

# f<sub>1</sub>(1285)

$$I^G(J^{PC}) = 0^+(1^{++})$$

## f<sub>1</sub>(1285) MASS

VALUE (MeV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1281.9 ± 0.6 OUR AVERAGE</b> Error includes scale factor of 1.6. See the ideogram below.					
1280 ± 4	95		ACCIARRI	01G L3	
1284 ± 6		1400	ALDE	97B GAM4	100 $\pi^- p \rightarrow \eta \pi^0 \pi^0 n$
1281 ± 1			BARBERIS	97B OMEG	450 $pp \rightarrow pp2(\pi^+ \pi^-)$
1281 ± 1			BARBERIS	97C OMEG	450 $pp \rightarrow ppK_S^0 K^\pm \pi^\mp$
1280 ± 2			<sup>1</sup> ANTINORI	95 OMEG	300,450 $pp \rightarrow pp2(\pi^+ \pi^-)$
1282.2 ± 1.5			LEE	94 MPS2	18 $\pi^- p \rightarrow K^+ \bar{K}^0 2\pi^- p$
1279 ± 5			FUKUI	91C SPEC	8.95 $\pi^- p \rightarrow \eta \pi^+ \pi^- n$
1278 ± 2		140	ARMSTRONG	89 OMEG	300 $pp \rightarrow K \bar{K} \pi pp$
1278 ± 2			ARMSTRONG	89G OMEG	85 $\pi^+ p \rightarrow 4\pi pp$ , $pp \rightarrow 4\pi pp$
1280.1 ± 2.1		60	RATH	89 MPS	21.4 $\pi^- p \rightarrow K_S^0 K_S^0 \pi^0 n$
1285 ± 1		4750	<sup>2</sup> BIRMAN	88 MPS	8 $\pi^- p \rightarrow K^+ \bar{K}^0 \pi^- n$
1280 ± 1		504	BITYUKOV	88 SPEC	32.5 $\pi^- p \rightarrow K^+ K^- \pi^0 n$
1280 ± 4			ANDO	86 SPEC	8 $\pi^- p \rightarrow \eta \pi^+ \pi^- n$
1277 ± 2		420	REEVES	86 SPEC	6.6 $p\bar{p} \rightarrow KK\pi X$
1285 ± 2			CHUNG	85 SPEC	8 $\pi^- p \rightarrow NK\bar{K}\pi$
1279 ± 2		604	ARMSTRONG	84 OMEG	85 $\pi^+ p \rightarrow K\bar{K}\pi pp$ , $pp \rightarrow K\bar{K}\pi pp$
1286 ± 1			CHAUVAT	84 SPEC	ISR 31.5 $pp$
1278 ± 4			EVANGELISTA	81 OMEG	12 $\pi^- p \rightarrow \eta \pi^+ \pi^- \pi^- p$
1283 ± 3		103	DIONISI	80 HBC	4 $\pi^- p \rightarrow K\bar{K}\pi n$
1282 ± 2		320	NACASCH	78 HBC	0.7, 0.76 $\bar{p}p \rightarrow K\bar{K}3\pi$
1279 ± 5		210	GRASSLER	77 HBC	16 $\pi^\mp p$
1286 ± 3		180	DUBOC	72 HBC	1.2 $\bar{p}p \rightarrow 2K4\pi$
1283 ± 5			DAHL	67 HBC	1.6–4.2 $\pi^- p$

