

$f_1(1285)$

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

$f_1(1285)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1281.8 ± 0.6 OUR AVERAGE		Error includes scale factor of 1.6. See the ideogram below.		
1281 ± 2 ± 1		AUBERT	07AU BABR	10.6 $e^+e^- \rightarrow f_1(1285)\pi^+\pi^-\gamma$
1276.1 ± 8.1 ± 8.0	203	BAI	04J BES2	$J/\psi \rightarrow \gamma\gamma\pi^+\pi^-$
1274 ± 6	237	ABDALLAH	03H DLPH	91.2 $e^+e^- \rightarrow K_S^0 K^\pm \pi^\mp + X$
1280 ± 4		ACCIARRI	01G L3	
1288 ± 4 ± 5	20k	ADAMS	01B B852	18 GeV $\pi^- p \rightarrow K^+ K^- \pi^0 n$
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		¹ 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 $\pi^+ p \rightarrow 4\pi\pi p, pp \rightarrow 4\pi pp$
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	² 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 $\pi^+ p \rightarrow K\bar{K}\pi\pi p, pp \rightarrow K\bar{K}\pi pp$
1286 ± 1		CHAUVAT	84 SPEC	ISR 31.5 pp
1278 ± 4		EVANGELIS...	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		³ SOSA	99 SPEC	$pp \rightarrow p_{\text{slow}} (K_S^0 K^+ \pi^-) p_{\text{fast}}$
1282.8 ± 0.6		³ 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	$pp \rightarrow p p \pi^+ \pi^- \gamma$
1281	± 1		ARMSTRONG	89E	OMEG 300	$pp \rightarrow p p 2(\pi^+ \pi^-)$
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			⁴ 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	⁵ 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	⁶ THUN	72	MMS	13.4 $\pi^- p$
1303	± 8		BARDADIN-...	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

¹ Supersedes ABATZIS 94, ARMSTRONG 89E.

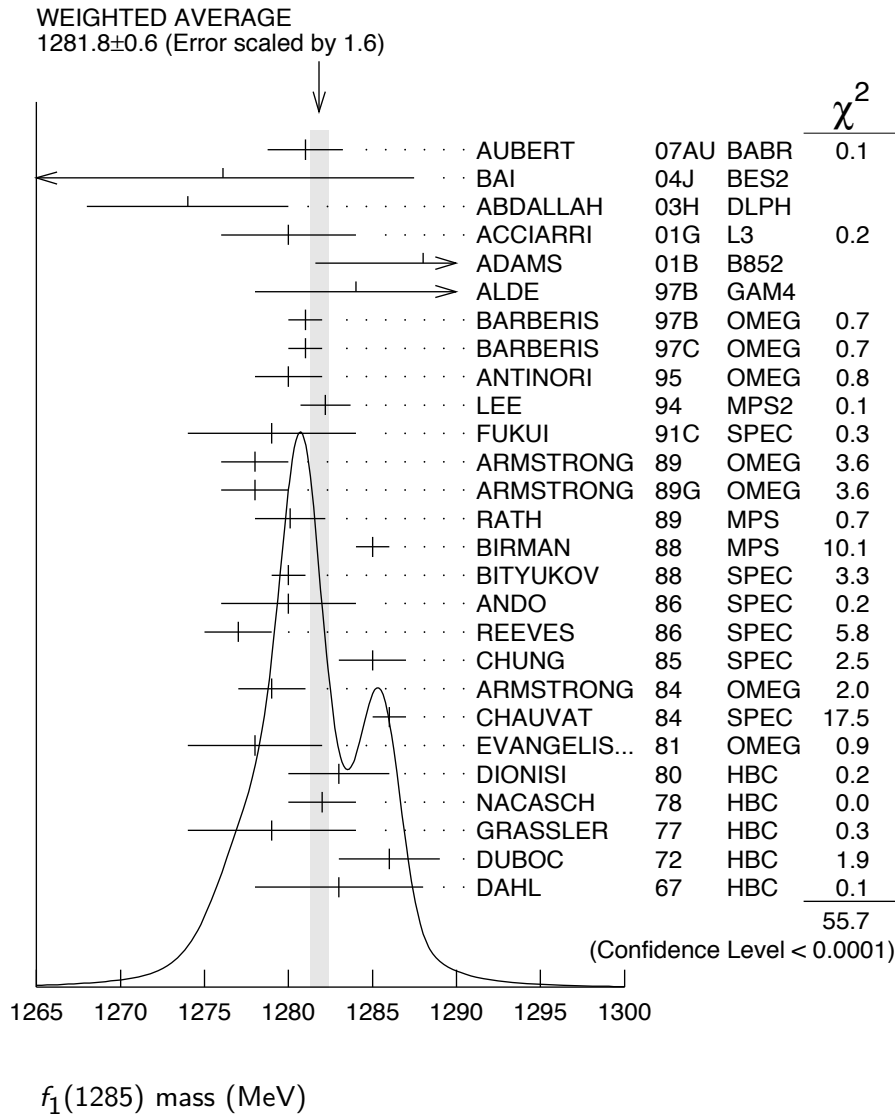
² From partial wave analysis of $K^+ \bar{K}^0 \pi^-$ system.

