

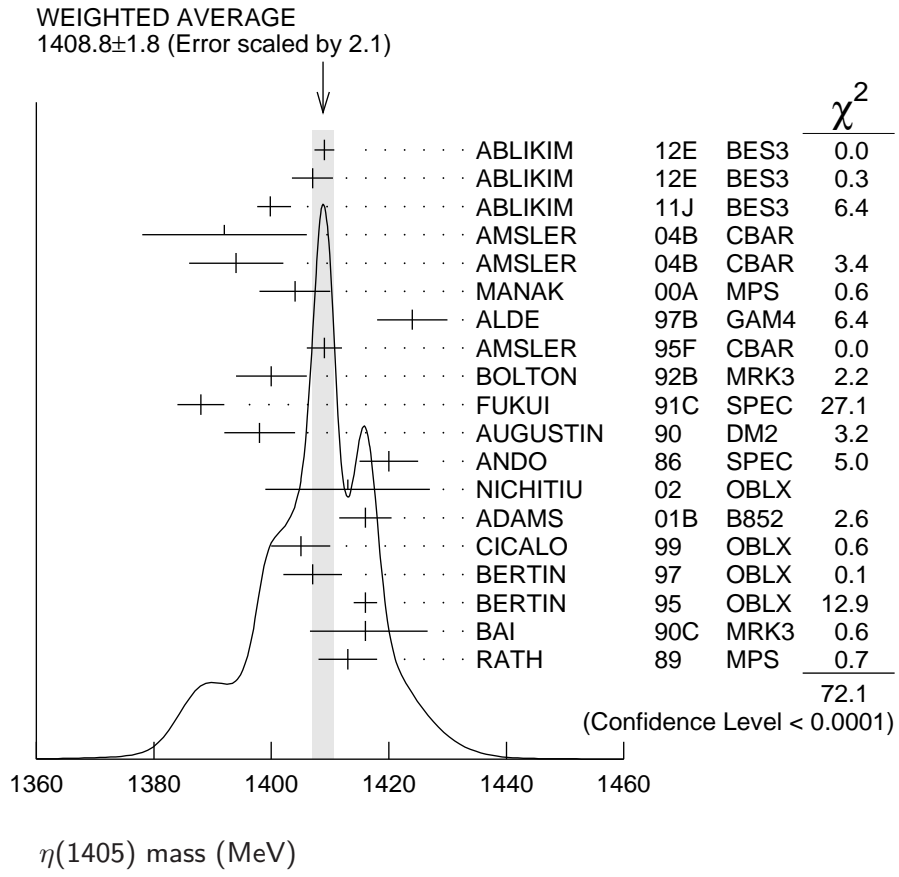
**$\eta(1405)$**

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

See also the  $\eta(1475)$ .  
 See the related review(s):  
[Pseudoscalar and Pseudovector Mesons in the 1400 MeV Region](#)

**$\eta(1405)$  MASS**

VALUE (MeV)                      DOCUMENT ID  
**1408.8 ± 1.8 OUR AVERAGE** Includes data from the 2 datablocks that follow this one.  
 Error includes scale factor of 2.1. 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.

**1406.2 ± 2.3 OUR AVERAGE** Error includes scale factor of 2.2. See the ideogram below.

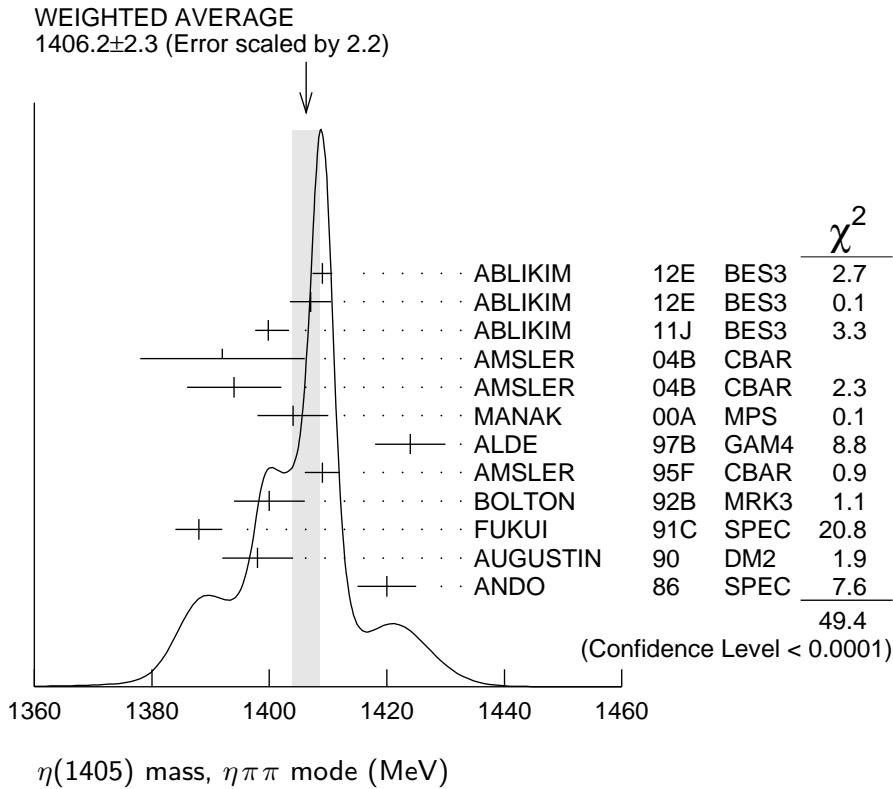
1409.0 ± 1.7	743	ABLIKIM	12E BES3	$J/\psi \rightarrow \gamma(\pi^+\pi^-\pi^0)$
1407.0 ± 3.5	198	ABLIKIM	12E BES3	$J/\psi \rightarrow \gamma(\pi^0\pi^0\pi^0)$
1399.8 ± 2.2 <sup>+2.8</sup> <sub>-0.1</sub>		<sup>1</sup> ABLIKIM	11J BES3	$J/\psi \rightarrow \omega(\eta\pi^+\pi^-)$
1392 ± 14	900 ± 375	AMSLER	04B CBAR	$0 \bar{p}p \rightarrow \pi^+\pi^-\pi^+\pi^-\eta$