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

1281.9 ± 0.5		<sup>3</sup> SOSA	99	SPEC	$pp \rightarrow p_{\text{slow}} (K_S^0 K^+ \pi^-)$
					$p_{\text{fast}}$
1282.8 ± 0.6		<sup>3</sup> SOSA	99	SPEC	$pp \rightarrow p_{\text{slow}} (K_S^0 K^- \pi^+)$
					$p_{\text{fast}}$
1270 ± 10		AMELIN	95	VES	37 $\pi^- N \rightarrow \pi^- \pi^+ \pi^- \gamma N$
1280 ± 2		ABATZIS	94	OMEG	450 $pp \rightarrow pp2(\pi^+ \pi^-)$
1282 ± 4		ARMSTRONG	93C	E760	$\bar{p}p \rightarrow \pi^0 \eta \eta \rightarrow 6\gamma$
1270 ± 6 ± 10		ARMSTRONG	92C	OMEG	300 $pp \rightarrow pp\pi^+ \pi^- \gamma$
1264 ± 8		AUGUSTIN	90	DM2	$J/\psi \rightarrow \gamma \eta \pi^+ \pi^-$
1281 ± 1		ARMSTRONG	89E	OMEG	300 $pp \rightarrow pp2(\pi^+ \pi^-)$
1279 ± 6 ± 10	16	BECKER	87	MRK3	$e^+ e^- \rightarrow \phi K \bar{K} \pi$
1286 ± 9		GIDAL	87	MRK2	$e^+ e^- \rightarrow e^+ e^- \eta \pi^+ \pi^-$
1287 ± 5	353	BITYUKOV	84B	SPEC	32 $\pi^- p \rightarrow K^+ K^- \pi^0 n$
~ 1279		<sup>4</sup> TORNQVIST	82B	RVUE	
1275 ± 6	31	BROMBERG	80	SPEC	100 $\pi^- p \rightarrow K \bar{K} \pi X$
1288 ± 9	200	GURTU	79	HBC	4.2 $K^- p \rightarrow n \eta 2\pi$
~ 1275.0	46	<sup>5</sup> STANTON	79	CNTR	8.5 $\pi^- p \rightarrow n 2\gamma 2\pi$
1271 ± 10	34	CORDEN	78	OMEG	12-15 $\pi^- p \rightarrow K^+ K^- \pi n$
1295 ± 12	85	CORDEN	78	OMEG	12-15 $\pi^- p \rightarrow n 5\pi$
1292 ± 10	150	DEFOIX	72	HBC	0.7 $\bar{p}p \rightarrow 7\pi$
1280 ± 3	500	<sup>6</sup> THUN	72	MMS	13.4 $\pi^- p$
1303 ± 8		BARADIN...	71	HBC	8 $\pi^+ p \rightarrow p 6\pi$
1283 ± 6		BOESEBECK	71	HBC	16.0 $\pi p \rightarrow p 5\pi$
1270 ± 10		CAMPBELL	69	DBC	2.7 $\pi^+ d$
1285 ± 7		LORSTAD	69	HBC	0.7 $\bar{p}p$ , 4,5-body
1290 ± 7		D'ANDLAU	68	HBC	1.2 $\bar{p}p$ , 5-6 body

<sup>1</sup> Supersedes ABATZIS 94, ARMSTRONG 89E.

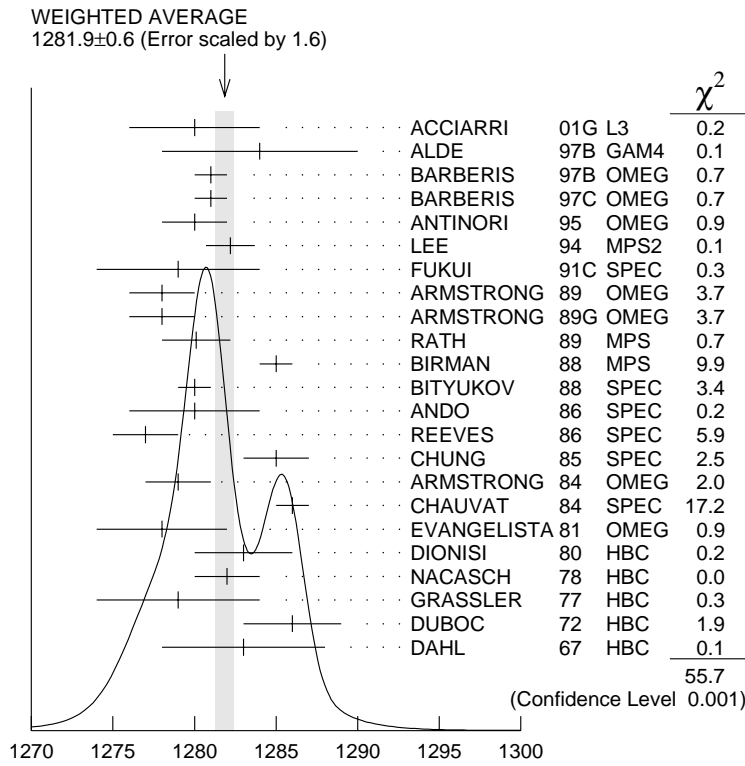
<sup>2</sup> From partial wave analysis of  $K^+ \bar{K}^0 \pi^-$  system.

<sup>3</sup> No systematic error given.

<sup>4</sup> From a unitarized quark-model calculation.

<sup>5</sup> From phase shift analysis of  $\eta \pi^+ \pi^-$  system.

<sup>6</sup> Seen in the missing mass spectrum.



$f_1(1285)$  mass (MeV)

### $f_1(1285)$ WIDTH

Only experiments giving width error less than 20 MeV are kept for averaging.

