

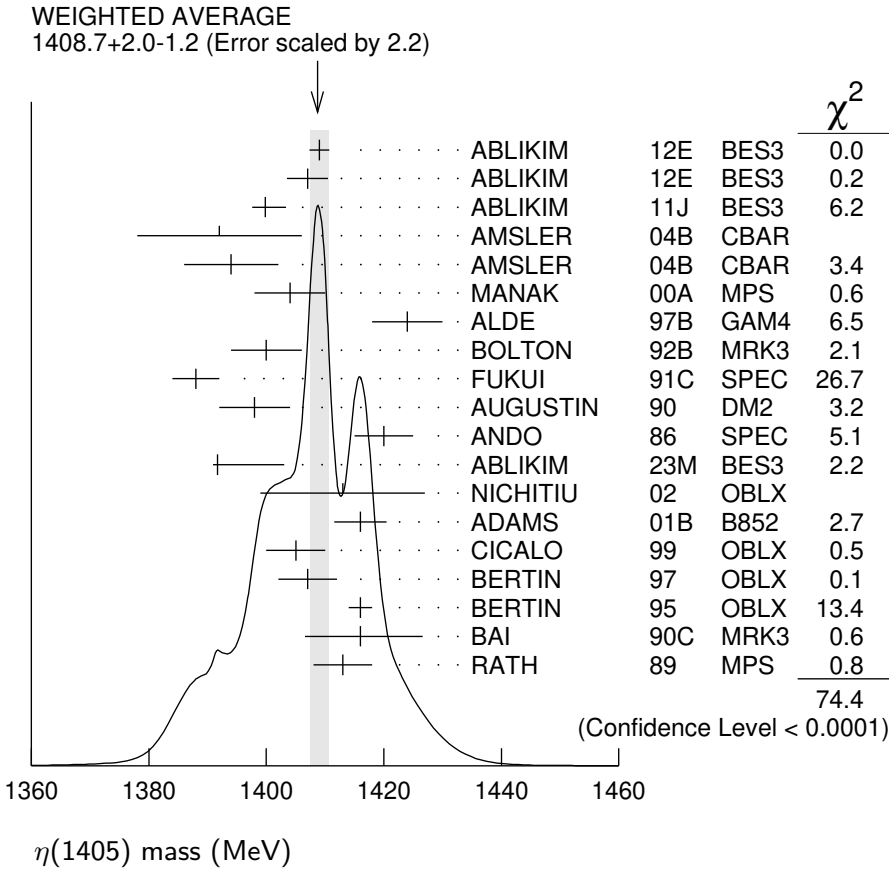
$\eta(1405)$

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

See also the $\eta(1475)$.

$\eta(1405)$ MASS

VALUE (MeV)	DOCUMENT ID
$1408.7^{+2.0}_{-1.2}$ 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.				
1405.8 ± 2.6 OUR AVERAGE		Error includes scale factor of 2.3. 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	$J/\psi \rightarrow \gamma(\pi^0\pi^0\pi^0)$
$1399.8 \pm 2.2^{+2.8}_{-0.1}$		¹ 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	$6.6 \pm 2.0k$	AMSLER	04B CBAR	$0 \bar{p}p \rightarrow \pi^+\pi^-\pi^0\pi^0\eta$
1404 ± 6	9082	MANAK	00A MPS	$18 \pi^-\pi^+ \rightarrow \eta\pi^+\pi^-n$