1394 ± 8	6.6 ± 2.0k	AMSLER	04B CBAR	0 $\bar{p}p \rightarrow \pi^+\pi^-\pi^0\pi^0\eta$
1404 ± 6	9082	MANAK	00A MPS	18 $\pi^-p \rightarrow \eta\pi^+\pi^-n$
1424 ± 6	2200	ALDE	97B GAM4	100 $\pi^-p \rightarrow \eta\pi^0\pi^0n$
1409 ± 3		AMSLER	95F CBAR	0 $\bar{p}p \rightarrow \pi^+\pi^-\pi^0\pi^0\eta$
1400 ± 6		<sup>2</sup> 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	<sup>3</sup> 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	$J/\psi \rightarrow \gamma\eta\pi^+\pi^-$

<sup>1</sup> The selected process is  $J/\psi \rightarrow \omega a_0(980)\pi$ .

<sup>2</sup> From fit to the  $a_0(980)\pi 0^-+$  partial wave.

<sup>3</sup> Best fit with a single Breit Wigner.



**$K\bar{K}\pi$  MODE ( $a_0(980)\pi$  or direct  $K\bar{K}\pi$ )**

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
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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	<sup>1</sup> NICHITIU	02	OBLX	
1416 ± 4 ± 2	20k	ADAMS	01B	B852	18 GeV $\pi^-p \rightarrow K^+K^-\pi^0n$
1405 ± 5		<sup>2</sup> CICALO	99	OBLX	0 $\bar{p}p \rightarrow K^\pm K_S^0 \pi^\mp \pi^+ \pi^-$
1407 ± 5		<sup>2</sup> BERTIN	97	OBLX	0 $\bar{p}p \rightarrow K^\pm (K^0) \pi^\mp \pi^+ \pi^-$

1416 ± 2		<sup>2</sup> BERTIN	95	OBLX	0	$\bar{p}p \rightarrow K\bar{K}\pi\pi\pi$
1416 ± 8	$\begin{smallmatrix} +7 \\ -5 \end{smallmatrix}$	700	<sup>3</sup> BAI	90C	MRK3	$J/\psi \rightarrow \gamma K_S^0 K^\pm \pi^\mp$
1413 ± 5		<sup>3</sup> RATH	89	MPS	21.4	$\pi^- p \rightarrow n K_S^0 K_S^0 \pi^0$

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

1459 ± 5		<sup>4</sup> AUGUSTIN	92	DM2		$J/\psi \rightarrow \gamma K\bar{K}\pi$
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<sup>1</sup> Decaying dominantly directly to  $K^+ K^- \pi^0$ .

<sup>2</sup> Decaying into  $(K\bar{K})_S \pi$ ,  $(K\pi)_S \bar{K}$ , and  $a_0(980)\pi$ .

<sup>3</sup> From fit to the  $a_0(980)\pi$   $0^- +$  partial wave. Cannot rule out a  $a_0(980)\pi$   $1^+ +$  partial wave.

<sup>4</sup> Excluded from averaging because averaging would be meaningless.

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

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1390±12</b>	235 ± 91	AMSLER	04B CBAR	$0 \bar{p}p \rightarrow \pi^+ \pi^- \pi^+ \pi^- \gamma$

• • • 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		<sup>1,2</sup> AUGUSTIN	90 DM2	$J/\psi \rightarrow \pi^+\pi^-\gamma\gamma$
1432± 8		<sup>2</sup> COFFMAN	90 MRK3	$J/\psi \rightarrow \pi^+\pi^-2\gamma$

<sup>1</sup> Best fit with a single Breit Wigner.

<sup>2</sup> This peak in the  $\gamma\rho$  channel may not be related to the  $\eta(1405)$ .