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>24.0 ± 1.2 OUR AVERAGE</b>		Error includes scale factor of 1.4. See the ideogram below.		
55 ± 18	1400	ALDE	97B GAM4	100 $\pi^- p \rightarrow \eta \pi^0 \pi^0 n$
24 ± 3		BARBERIS	97B OMEG	450 $pp \rightarrow pp2(\pi^+ \pi^-)$
20 ± 2		BARBERIS	97C OMEG	450 $pp \rightarrow ppK_S^0 K^\pm \pi^\mp$
36 ± 5		<sup>7</sup> ANTINORI	95 OMEG	300,450 $pp \rightarrow pp2(\pi^+ \pi^-)$
29.0 ± 4.1		LEE	94 MPS2	18 $\pi^- p \rightarrow K^+ \bar{K}^0 2\pi^- p$
25 ± 4	140	ARMSTRONG	89 OMEG	300 $pp \rightarrow K \bar{K} \pi pp$
22 ± 2	4750	<sup>8</sup> BIRMAN	88 MPS	8 $\pi^- p \rightarrow K^+ \bar{K}^0 \pi^- n$
25 ± 4	504	BITYUKOV	88 SPEC	32.5 $\pi^- p \rightarrow K^+ K^- \pi^0 n$

19 ± 5		ANDO	86	SPEC	8	$\pi^- p \rightarrow \eta \pi^+ \pi^- n$
32 ± 8	420	REEVES	86	SPEC	6.6	$p \bar{p} \rightarrow K K \pi X$
22 ± 2		CHUNG	85	SPEC	8	$\pi^- p \rightarrow N K \bar{K} \pi$
32 ± 3	604	ARMSTRONG	84	OMEG	85	$\pi^+ p \rightarrow K \bar{K} \pi \pi p,$ $pp \rightarrow K \bar{K} \pi pp$
24 ± 3		CHAUVAT	84	SPEC	ISR 31.5	$pp$
29 ± 10	103	DIONISI	80	HBC	4	$\pi^- p \rightarrow K \bar{K} \pi n$
28.3 ± 6.7	320	NACASCH	78	HBC	0.7, 0.76	$\bar{p} p \rightarrow K \bar{K} 3\pi$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●						
18.2 ± 1.2		<sup>9</sup> SOSA	99	SPEC		$pp \rightarrow p_{\text{slow}}$ $(K_S^0 K^+ \pi^-) p_{\text{fast}}$
19.4 ± 1.5		<sup>9</sup> SOSA	99	SPEC		$pp \rightarrow p_{\text{slow}}$ $(K_S^0 K^- \pi^+) p_{\text{fast}}$
40 ± 5		ABATZIS	94	OMEG	450	$pp \rightarrow$ $pp 2(\pi^+ \pi^-)$
44 ± 20		AUGUSTIN	90	DM2		$J/\psi \rightarrow \gamma \eta \pi^+ \pi^-$
31 ± 5		ARMSTRONG	89E	OMEG	300	$pp \rightarrow$ $pp 2(\pi^+ \pi^-)$
41 ± 12		ARMSTRONG	89G	OMEG	85	$\pi^+ p \rightarrow 4\pi \pi p,$ $pp \rightarrow 4\pi pp$
17.9 ± 10.9	60	RATH	89	MPS	21.4	$\pi^- p \rightarrow$ $K_S^0 K_S^0 \pi^0 n$
14 <sup>+20</sup> / <sub>-14</sub> ± 10	16	BECKER	87	MRK3		$e^+ e^- \rightarrow \phi K \bar{K} \pi$
26 ± 12		EVANGELISTA	81	OMEG	12	$\pi^- p \rightarrow$ $\eta \pi^+ \pi^- \pi^- p$
25 ± 15	200	GURTU	79	HBC	4.2	$K^- p \rightarrow n \eta 2\pi$
~ 10		<sup>10</sup> STANTON	79	CNTR	8.5	$\pi^- p \rightarrow n 2\gamma 2\pi$
24 ± 18	210	GRASSLER	77	HBC	16	$\pi^\mp p$
28 ± 5	150	<sup>11</sup> DEFOIX	72	HBC	0.7	$\bar{p} p \rightarrow 7\pi$
46 ± 9	180	<sup>11</sup> DUBOC	72	HBC	1.2	$\bar{p} p \rightarrow 2K 4\pi$
37 ± 5	500	<sup>12</sup> THUN	72	MMS	13.4	$\pi^- p$
10 ± 10		BOESEBECK	71	HBC	16.0	$\pi p \rightarrow p 5\pi$
30 ± 15		CAMPBELL	69	DBC	2.7	$\pi^+ d$
60 ± 15		<sup>11</sup> LORSTAD	69	HBC	0.7	$\bar{p} p, 4,5\text{-body}$
35 ± 10		<sup>11</sup> DAHL	67	HBC	1.6–4.2	$\pi^- p$

<sup>7</sup> Supersedes ABATZIS 94, ARMSTRONG 89E.