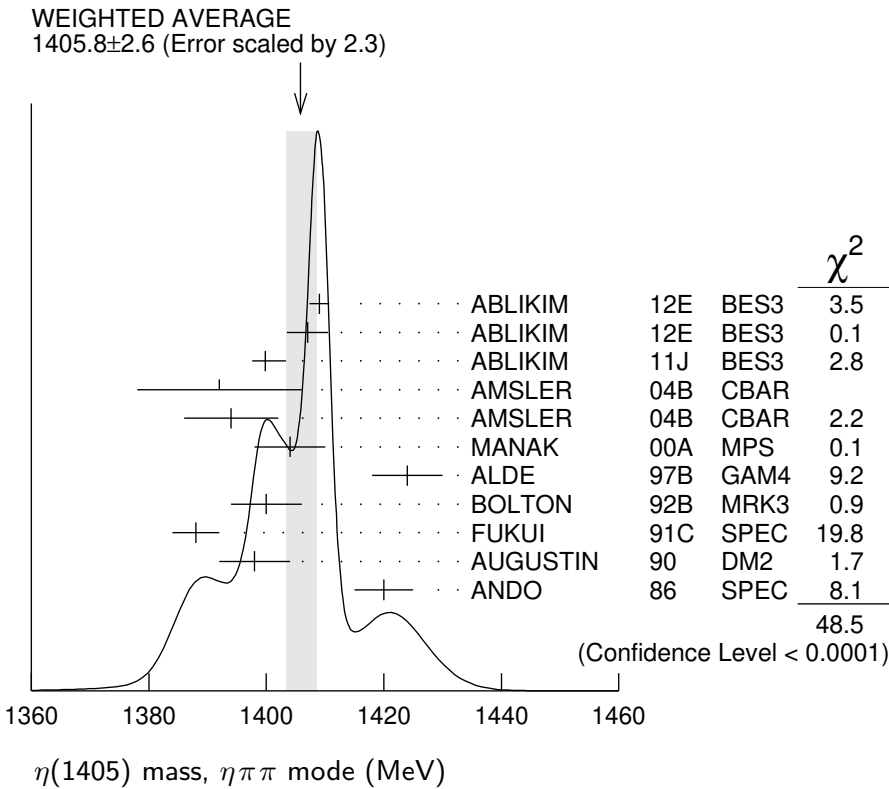
1424 ± 6	2200	ALDE	97B GAM4	100 $\pi^- p \rightarrow \eta \pi^0 \pi^0 n$
1400 ± 6		² BOLTON	92B MRK3	$J/\psi \rightarrow \gamma \eta \pi^+ \pi^-$
1388 ± 4		FUKUI	91C SPEC	8.95 $\pi^- p \rightarrow \eta \pi^+ \pi^- n$
1398 ± 6	261	³ AUGUSTIN	90 DM2	$J/\psi \rightarrow \gamma \eta \pi^+ \pi^-$
1420 ± 5		ANDO	86 SPEC	8 $\pi^- p \rightarrow \eta \pi^+ \pi^- n$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1404.0 ± 11.0	195	ABLIKIM	19BABES3	$e^+ e^- \rightarrow \psi(2S)$
1385 ± 7		BAI	99 BES	$J/\psi \rightarrow \gamma \eta \pi^+ \pi^-$
1409 ± 3		⁴ AMSLER	95F CBAR	0 $\bar{p} p \rightarrow \pi^+ \pi^- \pi^0 \pi^0 \eta$

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

² From fit to the $a_0(980) \pi^0 \pi^+$ partial wave.

³ Best fit with a single Breit Wigner.

⁴ Superseded by AMSLER 04B.



$K \bar{K} \pi$ 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.				

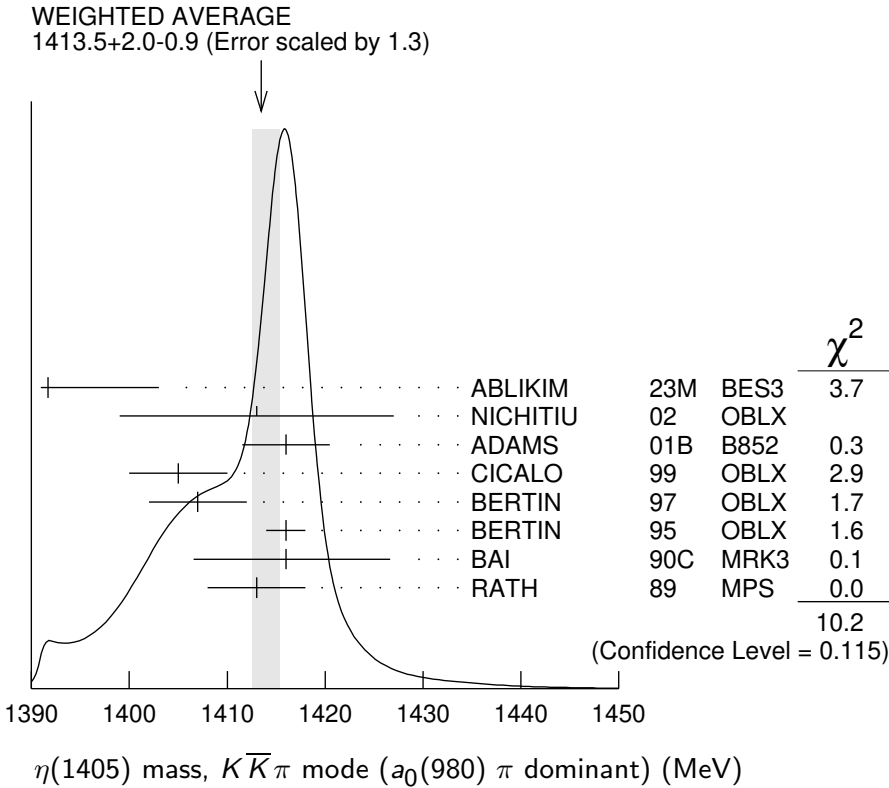
1413.5⁺_{-0.9} OUR AVERAGE Error includes scale factor of 1.3. See the ideogram below.