### $4\pi$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

1420±20		BUGG	95 MRK3	$J/\psi \rightarrow \gamma\pi^+\pi^-\pi^+\pi^-$
1489±12	3270	<sup>1</sup> BISELLO	89B DM2	$J/\psi \rightarrow 4\pi\gamma$

<sup>1</sup> Estimated by us from various fits.

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

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
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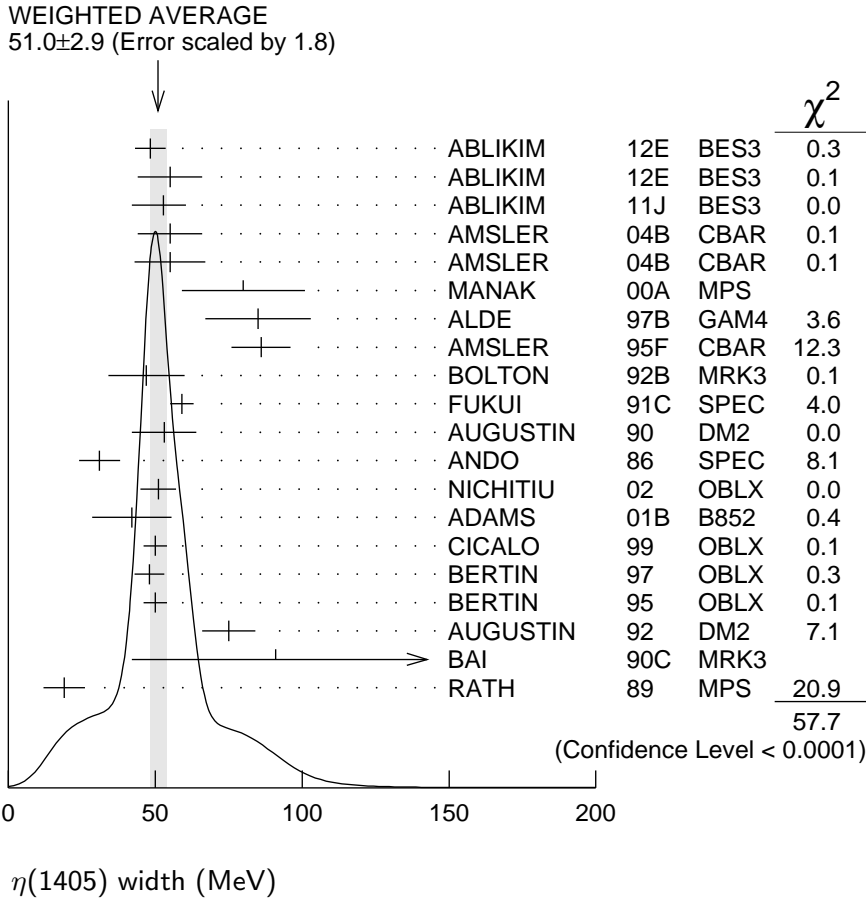
• • • We do not use the following data for averages, fits, limits, etc. • • •

1452.7 ± 3.3	191	<sup>1,2</sup> ABLIKIM	13M BES3	$\psi(2S) \rightarrow \omega K K \pi$
1437.6 ± 3.2	249 ± 35	<sup>1,2</sup> ABLIKIM	08E BES2	$J/\psi \rightarrow \omega K_S^0 K^+ \pi^- + c.c.$
1445.9 ± 5.7	62 ± 18	<sup>1,2</sup> ABLIKIM	08E BES2	$J/\psi \rightarrow \omega K^+ K^- \pi^0$
1442 ± 10	410	<sup>1</sup> BAI	98C BES	$J/\psi \rightarrow \gamma K^+ K^- \pi^0$
1445 ± 8	693	<sup>1</sup> AUGUSTIN	90 DM2	$J/\psi \rightarrow \gamma K_S^0 K^\pm \pi^\mp$
1433 ± 8	296	<sup>1</sup> AUGUSTIN	90 DM2	$J/\psi \rightarrow \gamma K^+ K^- \pi^0$
1413 ± 8	500	<sup>1</sup> DUCH	89 ASTE	$\bar{p}p \rightarrow \pi^+ \pi^- K^\pm \pi^\mp K^0$
1453 ± 7	170	<sup>1</sup> RATH	89 MPS	$21.4 \pi^- p \rightarrow K_S^0 K_S^0 \pi^0 n$
1419 ± 1	8800	<sup>1</sup> BIRMAN	88 MPS	$8 \pi^- p \rightarrow K^+ \bar{K}^0 \pi^- n$
1424 ± 3	620	<sup>1</sup> REEVES	86 SPEC	$6.6 p\bar{p} \rightarrow K\bar{K}\pi X$
1421 ± 2		<sup>1</sup> CHUNG	85 SPEC	$8 \pi^- p \rightarrow K\bar{K}\pi n$
1440 $\begin{smallmatrix} +20 \\ -15 \end{smallmatrix}$	174	<sup>1</sup> EDWARDS	82E CBAL	$J/\psi \rightarrow \gamma K^+ K^- \pi^0$
1440 $\begin{smallmatrix} +10 \\ -15 \end{smallmatrix}$		<sup>1</sup> SCHARRE	80 MRK2	$J/\psi \rightarrow \gamma K_S^0 K^\pm \pi^\mp$
1425 ± 7	800	<sup>1,3</sup> BAILLON	67 HBC	$0 \bar{p}p \rightarrow K\bar{K}\pi\pi\pi$

