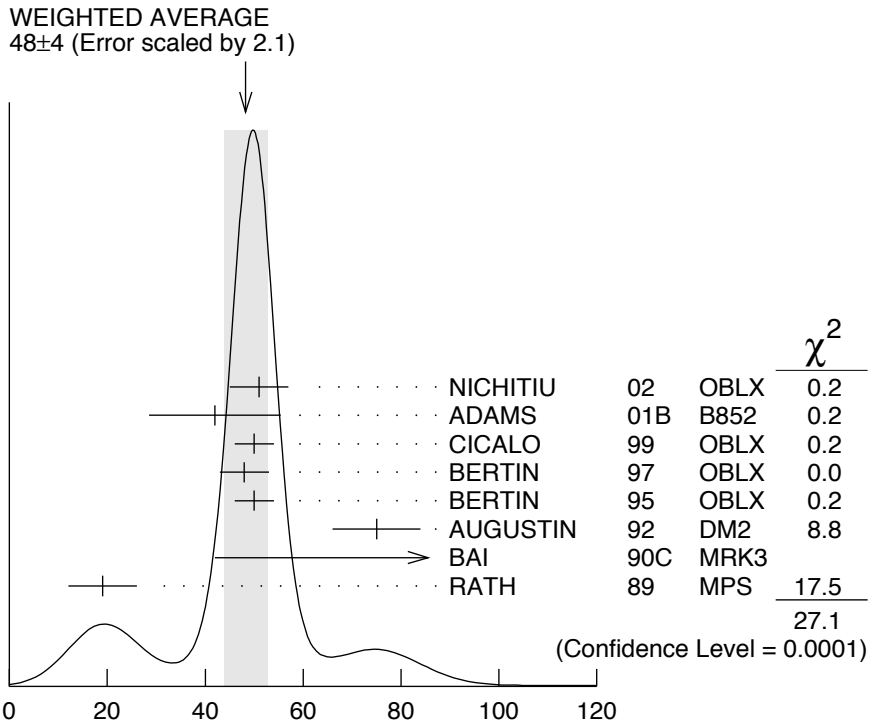
| | | | | | |
|---|---|---|---|---|---|
| 55±11 | 900 ± 375 | AMSLER | 04B | CBAR | 0 $\overline{p}p \rightarrow \pi^+\pi^-\pi^+\pi^-\eta$ |
| 55±12 | 6.6 ± 2.0k | AMSLER | 04B | CBAR | 0 $\overline{p}p \rightarrow \pi^+\pi^-\pi^0\pi^0\gamma$ |
| 80±21 | 9082 | MANAK | 00A | MPS | 18 $\pi^- p \rightarrow \eta\pi^+\pi^- n$ |
| 85±18 | 2200 | ALDE | 97B | GAM4 | 100 $\pi^- p \rightarrow \eta\pi^0\pi^0 n$ |
| 86±10 | | AMSLER | 95F | CBAR | 0 $\overline{p}p \rightarrow \pi^+\pi^-\pi^0\pi^0\eta$ |
| 47±13 | | [13] BOLTON | 92B | MRK3 | $J/\psi \rightarrow \gamma\eta\pi^+\pi^-$ |
| 59± 4 | | FUKUI | 91C | SPEC | 8.95 $\pi^- p \rightarrow \eta\pi^+\pi^- n$ |
| 53±11 | | [14] AUGUSTIN | 90 | DM2 | $J/\psi \rightarrow \gamma\eta\pi^+\pi^-$ |
| 31± 7 | | ANDO | 86 | SPEC | 8 $\pi^- p \rightarrow \eta\pi^+\pi^- n$ |




$\eta(1405)$ width $\eta\pi\pi$ mode (MeV)