1391.7 ± 0.7 ⁺ _{-0.3}	126k	¹ ABLIKIM	23M	BES3	$J/\psi \rightarrow \gamma K_S^0 K_S^0 \pi^0$
1413 ± 14	3651	² NICHITIU	02	OBLX	0 $\bar{p} p \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$
1416 ± 4 ± 2	20k	ADAMS	01B	B852	18 GeV $\pi^- p \rightarrow K^+ K^- \pi^0 n$
1405 ± 5		³ CICALO	99	OBLX	0 $\bar{p} p \rightarrow K^\pm K_S^0 \pi^\mp \pi^+ \pi^-$

1407 ± 5	³ BERTIN	97	OBLX	0	$\bar{p}p \rightarrow K^\pm (K^0) \pi^\mp \pi^+ \pi^-$
1416 ± 2	³ BERTIN	95	OBLX	0	$\bar{p}p \rightarrow K \bar{K} \pi \pi \pi$
1416 ± 8 $\pm \frac{7}{5}$	700	⁴ BAI	90C	MRK3	$J/\psi \rightarrow \gamma K_S^0 K^\pm \pi^\mp$
1413 ± 5	⁴ 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 ⁵ AUGUSTIN 92 DM2 $J/\psi \rightarrow \gamma K \bar{K} \pi$
- ¹ ABLIKIM 23M reports for this state a significance from the fit much higher than 35 σ .
² Decaying dominantly directly to $K^+ K^- \pi^0$.
³ Decaying into $(K \bar{K})_S \pi$, $(K \pi)_S \bar{K}$, and $a_0(980) \pi$.
⁴ From fit to the $a_0(980) \pi 0^- +$ partial wave. Cannot rule out a $a_0(980) \pi 1^+ +$ partial wave.
⁵ Excluded from averaging because averaging would be meaningless.



$\pi\pi\gamma$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1403±17 OUR AVERAGE	Error includes scale factor of 1.8.			
1390±12	235 ± 91	AMSLER	04B CBAR	$0 \bar{p}p \rightarrow \pi^+ \pi^- \pi^+ \pi^- \eta$
1424±10±11	547	BAI	04J BES2	$J/\psi \rightarrow \gamma \gamma \pi^+ \pi^-$

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

- 1401±18 ^{1,2} AUGUSTIN 90 DM2 $J/\psi \rightarrow \pi^+ \pi^- \gamma \gamma$

- 1432± 8 ² COFFMAN 90 MRK3 $J/\psi \rightarrow \pi^+ \pi^- 2\gamma$

¹ Best fit with a single Breit Wigner.
² This peak in the $\gamma\rho$ channel may not be related to the $\eta(1405)$.

4 π MODE

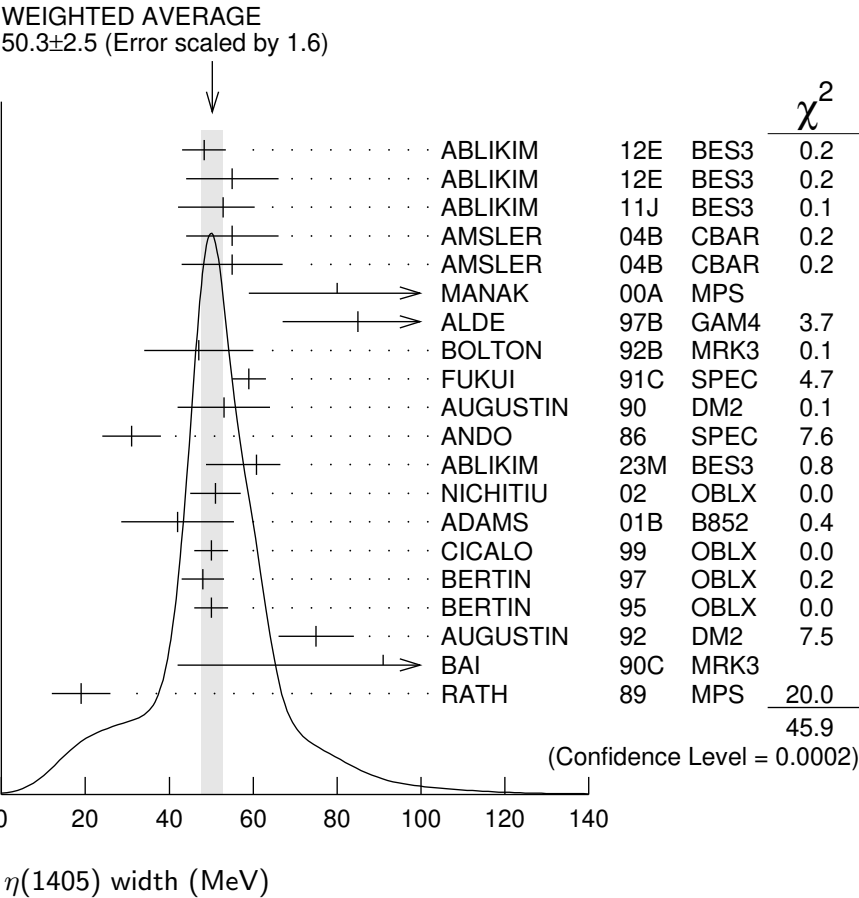
VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1420 $\pm$ 20		BUGG	95 MRK3	$J/\psi \rightarrow \gamma \pi^+ \pi^- \pi^+ \pi^-$
1489 $\pm$ 12	3270	¹ BISELLO	89B DM2	$J/\psi \rightarrow 4\pi \gamma$