<sup>8</sup> From partial wave analysis of  $K^+ \bar{K}^0 \pi^-$  system.

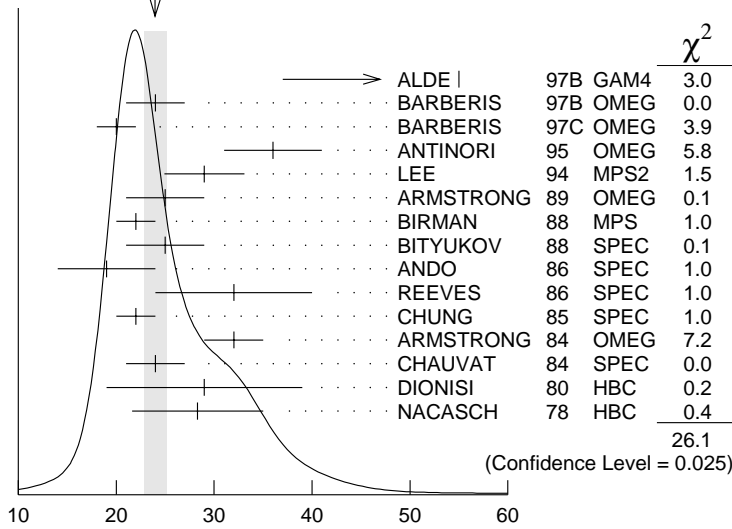
<sup>9</sup> No systematic error given.

<sup>10</sup> From phase shift analysis of  $\eta \pi^+ \pi^-$  system.

<sup>11</sup> Resolution is not unfolded.

<sup>12</sup> Seen in the missing mass spectrum.

WEIGHTED AVERAGE  
 $24.0 \pm 1.2$  (Error scaled by 1.4)



$f_1(1285)$  width (MeV)

### $f_1(1285)$ DECAY MODES

Mode	Fraction ( $\Gamma_i/\Gamma$ )	Scale factor/ Confidence level
$\Gamma_1$ $4\pi$	$(33.1^{+2.1}_{-1.8})\%$	S=1.3
$\Gamma_2$ $\pi^0\pi^0\pi^+\pi^-$	$(22.0^{+1.4}_{-1.2})\%$	S=1.3
$\Gamma_3$ $2\pi^+2\pi^-$	$(11.0^{+0.7}_{-0.6})\%$	S=1.3
$\Gamma_4$ $\rho^0\pi^+\pi^-$	$(11.0^{+0.7}_{-0.6})\%$	S=1.3
$\Gamma_5$ $\rho^0\rho^0$	seen	
$\Gamma_6$ $4\pi^0$	$< 7 \times 10^{-4}$	CL=90%
$\Gamma_7$ $\eta\pi\pi$	$(52 \pm 16)\%$	
$\Gamma_8$ $a_0(980)\pi$ [ignoring $a_0(980) \rightarrow K\bar{K}$ ]	$(36 \pm 7)\%$	
$\Gamma_9$ $\eta\pi\pi$ [excluding $a_0(980)\pi$ ]	$(16 \pm 7)\%$	
$\Gamma_{10}$ $K\bar{K}\pi$	$(9.0 \pm 0.4)\%$	S=1.1
$\Gamma_{11}$ $K\bar{K}^*(892)$	not seen	
$\Gamma_{12}$ $\gamma\rho^0$	$(5.5 \pm 1.3)\%$	S=2.8
$\Gamma_{13}$ $\phi\gamma$	$(7.4 \pm 2.6) \times 10^{-4}$	
$\Gamma_{14}$ $\gamma\gamma^*$		
$\Gamma_{15}$ $\gamma\gamma$		

## CONSTRAINED FIT INFORMATION

An overall fit to 7 branching ratios uses 16 measurements and one constraint to determine 5 parameters. The overall fit has a  $\chi^2 = 24.7$  for 12 degrees of freedom.

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

$x_8$	-17			
$x_9$	-8	-95		
$x_{10}$	46	-9	-4	
$x_{12}$	-36	-4	-2	-34
	$x_1$	$x_8$	$x_9$	$x_{10}$

### $f_1(1285) \Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

$\Gamma(\eta\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$		$\Gamma_7\Gamma_{15}/\Gamma = (\Gamma_8+\Gamma_9)\Gamma_{15}/\Gamma$		
VALUE (keV)	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.62</b>	95	GIDAL	87 MRK2	$e^+e^- \rightarrow e^+e^-\eta\pi^+\pi^-$