## $K\overline{K}\pi$ MODE ($a_0(980)\pi$ or direct $K\overline{K}\pi$)

| *VALUE* (MeV) | *EVTS* | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|---|
| The data in this block is included in the average printed for a previous datablock. | | | | | |
| **48± 4 OUR AVERAGE** | | Error includes scale factor of 2.1. See the ideogram below. | | | |
| 51± 6 | 3651 | [15] NICHITIU | 02 | OBLX | |
| 42±10± 9 | 20k | ADAMS | 01B | B852 | 18 GeV $\pi^- p \rightarrow K^+ K^- \pi^0 n$ |
| 50± 4 | | CICALO | 99 | OBLX | 0 $\overline{p}p \rightarrow K^\pm K^0_S \pi^\mp \pi^+ \pi^-$ |
| 48± 5 | | [16] BERTIN | 97 | OBLX | 0.0 $\overline{p}p \rightarrow K^\pm (K^0) \pi^\mp \pi^+ \pi^-$ |
| 50± 4 | | [16] BERTIN | 95 | OBLX | 0 $\overline{p}p \rightarrow K\overline{K}\pi\pi\pi$ |
| 75± 9 | | AUGUSTIN | 92 | DM2 | $J/\psi \rightarrow \gamma K\overline{K}\pi$ |
| $91^{+67+15}_{-31-38}$ | | [17] BAI | 90C | MRK3 | $J/\psi \rightarrow \gamma K^0_S K^\pm \pi^\mp$ |
| 19± 7 | | [17] RATH | 89 | MPS | 21.4 $\pi^- p \rightarrow n K^0_S K^0_S \pi^0$ |




$\eta(1405)$ width $K\overline{K}\pi$ mode ($a_0(980)$ $\pi$ dominant)

### $\pi\pi\gamma$ MODE

| *VALUE* (MeV) | *EVTS* | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|---|
| **64 ±18** | 235 ± 91 | AMSLER | 04B | CBAR | $0\ \overline{p}p \rightarrow\ \pi^+\pi^-\pi^+\pi^-\gamma$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| 101.0± 8.8±8.8 | 547 | BAI | 04J | BES2 | $J/\psi \rightarrow\ \gamma\gamma\pi^+\pi^-$ |
| 174 ±44 | | AUGUSTIN | 90 | DM2 | $J/\psi \rightarrow\ \pi^+\pi^-\gamma\gamma$ |
| 90 ±26 | | [18] COFFMAN | 90 | MRK3 | $J/\psi \rightarrow\ \pi^+\pi^-2\gamma$ |

### $4\pi$ MODE

| *VALUE* (MeV) | *EVTS* | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| 160±30 | | BUGG | 95 | MRK3 | $J/\psi \rightarrow\ \gamma\pi^+\pi^-\pi^+\pi^-$ |
| 144±13 | 3270 | [19] BISELLO | 89B | DM2 | $J/\psi \rightarrow\ 4\pi\gamma$ |

### $K\overline{K}\pi$ MODE (unresolved)

| *VALUE* (MeV) | *EVTS* | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| 48.9± 9.0 | 249 ± 35 | [20,21] ABLIKIM | 08E | BES2 | $J/\psi \rightarrow\ \omega K^0_S K^+\pi^-$ + c.c. |
| 34.2±18.5 | 62 ± 18 | [20,21] ABLIKIM | 08E | BES2 | $J/\psi \rightarrow\ \omega K^+ K^-\pi^0$ |
| 93 ±14 | 296 | [20] AUGUSTIN | 90 | DM2 | $J/\psi \rightarrow\ \gamma K^+ K^-\pi^0$ |
| 105 ±10 | 693 | [20] AUGUSTIN | 90 | DM2 | $J/\psi \rightarrow\ \gamma K^0_S K^\pm\pi^\mp$ |
| 62 ±16 | 500 | [20] DUCH | 89 | ASTE | $\overline{p}p \rightarrow\ K\overline{K}\pi\pi\pi$ |
| 100 ±11 | 170 | [20] RATH | 89 | MPS | $21.4\ \pi^- p \rightarrow\ K^0_S K^0_S \pi^0 n$ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 66 | $\pm$ 2 | 8800 | [20] BIRMAN | 88 | MPS | 8 $\pi^- p \rightarrow K^+ \overline{K}^0 \pi^- n$ |
| 60 | $\pm$10 | 620 | [20] REEVES | 86 | SPEC | 6.6 $p\overline{p} \rightarrow K K \pi X$ |
| 60 | $\pm$10 | | [20] CHUNG | 85 | SPEC | 8 $\pi^- p \rightarrow K \overline{K} \pi n$ |
| 55 | $^{+20}_{-30}$ | 174 | [20] EDWARDS | 82E | CBAL | $J/\psi \rightarrow \gamma K^+ K^- \pi^0$ |
| 50 | $^{+30}_{-20}$ | | [20] SCHARRE | 80 | MRK2 | $J/\psi \rightarrow \gamma K^0_S K^\pm \pi^\mp$ |
| 80 | $\pm$10 | 800 | [20,22] BAILLON | 67 | HBC | 0.0 $\overline{p} p \rightarrow K \overline{K} \pi \pi \pi$ |