¹ Estimated by us from various fits.**K $\bar{K}$ π MODE (unresolved)**

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1452.7 $\pm$ 3.3	191	^{1,2} ABLIKIM	13M BES3	$\psi(2S) \rightarrow \omega K K \pi$
1437.6 $\pm$ 3.2	249 $\pm$ 35	^{1,2} ABLIKIM	08E BES2	$J/\psi \rightarrow \omega K_S^0 K^+ \pi^- + \text{c.c.}$
1445.9 $\pm$ 5.7	62 $\pm$ 18	^{1,2} ABLIKIM	08E BES2	$J/\psi \rightarrow \omega K^+ K^- \pi^0$
1442 $\pm$ 10	410	¹ BAI	98C BES	$J/\psi \rightarrow \gamma K^+ K^- \pi^0$
1445 $\pm$ 8	693	¹ AUGUSTIN	90 DM2	$J/\psi \rightarrow \gamma K_S^0 K^\pm \pi^\mp$
1433 $\pm$ 8	296	¹ AUGUSTIN	90 DM2	$J/\psi \rightarrow \gamma K^+ K^- \pi^0$
1413 $\pm$ 8	500	¹ DUCH	89 ASTE	$\bar{p} p \rightarrow \pi^+ \pi^- K^\pm \pi^\mp K^0$
1453 $\pm$ 7	170	¹ RATH	89 MPS	$21.4 \pi^- p \rightarrow K_S^0 K_S^0 \pi^0 n$
1419 $\pm$ 1	8800	¹ BIRMAN	88 MPS	$8 \pi^- p \rightarrow K^+ \bar{K}^0 \pi^- n$
1424 $\pm$ 3	620	¹ REEVES	86 SPEC	$6.6 p \bar{p} \rightarrow K \bar{K} \pi X$
1421 $\pm$ 2		¹ CHUNG	85 SPEC	$8 \pi^- p \rightarrow K \bar{K} \pi n$
1440 $^{+20}_{-15}$	174	¹ EDWARDS	82E CBAL	$J/\psi \rightarrow \gamma K^+ K^- \pi^0$
1440 $^{+10}_{-15}$		¹ SCHARRE	80 MRK2	$J/\psi \rightarrow \gamma K_S^0 K^\pm \pi^\mp$
1425 $\pm$ 7	800	^{1,3} BAILLON	67 HBC	$0 \bar{p} p \rightarrow K \bar{K} \pi \pi \pi$

¹ These experiments identify only one pseudoscalar in the 1400–1500 range. Data could also refer to $\eta(1475)$.² Systematic uncertainty not evaluated.³ From best fit of $0^- +$ partial wave, 50% $K^*(892) K$, 50% $a_0(980) \pi$. **$\eta(1405)$ WIDTH**