$\Gamma(\eta\pi\pi) \times \Gamma(\gamma\gamma^*)/\Gamma_{\text{total}}$		$\Gamma_7\Gamma_{14}/\Gamma = (\Gamma_8+\Gamma_9)\Gamma_{14}/\Gamma$		
VALUE (keV)	EVT%	DOCUMENT ID	TECN	COMMENT
<b>1.4 ± 0.4 OUR AVERAGE</b>	Error includes scale factor of 1.4.			
1.18 ± 0.25 ± 0.20	26	<sup>13,14</sup> AIHARA	88B TPC	$e^+e^- \rightarrow e^+e^-\eta\pi^+\pi^-$
2.30 ± 0.61 ± 0.42		<sup>13,15</sup> GIDAL	87 MRK2	$e^+e^- \rightarrow e^+e^-\eta\pi^+\pi^-$

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

1.8 ± 0.3 ± 0.3	420	<sup>16</sup> ACHARD	02B L3	183–209 $e^+e^- \rightarrow e^+e^-\eta\pi^+\pi^-$
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<sup>13</sup> Assuming a  $\rho$ -pole form factor.

<sup>14</sup> Published value multiplied by  $\eta\pi\pi$  branching ratio 0.49.

<sup>15</sup> Published value divided by 2 and multiplied by the  $\eta\pi\pi$  branching ratio 0.49.

<sup>16</sup> Published value multiplied by the  $\eta\pi\pi$  branching ratio 0.52.

### $f_1(1285) \text{ BRANCHING RATIOS}$

$\Gamma(K\bar{K}\pi)/\Gamma(4\pi)$		$\Gamma_{10}/\Gamma_1$		
VALUE		DOCUMENT ID	TECN	COMMENT
<b>0.271 ± 0.016 OUR FIT</b>	Error includes scale factor of 1.3.			
<b>0.271 ± 0.016 OUR AVERAGE</b>	Error includes scale factor of 1.2.			
0.265 ± 0.014		<sup>17</sup> BARBERIS	97C OMEG	450 $pp \rightarrow ppK_S^0 K^\pm \pi^\mp$
0.28 ± 0.05		<sup>18</sup> ARMSTRONG	89E OMEG	300 $pp \rightarrow pp f_1(1285)$
0.37 ± 0.03 ± 0.05		<sup>19</sup> ARMSTRONG	89G OMEG	85 $\pi p \rightarrow 4\pi X$

<sup>17</sup> Using  $2(\pi^+\pi^-)$  data from BARBERIS 97B.

<sup>18</sup> Assuming  $\rho\pi\pi$  and  $a_0(980)\pi$  intermediate states.

<sup>19</sup>  $4\pi$  consistent with being entirely  $\rho\pi\pi$ .

$$\Gamma(\pi^0\pi^0\pi^+\pi^-)/\Gamma_{\text{total}} \qquad \Gamma_2/\Gamma = \frac{2}{3}\Gamma_1/\Gamma$$

VALUE DOCUMENT ID  
**0.220<sup>+0.014</sup><sub>-0.012</sub> OUR FIT** Error includes scale factor of 1.3.

$$\Gamma(2\pi^+2\pi^-)/\Gamma_{\text{total}} \qquad \Gamma_3/\Gamma = \frac{1}{3}\Gamma_1/\Gamma$$

VALUE DOCUMENT ID  
**0.110<sup>+0.007</sup><sub>-0.006</sub> OUR FIT** Error includes scale factor of 1.3.

$$\Gamma(\rho^0\pi^+\pi^-)/\Gamma_{\text{total}} \qquad \Gamma_4/\Gamma = \frac{1}{3}\Gamma_1/\Gamma$$

VALUE DOCUMENT ID  
**0.110<sup>+0.007</sup><sub>-0.006</sub> OUR FIT** Error includes scale factor of 1.3.

$$\Gamma(\rho^0\rho^0)/\Gamma_{\text{total}} \qquad \Gamma_5/\Gamma$$

VALUE DOCUMENT ID COMMENT  
 ••• We do not use the following data for averages, fits, limits, etc. •••  
 seen BARBERIS 00C 450  $p\rho \rightarrow \rho_f 4\pi p_S$

$$\Gamma(K\bar{K}\pi)/\Gamma(\eta\pi\pi) \qquad \Gamma_{10}/\Gamma_7 = \Gamma_{10}/(\Gamma_8+\Gamma_9)$$

VALUE DOCUMENT ID TECN COMMENT  
**0.171 $\pm$ 0.013 OUR FIT** Error includes scale factor of 1.1.  
**0.170 $\pm$ 0.012 OUR AVERAGE**  
 0.166 $\pm$ 0.01  $\pm$ 0.008 BARBERIS 98C OMEG 450  $p\rho \rightarrow \rho_f f_1(1285) p_S$   
 0.42  $\pm$ 0.15 GURTU 79 HBC 4.2  $K^- p$   
 0.5  $\pm$ 0.2 <sup>20</sup> CORDEN 78 OMEG 12–15  $\pi^- p$   
 0.20  $\pm$ 0.08 <sup>21</sup> DEFOIX 72 HBC 0.7  $\bar{p}p \rightarrow 7\pi$   
 0.16  $\pm$ 0.08 CAMPBELL 69 DBC 2.7  $\pi^+ d$

<sup>20</sup> CORDEN 78 assumes low-mass  $\eta\pi\pi$  region is dominantly  $1^{++}$ . See BARBERIS 98C and MANAK 00A for discussion.