³ No systematic error given.

⁴ From a unitarized quark-model calculation.

⁵ From phase shift analysis of $\eta \pi^+ \pi^-$ system.

⁶ Seen in the missing mass spectrum.



$f_1(1285)$ WIDTH

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

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
24.3 ± 1.1 OUR AVERAGE		Error includes scale factor of 1.4. See the ideogram below.		
$35 \pm 6 \pm 4$		AUBERT	07AU BABR	$10.6 e^+ e^- \rightarrow f_1(1285) \pi^+ \pi^- \gamma$
$40.0 \pm 8.6 \pm 9.3$	203	BAI	04J BES2	$J/\psi \rightarrow \gamma \gamma \pi^+ \pi^-$
29 ± 12	237	ABDALLAH	03H DLPH	$91.2 e^+ e^- \rightarrow K_S^0 K^\pm \pi^\mp + X$
$45 \pm 9 \pm 7$	20k	ADAMS	01B B852	$18 \text{ GeV } \pi^- p \rightarrow K^+ K^- \pi^0 n$
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		⁷ 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	⁸ 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 $p\bar{p} \rightarrow KK\pi X$
22 ± 2		CHUNG	85	SPEC	8 $\pi^- p \rightarrow NK\bar{K}\pi$
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		⁹ SOSA	99	SPEC	$pp \rightarrow p_{\text{slow}}(K_S^0 K^+ \pi^-)$ p_{fast}
19.4 ± 1.5		⁹ SOSA	99	SPEC	$pp \rightarrow p_{\text{slow}}(K_S^0 K^- \pi^+)$ p_{fast}
40 ± 5		ABATZIS	94	OMEG	450 $pp \rightarrow pp2(\pi^+\pi^-)$
31 ± 5		ARMSTRONG	89E	OMEG	300 $pp \rightarrow pp2(\pi^+\pi^-)$
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 $\begin{smallmatrix} +20 \\ -14 \end{smallmatrix}$ ± 10	16	BECKER	87	MRK3	$e^+e^- \rightarrow \phi K\bar{K}\pi$
26 ± 12		EVANGELIS...	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		¹⁰ STANTON	79	CNTR	8.5 $\pi^- p \rightarrow n2\gamma 2\pi$
24 ± 18	210	GRASSLER	77	HBC	16 $\pi^\mp p$
28 ± 5	150	¹¹ DEFOIX	72	HBC	0.7 $\bar{p}p \rightarrow 7\pi$
46 ± 9	180	¹¹ DUBOC	72	HBC	1.2 $\bar{p}p \rightarrow 2K4\pi$
37 ± 5	500	¹² THUN	72	MMS	13.4 $\pi^- p$
10 ± 10		BOESEBECK	71	HBC	16.0 $\pi p \rightarrow p5\pi$
30 ± 15		CAMPBELL	69	DBC	2.7 $\pi^+ d$
60 ± 15		¹¹ LORSTAD	69	HBC	0.7 $\bar{p}p, 4,5\text{-body}$
35 ± 10		¹¹ DAHL	67	HBC	1.6–4.2 $\pi^- p$

⁷ Supersedes ABATZIS 94, ARMSTRONG 89E.