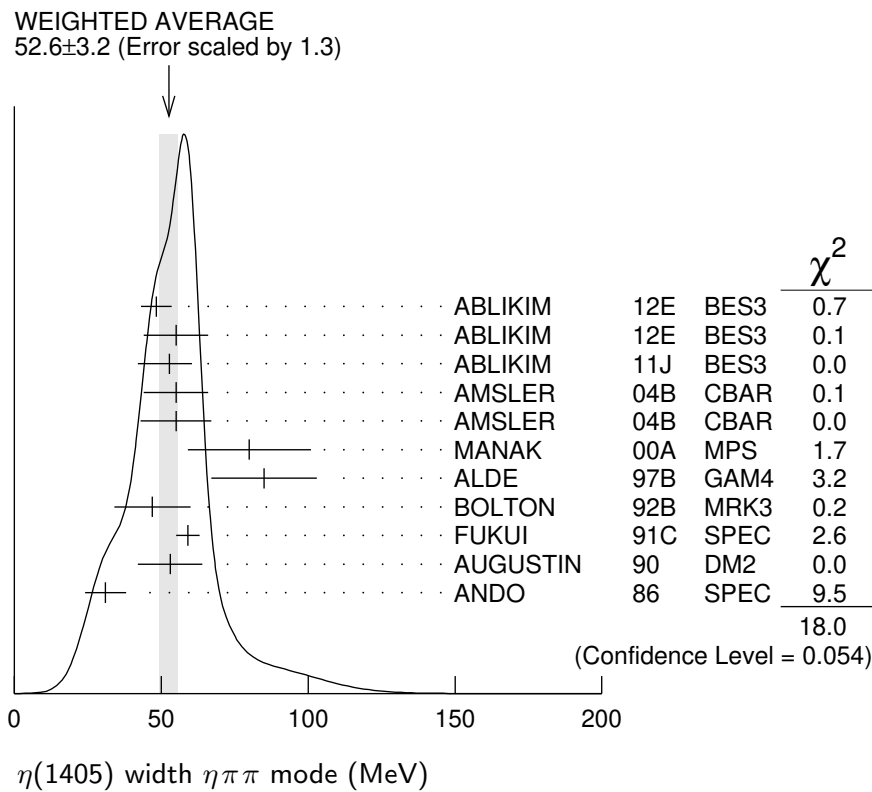
VALUE (MeV)	DOCUMENT ID
50.3 $\pm$ 2.5 OUR AVERAGE	Includes data from the 2 datablocks that follow this one. Error includes scale factor of 1.6. See the ideogram below.



$\eta\pi\pi$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
The data in this block is included in the average printed for a previous datablock.				
52.6 ± 3.2 OUR AVERAGE	Error includes scale factor of 1.3. 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 ^{+0.1} _{-7.6}	1	ABLIKIM	11J BES3	$J/\psi \rightarrow \omega(\eta\pi^+\pi^-)$
55 ± 11	900	AMSLER	04B CBAR	$0 \bar{p}p \rightarrow \pi^+\pi^-\pi^+\pi^-\eta$
55 ± 12	6.6k	AMSLER	04B CBAR	$0 \bar{p}p \rightarrow \pi^+\pi^-\pi^0\pi^0\gamma$
80 ± 21	9.0k	MANAK	00A MPS	$18 \pi^-\pi^+ \rightarrow \eta\pi^+\pi^-n$
85 ± 18	2.2k	ALDE	97B GAM4	$100 \pi^-\pi^+ \rightarrow \eta\pi^0\pi^0n$
47 ± 13	2	BOLTON	92B MRK3	$J/\psi \rightarrow \gamma\eta\pi^+\pi^-$
59 ± 4		FUKUI	91C SPEC	$8.95 \pi^-\pi^+ \rightarrow \eta\pi^+\pi^-n$
53 ± 11	3	AUGUSTIN	90 DM2	$J/\psi \rightarrow \gamma\eta\pi^+\pi^-$
31 ± 7		ANDO	86 SPEC	$8 \pi^-\pi^+ \rightarrow \eta\pi^+\pi^-n$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
79.0 ± 16.0	195	ABLIKIM	19BA BES3	$e^+e^- \rightarrow \psi(2S)$
86 ± 10	4	AMSLER	95F CBAR	$0 \bar{p}p \rightarrow \pi^+\pi^-\pi^0\pi^0\eta$

- ¹ The selected process is $J/\psi \rightarrow \omega a_0(980)\pi$.
² From fit to the $a_0(980)\pi$ 0^-+ partial wave.
³ From $\eta\pi^+\pi^-$ mass distribution - mainly $a_0(980)\pi$ - no spin-parity determination available.
⁴ Superseded by AMSLER 04B.