<sup>21</sup>  $K\bar{K}$  system characterized by the  $l = 1$  threshold enhancement. (See under  $a_0(980)$ ).

$$\Gamma(a_0(980)\pi \text{ [ignoring } a_0(980) \rightarrow K\bar{K}])/\Gamma(\eta\pi\pi) \qquad \Gamma_8/\Gamma_7 = \Gamma_8/(\Gamma_8+\Gamma_9)$$

VALUE CL% EVTS DOCUMENT ID TECN COMMENT  
**0.69 $\pm$ 0.13 OUR FIT**  
**0.69<sup>+0.13</sup><sub>-0.12</sub> OUR AVERAGE**  
 0.72 $\pm$ 0.15 GURTU 79 HBC 4.2  $K^- p$   
 0.6 <sup>+0.3</sup><sub>-0.2</sub> CORDEN 78 OMEG 12–15  $\pi^- p$

••• We do not use the following data for averages, fits, limits, etc. •••  
 >0.69 95 318 ACHARD 02B L3 183–209  $e^+e^- \rightarrow e^+e^-\eta\pi^+\pi^-$   
 0.28 $\pm$ 0.07 1400 ALDE 97B GAM4 100  $\pi^- p \rightarrow \eta\pi^0\pi^0 n$   
 1.0  $\pm$ 0.3 GRASSLER 77 HBC 16  $\pi^\mp p$

$\Gamma(4\pi)/\Gamma(\eta\pi\pi)$

$\Gamma_1/\Gamma_7 = \Gamma_1/(\Gamma_8+\Gamma_9)$

VALUE DOCUMENT ID TECN COMMENT

**0.63±0.06 OUR FIT** Error includes scale factor of 1.2.

**0.41±0.14 OUR AVERAGE**

0.37±0.11±0.11 BOLTON 92 MRK3  $J/\psi \rightarrow \gamma f_1(1285)$

0.64±0.40 GURTU 79 HBC  $4.2 K^- p$

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

0.93±0.30 <sup>22</sup> GRASSLER 77 HBC  $16 \pi^\mp p$

<sup>22</sup> Assuming  $\rho\pi\pi$  and  $a_0(980)\pi$  intermediate states.

$\Gamma(K\bar{K}^*(892))/\Gamma_{\text{total}}$

$\Gamma_{11}/\Gamma$

VALUE DOCUMENT ID TECN COMMENT

**not seen** NACASCH 78 HBC  $0.7, 0.76 \bar{p}p \rightarrow K\bar{K}^*3\pi$

$\Gamma(\rho^0\pi^+\pi^-)/\Gamma(2\pi^+2\pi^-)$

$\Gamma_4/\Gamma_3$

VALUE DOCUMENT ID TECN COMMENT

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

1.0±0.4 GRASSLER 77 HBC  $16 \text{ GeV } \pi^\pm p$

$\Gamma(4\pi^0)/\Gamma_{\text{total}}$

$\Gamma_6/\Gamma$

VALUE (units  $10^{-4}$ ) CL% DOCUMENT ID TECN COMMENT

**<7** 90 ALDE 87 GAM4  $100 \pi^- p \rightarrow 4\pi^0 n$

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

$\Gamma_{13}/\Gamma_{10}$

VALUE (units  $10^{-2}$ ) CL% EVTS DOCUMENT ID TECN COMMENT

**0.82±0.21±0.20** 19 BITYUKOV 88 SPEC  $32.5 \pi^- p \rightarrow K^+ K^- \pi^0 n$

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

<0.50 95 BARBERIS 98C OMEG  $450 p p \rightarrow \rho_f f_1(1285) p_S$

<0.93 95 AMELIN 95 VES  $37 \pi^- N \rightarrow \pi^- \pi^+ \pi^- \gamma N$

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

$\Gamma_{12}/\Gamma_{10}$

VALUE CL% DOCUMENT ID TECN COMMENT

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

>0.035 90 <sup>23</sup> COFFMAN 90 MRK3  $J/\psi \rightarrow \gamma\gamma\pi^+\pi^-$

<sup>23</sup> Using  $B(J/\psi \rightarrow \gamma f_1(1285) \rightarrow \gamma\gamma\rho^0) = 0.25 \times 10^{-4}$  and  $B(J/\psi \rightarrow \gamma f_1(1285) \rightarrow \gamma K\bar{K}\pi) = < 0.72 \times 10^{-3}$ .