- <sup>1</sup> These experiments identify only one pseudoscalar in the 1400–1500 range. Data could also refer to  $\eta(1475)$ .  
<sup>2</sup> Systematic uncertainty not evaluated.  
<sup>3</sup> From best fit of  $0^{-+}$  partial wave, 50%  $K^*(892)K$ , 50%  $a_0(980)\pi$ .

## $\eta(1405)$ WIDTH

VALUE (MeV)                      DOCUMENT ID  
**51.0 ± 2.9 OUR AVERAGE** Includes data from the 2 datablocks that follow this one. Error includes scale factor of 1.8. 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.

**54 ± 4 OUR AVERAGE** Error includes scale factor of 1.6. See the ideogram below.

48.3 ± 5.2	743	ABLIKIM	12E BES3	$J/\psi \rightarrow \gamma(\pi^+\pi^-\pi^0)$
55.0 ± 11.0	198	ABLIKIM	12E BES3	$J/\psi \rightarrow \gamma(\pi^0\pi^0\pi^0)$
52.8 ± 7.6 <sup>+0.1</sup> <sub>-7.6</sub>		<sup>1</sup> ABLIKIM	11J BES3	$J/\psi \rightarrow \omega(\eta\pi^+\pi^-)$
55 ± 11	900 ± 375	AMSLER	04B CBAR	$0 \bar{p}p \rightarrow \pi^+\pi^-\pi^+\pi^-\eta$
55 ± 12	6.6 ± 2.0k	AMSLER	04B CBAR	$0 \bar{p}p \rightarrow \pi^+\pi^-\pi^0\pi^0\gamma$
80 ± 21	9082	MANAK	00A MPS	$18 \pi^-p \rightarrow \eta\pi^+\pi^-n$

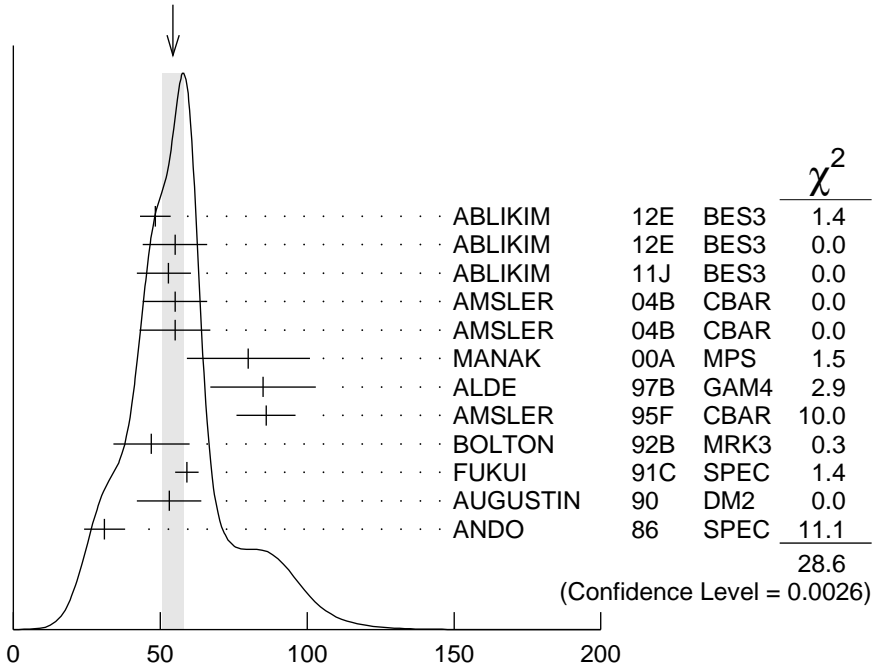
85 ± 18	2200	ALDE	97B GAM4	100	$\pi^- p \rightarrow \eta \pi^0 \pi^0 n$
86 ± 10		AMSLER	95F CBAR	0	$\bar{p} p \rightarrow \pi^+ \pi^- \pi^0 \pi^0 \eta$
47 ± 13		<sup>2</sup> BOLTON	92B MRK3		$J/\psi \rightarrow \gamma \eta \pi^+ \pi^-$
59 ± 4		FUKUI	91C SPEC	8.95	$\pi^- p \rightarrow \eta \pi^+ \pi^- n$
53 ± 11		<sup>3</sup> AUGUSTIN	90 DM2		$J/\psi \rightarrow \gamma \eta \pi^+ \pi^-$
31 ± 7		ANDO	86 SPEC	8	$\pi^- p \rightarrow \eta \pi^+ \pi^- n$

<sup>1</sup> The selected process is  $J/\psi \rightarrow \omega a_0(980) \pi$ .