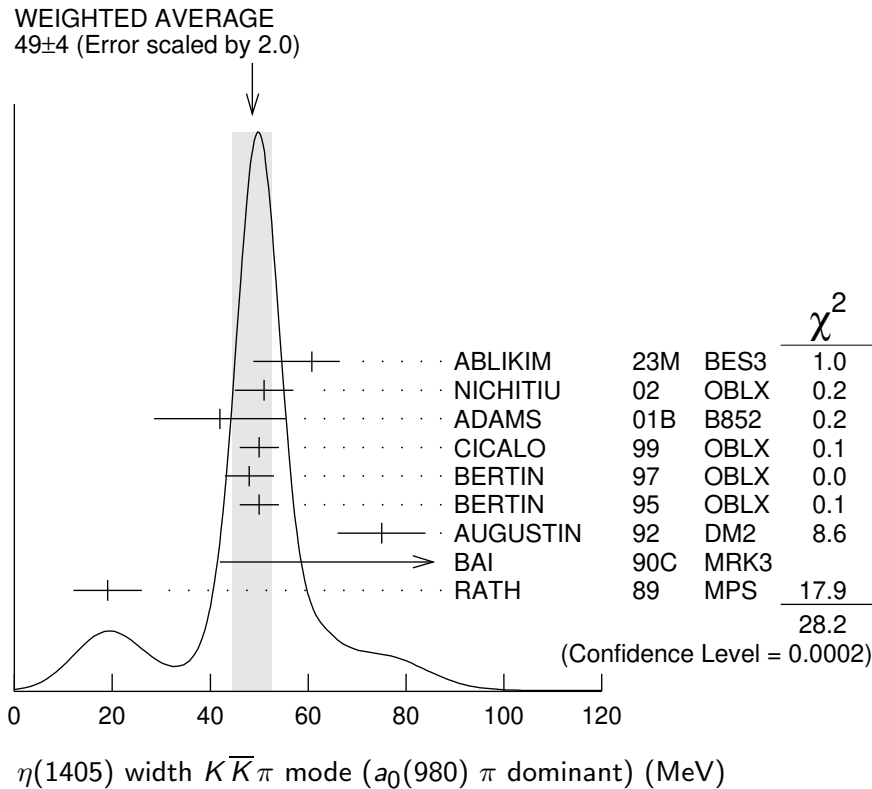
$K\bar{K}\pi$ MODE ($a_0(980)\pi$ or direct $K\bar{K}\pi$)

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
The data in this block is included in the average printed for a previous datablock.				

49 ± 4 OUR AVERAGE Error includes scale factor of 2.0. See the ideogram below.

$60.8 \pm 1.2^{+5.5}_{-12.0}$	126K	ABLIKIM	23M	BES3	$J/\psi \rightarrow \gamma K_S^0 K_S^0 \pi^0$
51 ± 6	3651	¹ NICHITIU	02	OBLX	$0 \bar{p} p \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$
42 ± 10 ± 9	20k	ADAMS	01B	B852	$18 \text{ GeV } \pi^- p \rightarrow K^+ K^- \pi^0 n$
50 ± 4		CICALO	99	OBLX	$0 \bar{p} p \rightarrow K^\pm K_S^0 \pi^\mp \pi^+ \pi^-$
48 ± 5		² BERTIN	97	OBLX	$0.0 \bar{p} p \rightarrow K^\pm (K^0) \pi^\mp \pi^+ \pi^-$
50 ± 4		² 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 $^{+67}_{-31}$ $^{+15}_{-38}$		³ BAI	90C	MRK3	$J/\psi \rightarrow \gamma K_S^0 K^\pm \pi^\mp$
19 ± 7		³ RATH	89	MPS	$21.4 \pi^- p \rightarrow n K_S^0 K_S^0 \pi^0$

- ¹Decaying dominantly directly to $K^+ K^- \pi^0$.
²Decaying into $(K \bar{K})_5 \pi$, $(K \pi)_5 \bar{K}$, and $a_0(980) \pi$.
³From 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
89 ±17 OUR AVERAGE		Error includes scale factor of 1.7.		
64 ±18	235 ± 91	AMSLER	04B CBAR	$0 \bar{p} p \rightarrow \pi^+ \pi^- \pi^+ \pi^- \gamma$
101.0 ± 8.8 ± 8.8	547	BAI	04J BES2	$J/\psi \rightarrow \gamma \gamma \pi^+ \pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
174 ±44		AUGUSTIN	90 DM2	$J/\psi \rightarrow \pi^+ \pi^- \gamma \gamma$
90 ±26		¹ COFFMAN	90 MRK3	$J/\psi \rightarrow \pi^+ \pi^- 2\gamma$

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

4π 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	¹ BISELLO	89B DM2	$J/\psi \rightarrow 4\pi \gamma$