$\Gamma(\gamma\rho^0)/\Gamma(2\pi^+2\pi^-)$

$\Gamma_{12}/\Gamma_3 = \Gamma_{12}/\frac{1}{3}\Gamma_1$

VALUE DOCUMENT ID TECN COMMENT

**0.50±0.13 OUR FIT** Error includes scale factor of 2.5.

**0.45±0.18** <sup>24</sup> COFFMAN 90 MRK3  $J/\psi \rightarrow \gamma\gamma\pi^+\pi^-$

<sup>24</sup> Using  $B(J/\psi \rightarrow \gamma f_1(1285) \rightarrow \gamma\gamma\rho^0) = 0.25 \times 10^{-4}$  and  $B(J/\psi \rightarrow \gamma f_1(1285) \rightarrow \gamma 2\pi^+ 2\pi^-) = 0.55 \times 10^{-4}$  given by MIR 88.



$\Gamma(\gamma\rho^0)/\Gamma_{\text{total}}$	CL%	DOCUMENT ID	TECN	COMMENT	$\Gamma_{12}/\Gamma$
<b>0.055±0.013 OUR FIT</b>				Error includes scale factor of 2.8.	
<b>0.028±0.007±0.006</b>		AMELIN	95 VES	$37 \pi^- N \rightarrow \pi^- \pi^+ \pi^- \gamma N$	

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

<0.05	95	BITYUKOV	91B SPEC	$32 \pi^- p \rightarrow \pi^+ \pi^- \gamma n$	
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$\Gamma(\eta\pi\pi)/\Gamma(\gamma\rho^0)$	DOCUMENT ID	TECN	COMMENT	$\Gamma_7/\Gamma_{12} = (\Gamma_8 + \Gamma_9)/\Gamma_{12}$
<b>9.5±2.0 OUR FIT</b>				Error includes scale factor of 2.5.
<b>7.9±0.9 OUR AVERAGE</b>				
10.0±1.0±2.0	BARBERIS	98C OMEG	450 $pp \rightarrow p_f f_1(1285) p_s$	
7.5±1.0	<sup>25</sup> ARMSTRONG	92C OMEG	300 $pp \rightarrow pp\pi^+\pi^-\gamma, pp\eta\pi^+\pi^-$	

<sup>25</sup> Published value multiplied by 1.5.

### $f_1(1285)$ REFERENCES

ACHARD	02B	PL B526 269	P. Achard <i>et al.</i>	(L3 Collab.)
ACCIARRI	01G	PL B501 1	M. Acciarri <i>et al.</i>	(L3 Collab.)
BARBERIS	00C	PL B471 440	D. Barberis <i>et al.</i>	(WA 102 Collab.)
MANAK	00A	PR D62 012003	J.J. Manak <i>et al.</i>	
SOSA	99	PRL 83 913	M. Sosa <i>et al.</i>	
BARBERIS	98C	PL B440 225	D. Barberis <i>et al.</i>	(WA 102 Collab.)
ALDE	97B	PAN 60 386	D. Alde <i>et al.</i>	(GAMS Collab.)
		Translated from YAF 60	458.	
BARBERIS	97B	PL B413 217	D. Barberis <i>et al.</i>	(WA 102 Collab.)
BARBERIS	97C	PL B413 225	D. Barberis <i>et al.</i>	(WA 102 Collab.)
AMELIN	95	ZPHY C66 71	D.V. Amelin <i>et al.</i>	(VES Collab.)
ANTINORI	95	PL B353 589	F. Antinori <i>et al.</i>	(ATHU, BARI, BIRM+)
ABATZIS	94	PL B324 509	S. Abatzis <i>et al.</i>	(ATHU, BARI, BIRM+)
LEE	94	PL B323 227	J.H. Lee <i>et al.</i>	(BNL, IND, KYUN, MASD+)
ARMSTRONG	93C	PL B307 394	T.A. Armstrong <i>et al.</i>	(FNAL, FERR, GENO+)
ARMSTRONG	92C	ZPHY C54 371	T.A. Armstrong <i>et al.</i>	(ATHU, BARI, BIRM+)
BOLTON	92	PL B278 495	T. Bolton <i>et al.</i>	(Mark III Collab.)
BITYUKOV	91B	SJNP 54 318	S.I. Bitjukov <i>et al.</i>	(SERP)
		Translated from YAF 54	529.	
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.)
COFFMAN	90	PR D41 1410	D.M. Coffman <i>et al.</i>	(Mark III Collab.)
ARMSTRONG	89	PL B221 216	T.A. Armstrong <i>et al.</i>	(CERN, CDEF, BIRM+) JPC
ARMSTRONG	89E	PL B228 536	T.A. Armstrong, M. Benayoun	(ATHU, BARI, BIRM+)
ARMSTRONG	89G	ZPHY C43 55	T.A. Armstrong <i>et al.</i>	(CERN, BIRM, BARI+)
RATH	89	PR D40 693	M.G. Rath <i>et al.</i>	(NDAM, BRAN, BNL, CUNY+)
AIHARA	88B	PL B209 107	H. Aihara <i>et al.</i>	(TPC-2 $\gamma$ Collab.)
BIRMAN	88	PRL 61 1557	A. Birman <i>et al.</i>	(BNL, FSU, IND, MASD) JP
BITYUKOV	88	PL B203 327	S.I. Bitjukov <i>et al.</i>	(SERP)
MIR	88	Photon-Photon 88, 126	R. Mir	(Mark III Collab.)
		Conference		
ALDE	87	PL B198 286	D.M. Alde <i>et al.</i>	(LANL, BRUX, SERP, LAPP)
BECKER	87	PRL 59 186	J.J. Becker <i>et al.</i>	(Mark III Collab.)
GIDAL	87	PRL 59 2012	G. Gidal <i>et al.</i>	(LBL, SLAC, HARV)
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
ARMSTRONG	84	PL 146B 273	T.A. Armstrong <i>et al.</i>	(ATHU, BARI, BIRM+) JP
BITYUKOV	84B	PL 144B 133	S.I. Bitjukov <i>et al.</i>	(SERP)
CHAUVAT	84	PL 148B 382	P. Chauvat <i>et al.</i>	(CERN, CLER, UCLA+)
TORNQVIST	82B	NP B203 268	N.A. Tornqvist	(HELS)