<sup>2</sup> From fit to the  $a_0(980) \pi^0 \pi^+ \pi^-$  partial wave.

<sup>3</sup> From  $\eta \pi^+ \pi^-$  mass distribution - mainly  $a_0(980) \pi$  - no spin-parity determination available.

WEIGHTED AVERAGE  
54±4 (Error scaled by 1.6)



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

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

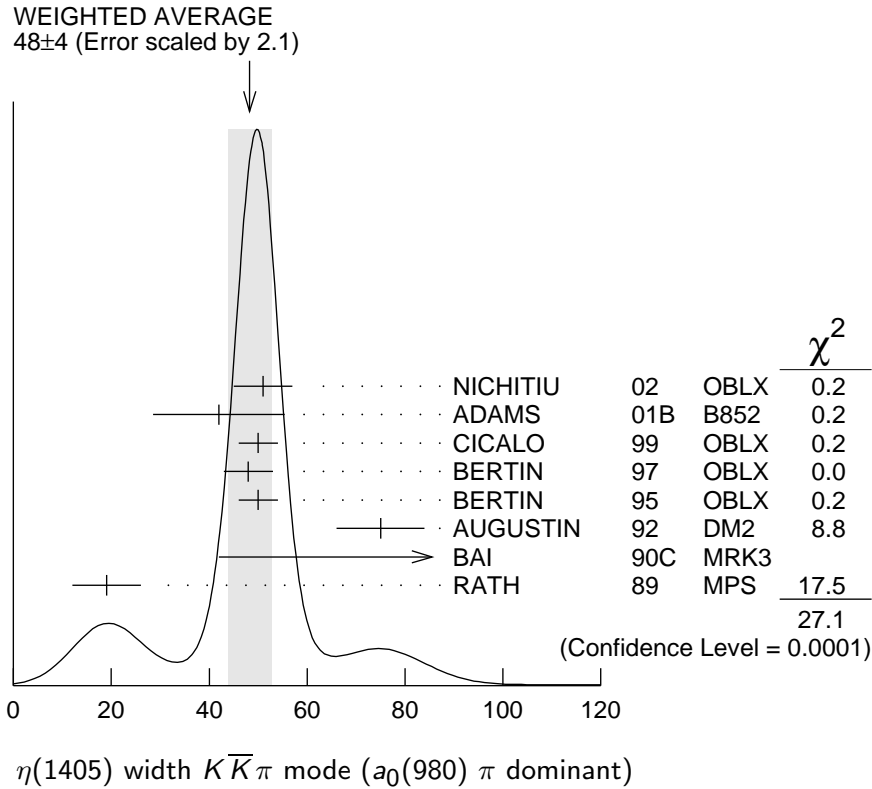
VALUE (MeV)    EVTS    DOCUMENT ID    TECN    COMMENT

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	<sup>1</sup> 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 $\bar{p} p \rightarrow K^\pm K_S^0 \pi^\mp \pi^+ \pi^-$
48 ± 5		<sup>2</sup> BERTIN	97	OBLX	0.0 $\bar{p} p \rightarrow K^\pm (K^0) \pi^\mp \pi^+ \pi^-$
50 ± 4		<sup>2</sup> BERTIN	95	OBLX	0 $\bar{p} p \rightarrow K \bar{K} \pi \pi \pi$
75 ± 9		AUGUSTIN	92	DM2	$J/\psi \rightarrow \gamma K \bar{K} \pi$
91 <sup>+67+15</sup> -31-38		<sup>3</sup> BAI	90C	MRK3	$J/\psi \rightarrow \gamma K_S^0 K^\pm \pi^\mp$
19 ± 7		<sup>3</sup> RATH	89	MPS	21.4 $\pi^- p \rightarrow n K_S^0 K_S^0 \pi^0$

- <sup>1</sup> Decaying dominantly directly to  $K^+ K^- \pi^0$ .
- <sup>2</sup> Decaying into  $(K \bar{K})_S \pi$ ,  $(K \pi)_S \bar{K}$ , and  $a_0(980) \pi$ .
- <sup>3</sup> From fit to the  $a_0(980) \pi 0^- +$  partial wave, but  $a_0(980) \pi 1^- +$  cannot be excluded.



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

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>64 ±18</b>	235 ± 91	AMSLER	04B CBAR	$0 \bar{p} p \rightarrow \pi^+ \pi^- \pi^+ \pi^- \gamma$
● ● ● 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		<sup>1</sup> COFFMAN	90 MRK3	$J/\psi \rightarrow \pi^+ \pi^- 2\gamma$

<sup>1</sup> This peak in the  $\gamma\rho$  channel may not be related to the  $\eta(1405)$ .

### $4\pi$ 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	<sup>1</sup> BISELLO	89B DM2	$J/\psi \rightarrow 4\pi \gamma$

<sup>1</sup> Estimated by us from various fits.