[13] From fit to the $a_0(980)\pi$ $0^{-+}$ partial wave.
[14] From $\eta\pi^+\pi^-$ mass distribution - mainly $a_0(980)\pi$ - no spin–parity determination available.
[15] Decaying dominantly directly to $K^+ K^- \pi^0$.
[16] Decaying into $(K\overline{K})_S\pi$, $(K\pi)_S\overline{K}$, and $a_0(980)\pi$.
[17] From fit to the $a_0(980)\pi$ $0^{-+}$ partial wave , but $a_0(980)\pi$ $1^{++}$ cannot be excluded.
[18] This peak in the $\gamma\rho$ channel may not be related to the $\eta(1405)$.
[19] Estimated by us from various fits.
[20] These experiments identify only one pseudoscalar in the 1400–1500 range. Data could also refer to $\eta(1475)$.
[21] Systematic uncertainty not evaluated.
[22] From best fit to $0^{-+}$ partial wave , 50% $K^*(892)K$ , 50% $a_0(980)\pi$.

## $\eta(1405)$ DECAY MODES

| | Mode | Fraction ($\Gamma_i/\Gamma$) | Confidence level |
|---|---|---|---|
| $\Gamma_1$ | $K\overline{K}\pi$ | seen | |
| $\Gamma_2$ | $\eta\pi\pi$ | seen | |
| $\Gamma_3$ | $a_0(980)\pi$ | seen | |
| $\Gamma_4$ | $\eta(\pi\pi)_S$-wave | seen | |
| $\Gamma_5$ | $f_0(980)\eta$ | seen | |
| $\Gamma_6$ | $4\pi$ | seen | |
| $\Gamma_7$ | $\rho\rho$ | $<58$ % | 99.85% |
| $\Gamma_8$ | $\gamma\gamma$ | | |
| $\Gamma_9$ | $\rho^0\gamma$ | seen | |
| $\Gamma_{10}$ | $\phi\gamma$ | | |
| $\Gamma_{11}$ | $K^*(892)K$ | seen | |

## $\eta(1405)$ $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma(total)$

### $\Gamma(K\overline{K}\pi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_1\Gamma_8/\Gamma$

| *VALUE* (keV) | *CL%* | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| $<0.035$ | 90 | [23,24] AHOHE | 05 | CLE2 | 10.6 $e^+e^- \rightarrow e^+e^- K^0_S K^\pm \pi^\mp$ |

### $\Gamma(\eta\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_2\Gamma_8/\Gamma$

| *VALUE* (keV) | *CL%* | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|---|
| **<0.095** | 95 | ACCIARRI | 01G | L3 | 183–202 $e^+e^- \rightarrow e^+e^-\eta\pi^+\pi^-$ |

### $\Gamma(\rho^0\gamma) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_9\Gamma_8/\Gamma$

| VALUE (keV) | CL% | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| <1.5 | 95 | ALTHOFF | 84E | TASS | $e^+e^- \to e^+e^-\pi^+\pi^-\gamma$ |

[23] Using $\eta(1405)$ mass and width 1410 MeV and 51 MeV, respectively.
[24] Assuming three-body phase-space decay to $K^0_S K^\pm\pi^\mp$.

## $\eta(1405)$ BRANCHING RATIOS

### $\Gamma(\eta\pi\pi)/\Gamma(K\overline{K}\pi)$ $\Gamma_2/\Gamma_1$

| VALUE | CL% | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| 1.09±0.48 | | [25] AMSLER | 04B | CBAR | 0 $\overline{p}p \to \pi^+\pi^-\pi^+\pi^-\eta$ |
| <0.5 | 90 | EDWARDS | 83B | CBAL | $J/\psi \to \eta\pi\pi\gamma$ |
| <1.1 | 90 | SCHARRE | 80 | MRK2 | $J/\psi \to \eta\pi\pi\gamma$ |
| <1.5 | 95 | FOSTER | 68B | HBC | 0.0 $\overline{p}p$ |

### $\Gamma(\rho^0\gamma)/\Gamma(\eta\pi\pi)$ $\Gamma_9/\Gamma_2$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **0.111±0.064** | AMSLER | 04B | CBAR | 0 $\overline{p}p$ |

### $\Gamma(a_0(980)\pi)/\Gamma(K\overline{K}\pi)$ $\Gamma_3/\Gamma_1$

| VALUE | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| ∼ 0.15 | | [26] BERTIN | 95 | OBLX | 0 $\overline{p}p \to K\overline{K}\pi\pi\pi$ |
| ∼ 0.8 | 500 | [26] DUCH | 89 | ASTE | $\overline{p}p \to \pi^+\pi^- K^\pm\pi^\mp K^0$ |
| ∼ 0.75 | | [26] REEVES | 86 | SPEC | 6.6 $p\overline{p} \to KK\pi X$ |