¹Estimated 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 ± 8.2	191	^{1,2} ABLIKIM	13M BES3	$\psi(2S) \rightarrow \omega K K \pi$
48.9 ± 9.0	249 ± 35	^{1,2} ABLIKIM	08E BES2	$J/\psi \rightarrow \omega K_S^0 K^+ \pi^- + \text{c.c.}$
34.2 ± 18.5	62 ± 18	^{1,2} ABLIKIM	08E BES2	$J/\psi \rightarrow \omega K^+ K^- \pi^0$
93 ± 14	296	¹ AUGUSTIN	90 DM2	$J/\psi \rightarrow \gamma K^+ K^- \pi^0$
105 ± 10	693	¹ AUGUSTIN	90 DM2	$J/\psi \rightarrow \gamma K_S^0 K^\pm \pi^\mp$
62 ± 16	500	¹ DUCH	89 ASTE	$\bar{p}p \rightarrow K\bar{K}\pi\pi\pi$
100 ± 11	170	¹ RATH	89 MPS	$21.4 \pi^- p \rightarrow K_S^0 K_S^0 \pi^0 n$
66 ± 2	8800	¹ BIRMAN	88 MPS	$8 \pi^- p \rightarrow K^+ \bar{K}^0 \pi^- n$
60 ± 10	620	¹ REEVES	86 SPEC	$6.6 p\bar{p} \rightarrow K K \pi X$
60 ± 10		¹ CHUNG	85 SPEC	$8 \pi^- p \rightarrow K\bar{K}\pi n$
$55 \begin{smallmatrix} +20 \\ -30 \end{smallmatrix}$	174	¹ EDWARDS	82E CBAL	$J/\psi \rightarrow \gamma K^+ K^- \pi^0$
$50 \begin{smallmatrix} +30 \\ -20 \end{smallmatrix}$		¹ SCHARRE	80 MRK2	$J/\psi \rightarrow \gamma K_S^0 K^\pm \pi^\mp$
80 ± 10	800	^{1,3} BAILLON	67 HBC	$0.0 \bar{p}p \rightarrow K\bar{K}\pi\pi\pi$

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

² Systematic uncertainty not evaluated.

³ From best fit to 0^-+ partial wave, 50% $K^*(892)K$, 50% $a_0(980)\pi$.

 $\eta(1405)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)	Confidence level
Γ_1 $K\bar{K}\pi$	seen	
Γ_2 $\eta\pi\pi$	seen	
Γ_3 $a_0(980)\pi$	seen	
Γ_4 $\eta(\pi\pi)_S\text{-wave}$	seen	
Γ_5 $f_0(980)\pi^0 \rightarrow \pi^+\pi^-\pi^0$		
Γ_6 $f_0(980)\eta$	seen	
Γ_7 4π	seen	
Γ_8 $\rho\rho$	<58 %	99.85%
Γ_9 $\gamma\gamma$		
Γ_{10} $\rho^0\gamma$	seen	
Γ_{11} $\phi\gamma$		
Γ_{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	^{1,2} AHOHE	05 CLE2	$10.6 e^+e^- \rightarrow e^+e^- K_S^0 K^\pm \pi^\mp$

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

² 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
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<1.5	95	ALTHOFF	84E TASS	$e^+e^- \rightarrow e^+e^-\pi^+\pi^-\gamma$

 $\eta(1405)$ BRANCHING RATIOS
 $\Gamma(\eta\pi\pi)/\Gamma(K\bar{K}\pi)$
 Γ_2/Γ_1

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
1.09±0.48		¹ AMSLER	04B CBAR	0 $\bar{p}p \rightarrow \pi^+\pi^-\pi^+\pi^-\eta$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<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 $\bar{p}p$

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

 $\Gamma(\rho^0\gamma)/\Gamma(\eta\pi\pi)$
 Γ_{10}/Γ_2

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

 $\Gamma(a_0(980)\pi)/\Gamma(K\bar{K}\pi)$
 Γ_3/Γ_1

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

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

 $\Gamma(a_0(980)\pi)/\Gamma(\eta\pi\pi)$
 Γ_3/Γ_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	¹ ALDE	97B GAM4	100 $\pi^-p \rightarrow \eta\pi^0\pi^0n$
0.56±0.04±0.03		¹ AMSLER	95F CBAR	0 $\bar{p}p \rightarrow \pi^+\pi^-\pi^0\pi^0\eta$

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

 $\Gamma(a_0(980)\pi)/\Gamma(\eta(\pi\pi)_{\text{s-wave}})$
 Γ_3/Γ_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	¹ MANAK	00A MPS	18 $\pi^-p \rightarrow \eta\pi^+\pi^-n$
0.70±0.12±0.20		² BAI	99 BES	$J/\psi \rightarrow \gamma\eta\pi^+\pi^-$

¹ Statistical error only.