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

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$45.9 \pm 8.2$	191	<sup>1,2</sup> ABLIKIM	13M BES3	$\psi(2S) \rightarrow \omega K K \pi$
$48.9 \pm 9.0$	$249 \pm 35$	<sup>1,2</sup> ABLIKIM	08E BES2	$J/\psi \rightarrow \omega K_S^0 K^+ \pi^- + \text{c.c.}$
$34.2 \pm 18.5$	$62 \pm 18$	<sup>1,2</sup> ABLIKIM	08E BES2	$J/\psi \rightarrow \omega K^+ K^- \pi^0$
$93 \pm 14$	296	<sup>1</sup> AUGUSTIN	90 DM2	$J/\psi \rightarrow \gamma K^+ K^- \pi^0$
$105 \pm 10$	693	<sup>1</sup> AUGUSTIN	90 DM2	$J/\psi \rightarrow \gamma K_S^0 K^\pm \pi^\mp$
$62 \pm 16$	500	<sup>1</sup> DUCH	89 ASTE	$\bar{p}p \rightarrow K\bar{K}\pi\pi\pi$
$100 \pm 11$	170	<sup>1</sup> RATH	89 MPS	$21.4 \pi^- p \rightarrow K_S^0 K_S^0 \pi^0 n$
$66 \pm 2$	8800	<sup>1</sup> BIRMAN	88 MPS	$8 \pi^- p \rightarrow K^+ \bar{K}^0 \pi^- n$
$60 \pm 10$	620	<sup>1</sup> REEVES	86 SPEC	$6.6 p\bar{p} \rightarrow K K \pi X$
$60 \pm 10$		<sup>1</sup> CHUNG	85 SPEC	$8 \pi^- p \rightarrow K\bar{K}\pi n$
$55 \begin{smallmatrix} +20 \\ -30 \end{smallmatrix}$	174	<sup>1</sup> EDWARDS	82E CBAL	$J/\psi \rightarrow \gamma K^+ K^- \pi^0$
$50 \begin{smallmatrix} +30 \\ -20 \end{smallmatrix}$		<sup>1</sup> SCHARRE	80 MRK2	$J/\psi \rightarrow \gamma K_S^0 K^\pm \pi^\mp$
$80 \pm 10$	800	<sup>1,3</sup> BAILLON	67 HBC	$0.0 \bar{p}p \rightarrow K\bar{K}\pi\pi\pi$

<sup>1</sup> These experiments identify only one pseudoscalar in the 1400–1500 range. Data could also refer to  $\eta(1475)$ .

<sup>2</sup> Systematic uncertainty not evaluated.

<sup>3</sup> 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
$\Gamma_1$ $K\bar{K}\pi$	seen	
$\Gamma_2$ $\eta\pi\pi$	seen	
$\Gamma_3$ $a_0(980)\pi$	seen	
$\Gamma_4$ $\eta(\pi\pi)_S\text{-wave}$	seen	
$\Gamma_5$ $f_0(980)\pi^0 \rightarrow \pi^+\pi^-\pi^0$	not seen	
$\Gamma_6$ $f_0(980)\eta$	seen	
$\Gamma_7$ $4\pi$	seen	
$\Gamma_8$ $\rho\rho$	<58 %	99.85%
$\Gamma_9$ $\gamma\gamma$		
$\Gamma_{10}$ $\rho^0\gamma$	seen	
$\Gamma_{11}$ $\phi\gamma$		
$\Gamma_{12}$ $K^*(892)K$	seen	

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

$\Gamma(K\bar{K}\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_1\Gamma_9/\Gamma$

VALUE (keV)	CL%	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
<0.035	90	<sup>1,2</sup> AHOHE	05 CLE2	$10.6 e^+e^- \rightarrow e^+e^- K_S^0 K^\pm \pi^\mp$

<sup>1</sup> Using  $\eta(1405)$  mass and width 1410 MeV and 51 MeV, respectively.

<sup>2</sup> Assuming three-body phase-space decay to  $K_S^0 K^\pm \pi^\mp$ .

$\Gamma(\eta\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_2\Gamma_9/\Gamma$

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

$\Gamma(\rho^0\gamma) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{10}\Gamma_9/\Gamma$

VALUE (keV)	CL%	DOCUMENT ID	TECN	COMMENT
<1.5	95	ALTHOFF	84E TASS	$e^+e^- \rightarrow e^+e^-\pi^+\pi^-\gamma$

**$\eta(1405)$  BRANCHING RATIOS**

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

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.09±0.48		<sup>1</sup> AMSLER	04B CBAR	$0 \bar{p}p \rightarrow \pi^+\pi^-\pi^+\pi^-\eta$
<0.5	90	EDWARDS	83B CBAL	$J/\psi \rightarrow \eta\pi\pi\gamma$
<1.1	90	SCHARRE	80 MRK2	$J/\psi \rightarrow \eta\pi\pi\gamma$
<1.5	95	FOSTER	68B HBC	0.0 $\bar{p}p$

<sup>1</sup> Using the data of BAILLON 67 on  $\bar{p}p \rightarrow K\bar{K}\pi$ .