### $\Gamma(a_0(980)\pi)/\Gamma(\eta\pi\pi)$ $\Gamma_3/\Gamma_2$

| VALUE | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| 0.29±0.10 | | ABELE | 98E | CBAR | 0 $p\overline{p} \to \eta\pi^0\pi^0\pi^0$ |
| 0.19±0.04 | 2200 | [27] ALDE | 97B | GAM4 | 100 $\pi^- p \to \eta\pi^0\pi^0 n$ |
| 0.56±0.04±0.03 | | [27] AMSLER | 95F | CBAR | 0 $\overline{p}p \to \pi^+\pi^-\pi^0\pi^0\eta$ |

### $\Gamma(a_0(980)\pi)/\Gamma(\eta(\pi\pi)_{S\text{-wave}})$ $\Gamma_3/\Gamma_4$

| VALUE | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| 0.91±0.12 | | ANISOVICH | 01 | SPEC | 0.0 $\overline{p}p \to \eta\pi^+\pi^-\pi^+\pi^-$ |
| 0.15±0.04 | 9082 | [28] MANAK | 00A | MPS | 18 $\pi^- p \to \eta\pi^+\pi^- n$ |
| 0.70±0.12±0.20 | | [29] BAI | 99 | BES | $J/\psi \to \gamma\eta\pi^+\pi^-$ |

### $\Gamma(\rho^0\gamma)/\Gamma(K\overline{K}\pi)$ $\Gamma_9/\Gamma_1$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **0.0152±0.0038** | [30] COFFMAN | 90 | MRK3 | $J/\psi \to \gamma\gamma\pi^+\pi^-$ |

### $\Gamma(\eta(\pi\pi)_{S\text{-wave}})/\Gamma(\eta\pi\pi)$ $\Gamma_4/\Gamma_2$

| VALUE | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| $0.81\pm0.04$ | 2200 | ALDE | 97B | GAM4 | 100 $\pi^- p \to \eta\pi^0\pi^0 n$ |

### $\Gamma(f_0(980)\eta)/\Gamma(\eta\pi\pi)$ $\Gamma_5/\Gamma_2$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| $0.32\pm0.07$ | [31] ANISOVICH | 00 | SPEC | 0.9–1.2 $\overline{p}p \to \eta 3\pi^0$ |

### $\Gamma(\rho\rho)/\Gamma_{\text{total}}$ $\Gamma_7/\Gamma$

| VALUE | CL% | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| **<0.58** | 99.85 | [25,32] AMSLER | 04B | CBAR | 0 $\overline{p}p$ |

### $\Gamma(K^*(892)K)/\Gamma(a_0(980)\pi)$ $\Gamma_{11}/\Gamma_3$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| $0.084\pm0.024$ | [28] ADAMS | 01B | B852 | 18 GeV $\pi^- p \to K^+K^-\pi^0 n$ |

### $\Gamma(\phi\gamma)/\Gamma(\rho^0\gamma)$ $\Gamma_{10}/\Gamma_9$

| VALUE | CL% | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| $<0.77$ | 95 | [33] BAI | 04J | BES2 | $J/\psi \to \gamma\gamma K^+K^-$ |

[25] Using the data of BAILLON 67 on $\overline{p}p \to K\overline{K}\pi$.
[26] Assuming that the $a_0(980)$ decays only into $K\overline{K}$.
[27] Assuming that the $a_0(980)$ decays only into $\eta\pi$.
[28] Statistical error only.
[29] Assuming that the $a_0(980)$ decays only into $\eta\pi$.
[30] Using $B(J/\psi \to \gamma\eta(1405) \to \gamma K\overline{K}\pi)=4.2\times10^{-3}$ and $B(J/\psi \to \gamma\eta(1405) \to \gamma\gamma\rho^0)=6.4\times10^{-5}$ and assuming that the $\gamma\rho^0$ signal does not come from the $f_1(1420)$.
[31] Using preliminary Crystal Barrel data.
[32] Assuming that the $\eta(1405)$ decays are saturated by the $\pi\pi\eta$, $K\overline{K}\pi$ and $\rho\rho$ modes.
[33] Calculated by us from $B(J/\psi \to \eta(1405)\gamma \to \phi\gamma\gamma) < 0.82\times10^{-4}$ and $B(J/\psi \to \eta(1405)\gamma \to \rho^0\gamma\gamma) = (1.07\pm0.17\pm0.11)\times10^{-4}$.

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