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

$\Gamma(\rho^0\gamma)/\Gamma(K\bar{K}\pi)$ Γ_{10}/Γ_1

VALUE	DOCUMENT ID	TECN	COMMENT
0.0152±0.0038	¹ COFFMAN	90	MRK3 $J/\psi \rightarrow \gamma\gamma\pi^+\pi^-$
¹ Using $B(J/\psi \rightarrow \gamma\eta(1405) \rightarrow \gamma K\bar{K}\pi) = 4.2 \times 10^{-3}$ and $B(J/\psi \rightarrow \gamma\eta(1405) \rightarrow \gamma\gamma\rho^0) = 6.4 \times 10^{-5}$.			

 $\Gamma(\gamma\gamma)/\Gamma(K\bar{K}\pi)$ Γ_9/Γ_1

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<1.78 × 10⁻³	90	¹ ABLIKIM	180	BES3 $\psi(2S) \rightarrow \pi^+\pi^-\gamma\gamma$
¹ Using results from BAI 00D.				

 $\Gamma(\eta(\pi\pi)_{S\text{-wave}})/\Gamma(\eta\pi\pi)$ Γ_4/Γ_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 $\pi^-p \rightarrow \eta\pi^0\pi^0n$

 $\Gamma(f_0(980)\eta)/\Gamma(\eta\pi\pi)$ Γ_6/Γ_2

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

 $\Gamma(f_0(980)\pi^0 \rightarrow \pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$ Γ_5/Γ

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
seen	203	¹ ABLIKIM	24i	BES3 $J/\psi \rightarrow e^+e^-\eta(1405)$
seen	743	² ABLIKIM	12E	BES3 $J/\psi \rightarrow \gamma\eta(1405)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen		³ ABLIKIM	17AJ	BES3 $\psi(2S) \rightarrow \gamma\pi^+\pi^-\pi^0$
¹ ABLIKIM 24i reports $B(J/\psi \rightarrow e^+e^-\eta(1405) \rightarrow f_0(980)\pi^0 \rightarrow \pi^+\pi^-\pi^0) = (2.04 \pm 0.20 \pm 0.08) \times 10^{-7}$.				
² ABLIKIM 12E reports $B(J/\psi \rightarrow \gamma\eta(1405) \rightarrow f_0(980)\pi^0 \rightarrow \pi^+\pi^-\pi^0) = (1.5 \pm 0.11 \pm 0.11) \times 10^{-5}$ and $B(J/\psi \rightarrow \gamma\eta(1405) \rightarrow f_0(980)\pi^0 \rightarrow \pi^0\pi^0\pi^0) = (7.10 \pm 0.82 \pm 0.72) \times 10^{-6}$.				
³ ABLIKIM 17AJ reports $B(\psi(2S) \rightarrow \gamma\eta(1405) \rightarrow \gamma f_0(980)\pi^0 \rightarrow \gamma\pi^+\pi^-\pi^0) < 5.0 \times 10^{-7}$.				

 $\Gamma(\rho\rho)/\Gamma_{\text{total}}$ Γ_8/Γ

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

 $\Gamma(K^*(892)K)/\Gamma(a_0(980)\pi)$ Γ_{12}/Γ_3

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

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

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.09 ± 0.03		¹ ABLIKIM	18i	BES3 $J/\psi \rightarrow \gamma\gamma\phi(1020)$
0.13 ± 0.04		² ABLIKIM	18i	BES3 $J/\psi \rightarrow \gamma\gamma\phi(1020)$
< 0.77	95	³ BAI	04J	BES2 $J/\psi \rightarrow \gamma\gamma K^+ K^-$

¹ Constructive interference between $X(1835)$ and $\eta(1405)/\eta(1475)$ decays to $\gamma\phi$ is assumed. Also see $\eta(1475)$. ABLIKIM 18i reports the inverse as 11.10 ± 3.5 .

² Destructive interference between $X(1835)$ and $\eta(1405)/\eta(1475)$ decays to $\gamma\phi$ is assumed. Also see $\eta(1475)$. ABLIKIM 18i reports the inverse as 7.53 ± 2.49 .

³ 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	24I	PR D109 012007	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	23M	JHEP 2303 121	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	19BA	PR D100 092003	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	18I	PR D97 051101	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	18O	PR D97 072014	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	17AJ	PR D96 112008	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	13M	PR D87 092006	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	12E	PRL 108 182001	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	11J	PRL 107 182001	M. Ablikim <i>et al.</i>	(BESIII 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>	
BAI	00D	PL B476 25	J.Z. Bai <i>et al.</i>	(BES Collab.)
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)