$\Gamma(\rho^0\gamma)/\Gamma(\eta\pi\pi)$   $\Gamma_{10}/\Gamma_2$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.111±0.064</b>	AMSLER	04B CBAR	$0 \bar{p}p$

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 0.15		<sup>1</sup> BERTIN	95 OBLX	$0 \bar{p}p \rightarrow K\bar{K}\pi\pi\pi$
~ 0.8	500	<sup>1</sup> DUCH	89 ASTE	$\bar{p}p \rightarrow \pi^+\pi^-K^\pm\pi^\mp K^0$
~ 0.75		<sup>1</sup> REEVES	86 SPEC	$6.6 p\bar{p} \rightarrow KK\pi X$

<sup>1</sup> Assuming that the  $a_0(980)$  decays only into  $K\bar{K}$ .

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

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	$0 p\bar{p} \rightarrow \eta\pi^0\pi^0\pi^0$
0.19±0.04	2200	<sup>1</sup> ALDE	97B GAM4	$100 \pi^-p \rightarrow \eta\pi^0\pi^0n$
0.56±0.04±0.03		<sup>1</sup> AMSLER	95F CBAR	$0 \bar{p}p \rightarrow \pi^+\pi^-\pi^0\pi^0\eta$

<sup>1</sup> Assuming that the  $a_0(980)$  decays only into  $\eta\pi$ .

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

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	$0.0 \bar{p}p \rightarrow \eta\pi^+\pi^-\pi^+\pi^-$
0.15±0.04	9082	<sup>1</sup> MANAK	00A MPS	$18 \pi^-p \rightarrow \eta\pi^+\pi^-n$
0.70±0.12±0.20		<sup>2</sup> BAI	99 BES	$J/\psi \rightarrow \gamma\eta\pi^+\pi^-$

<sup>1</sup> Statistical error only.

<sup>2</sup> Assuming that the  $a_0(980)$  decays only into  $\eta\pi$ .



$\Gamma(\rho^0\gamma)/\Gamma(K\bar{K}\pi)$   $\Gamma_{10}/\Gamma_1$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.0152±0.0038</b>	<sup>1</sup> COFFMAN	90	MRK3 $J/\psi \rightarrow \gamma\gamma\pi^+\pi^-$
<sup>1</sup> Using $B(J/\psi \rightarrow \gamma\eta(1405) \rightarrow \gamma K\bar{K}\pi)=4.2 \times 10^{-3}$ and $B(J/\psi \rightarrow \gamma\eta(1405) \rightarrow \gamma\gamma\rho^0)=6.4 \times 10^{-5}$ and assuming that the $\gamma\rho^0$ signal does not come from the $f_1(1420)$ .			

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.81±0.04	2200	ALDE	97B	GAM4 100 $\pi^-\rho \rightarrow \eta\pi^0\pi^0n$

$\Gamma(f_0(980)\eta)/\Gamma(\eta\pi\pi)$   $\Gamma_6/\Gamma_2$

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.32±0.07	<sup>1</sup> ANISOVICH	00	SPEC 0.9–1.2 $\bar{p}p \rightarrow \eta 3\pi^0$
<sup>1</sup> Using preliminary Crystal Barrel data.			

$\Gamma(f_0(980)\pi^0 \rightarrow \pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$   $\Gamma_5/\Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>not seen</b>	<sup>1</sup> ABLIKIM	17AJ	BES3 $\psi(2S) \rightarrow \gamma\pi^+\pi^-\pi^0$
<sup>1</sup> ABLIKIM 17AJ reports $B(\psi(2S) \rightarrow \gamma\eta(1405) \rightarrow \gamma f_0(980)\pi^0 \rightarrow \gamma\pi^+\pi^-\pi^0) < 5.0 \times 10^{-7}$ .			

$\Gamma(\rho\rho)/\Gamma_{\text{total}}$   $\Gamma_8/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.58</b>	99.85	<sup>1,2</sup> AMSLER	04B	CBAR 0 $\bar{p}p$
<sup>1</sup> Assuming that the $\eta(1405)$ decays are saturated by the $\pi\pi\eta$ , $K\bar{K}\pi$ and $\rho\rho$ modes.				
<sup>2</sup> Using the data of BAILLON 67 on $\bar{p}p \rightarrow K\bar{K}\pi$ .				

$\Gamma(K^*(892)K)/\Gamma(a_0(980)\pi)$   $\Gamma_{12}/\Gamma_3$

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.084±0.024	<sup>1</sup> ADAMS	01B	B852 18 GeV $\pi^-\rho \rightarrow K^+K^-\pi^0n$
<sup>1</sup> Statistical error only.			

$\Gamma(\phi\gamma)/\Gamma(\rho^0\gamma)$   $\Gamma_{11}/\Gamma_{10}$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.77	95	<sup>1</sup> BAI	04J	BES2 $J/\psi \rightarrow \gamma\gamma K^+K^-$
<sup>1</sup> Calculated by us from $B(J/\psi \rightarrow \eta(1405)\gamma \rightarrow \phi\gamma\gamma) < 0.82 \times 10^{-4}$ and $B(J/\psi \rightarrow \eta(1405)\gamma \rightarrow \rho^0\gamma\gamma) = (1.07 \pm 0.17 \pm 0.11) \times 10^{-4}$ .				