EVANGELISTA	81	NP B178 197	C. Evangelista <i>et al.</i>	(BARI, BONN, CERN+)
BROMBERG	80	PR D22 1513	C.M. Bromberg <i>et al.</i>	(CIT, FNAL, ILLC+)
DIONISI	80	NP B169 1	C. Dionisi <i>et al.</i>	(CERN, MADR, CDEF+)
GURTU	79	NP B151 181	A. Gurtu <i>et al.</i>	(CERN, ZEEM, NIJM, OXF)
STANTON	79	PRL 42 346	N.R. Stanton <i>et al.</i>	(OSU, CARL, MCGI+) JP
CORDEN	78	NP B144 253	M.J. Corden <i>et al.</i>	(BIRM, RHEL, TELA+) JP
NACASCH	78	NP B135 203	R. Nacasch <i>et al.</i>	(PARIS, MADR, CERN)
GRASSLER	77	NP B121 189	H. Grassler <i>et al.</i>	(AACH3, BERL, BONN+)
DEFOIX	72	NP B44 125	C. Defoix <i>et al.</i>	(CDEF, CERN)
DUBOC	72	NP B46 429	J. Duboc <i>et al.</i>	(PARIS, LIVP)
THUN	72	PRL 28 1733	R. Thun <i>et al.</i>	(STON, NEAS)
BARADIN-...	71	PR D4 2711	M. Bardadin-Otwinowska <i>et al.</i>	(WARS)
BOESEBECK	71	PL 34B 659	K. Boesebeck	(AACH, BERL, BONN, CERN, CRAC+)
CAMPBELL	69	PRL 22 1204	J.H. Campbell <i>et al.</i>	(PURD)
LORSTAD	69	NP B14 63	B. Lorstad <i>et al.</i>	(CDEF, CERN) JP
D'ANDLAU	68	NP B5 693	C. d'Andlau <i>et al.</i>	(CDEF, CERN, IRAD+) IJP
DAHL	67	PR 163 1377	O.I. Dahl <i>et al.</i>	(LRL) IJP

### OTHER RELATED PAPERS

AIHARA	88C	PR D38 1	H. Aihara <i>et al.</i>	(TPC-2 $\gamma$ Collab.) JPC
ASTON	85	PR D32 2255	D. Aston <i>et al.</i>	(SLAC, CARL, CNRC)
ATKINSON	84E	PL 138B 459	M. Atkinson <i>et al.</i>	(BONN, CERN, GLAS+)
GAVILLET	82	ZPHY C16 119	P. Gavillet <i>et al.</i>	(CERN, CDEF, PADO+)
D'ANDLAU	65	PL 17 347	C. d'Andlau <i>et al.</i>	(CDEF, CERN, IRAD+)
MILLER	65	PRL 14 1074	D.H. Miller <i>et al.</i>	(LRL, UCB)