$\eta(1405)$  REFERENCES

ABLIKIM	17AJ	PR D96 112008	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	13M	PR D87 092006	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	12E	PRL 108 182001	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	11J	PRL 107 182001	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	08E	PR D77 032005	M. Ablikim <i>et al.</i>	(BES Collab.)
AHOHE	05	PR D71 072001	R. Ahohe <i>et al.</i>	(CLEO Collab.)
AMSLER	04B	EPJ C33 23	C. AMSler <i>et al.</i>	(Crystal Barrel Collab.)
BAI	04J	PL B594 47	J.Z. Bai <i>et al.</i>	(BES Collab.)
NICHITIU	02	PL B545 261	F. Nichitiu <i>et al.</i>	(OBELIX Collab.)
ACCIARRI	01G	PL B501 1	M. Acciarri <i>et al.</i>	(L3 Collab.)
ADAMS	01B	PL B516 264	G.S. Adams <i>et al.</i>	(BNL E852 Collab.)
ANISOVICH	01	NP A690 567	A.V. Anisovich <i>et al.</i>	
ANISOVICH	00	PL B472 168	A.V. Anisovich <i>et al.</i>	
MANAK	00A	PR D62 012003	J.J. Manak <i>et al.</i>	(BNL E852 Collab.)
BAI	99	PL B446 356	J.Z. Bai <i>et al.</i>	(BES Collab.)
CICALO	99	PL B462 453	C. Cicalo <i>et al.</i>	(OBELIX Collab.)
ABELE	98E	NP B514 45	A. Abele <i>et al.</i>	(Crystal Barrel Collab.)
BAI	98C	PL B440 217	J.Z. Bai <i>et al.</i>	(BES Collab.)
ALDE	97B	PAN 60 386	D. Alde <i>et al.</i>	(GAMS Collab.)
		Translated from YAF 60 458.		
BERTIN	97	PL B400 226	A. Bertin <i>et al.</i>	(OBELIX Collab.)
AMSLER	95F	PL B358 389	C. AMSler <i>et al.</i>	(Crystal Barrel Collab.)
BERTIN	95	PL B361 187	A. Bertin <i>et al.</i>	(OBELIX Collab.)
BUGG	95	PL B353 378	D.V. Bugg <i>et al.</i>	(LOQM, PNPI, WASH)
AUGUSTIN	92	PR D46 1951	J.E. Augustin, G. Cosme	(DM2 Collab.)
BOLTON	92B	PRL 69 1328	T. Bolton <i>et al.</i>	(Mark III Collab.)
FUKUI	91C	PL B267 293	S. Fukui <i>et al.</i>	(SUGI, NAGO, KEK, KYOT+)
AUGUSTIN	90	PR D42 10	J.E. Augustin <i>et al.</i>	(DM2 Collab.)
BAI	90C	PRL 65 2507	Z. Bai <i>et al.</i>	(Mark III Collab.)
COFFMAN	90	PR D41 1410	D.M. Coffman <i>et al.</i>	(Mark III Collab.)
BISELLO	89B	PR D39 701	G. Busetto <i>et al.</i>	(DM2 Collab.)
DUCH	89	ZPHY C45 223	K.D. Duch <i>et al.</i>	(ASTERIX Collab.) JP
RATH	89	PR D40 693	M.G. Rath <i>et al.</i>	(NDAM, BRAN, BNL, CUNY+)
BIRMAN	88	PRL 61 1557	A. Birman <i>et al.</i>	(BNL, FSU, IND, MASD) JP
ANDO	86	PRL 57 1296	A. Ando <i>et al.</i>	(KEK, KYOT, NIRS, SAGA+) IJP
REEVES	86	PR D34 1960	D.F. Reeves <i>et al.</i>	(FLOR, BNL, IND+) JP
CHUNG	85	PRL 55 779	S.U. Chung <i>et al.</i>	(BNL, FLOR, IND+) JP
ALTHOFF	84E	PL 147B 487	M. Althoff <i>et al.</i>	(TASSO Collab.)
EDWARDS	83B	PRL 51 859	C. Edwards <i>et al.</i>	(CIT, HARV, PRIN+)
EDWARDS	82E	PRL 49 259	C. Edwards <i>et al.</i>	(CIT, HARV, PRIN+)
Also		PRL 50 219	C. Edwards <i>et al.</i>	(CIT, HARV, PRIN+)
SCHARRE	80	PL 97B 329	D.L. Scharre <i>et al.</i>	(SLAC, LBL)
FOSTER	68B	NP B8 174	M. Foster <i>et al.</i>	(CERN, CDEF)
BAILLON	67	NC 50A 393	P.H. Baillon <i>et al.</i>	(CERN, CDEF, IRAD)