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

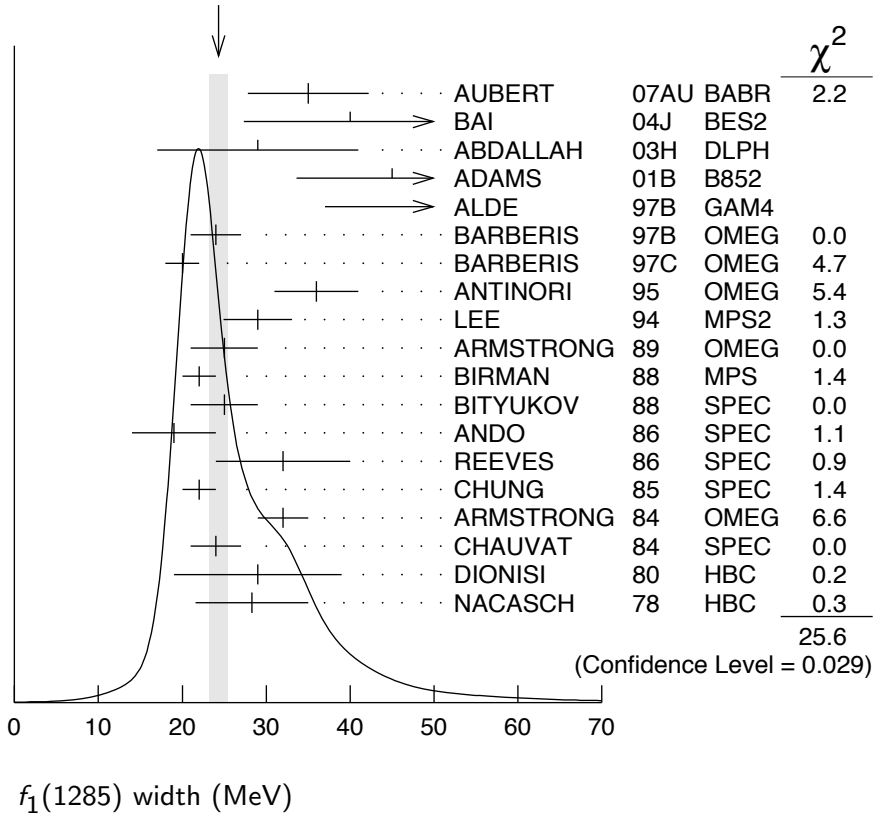
⁹ No systematic error given.

¹⁰ From phase shift analysis of $\eta\pi^+\pi^-$ system.

¹¹ Resolution is not unfolded.

¹² Seen in the missing mass spectrum.

WEIGHTED AVERAGE
 24.3 ± 1.1 (Error scaled by 1.4)



$f_1(1285)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1 4π	$(33.1^{+2.1}_{-1.8})\%$	S=1.3
Γ_2 $\pi^0\pi^0\pi^+\pi^-$	$(22.0^{+1.4}_{-1.2})\%$	S=1.3
Γ_3 $2\pi^+2\pi^-$	$(11.0^{+0.7}_{-0.6})\%$	S=1.3
Γ_4 $\rho^0\pi^+\pi^-$	$(11.0^{+0.7}_{-0.6})\%$	S=1.3
Γ_5 $\rho^0\rho^0$	seen	
Γ_6 $4\pi^0$	$< 7 \times 10^{-4}$	CL=90%
Γ_7 $\eta\pi\pi$	$(52 \pm 5)\%$	
Γ_8 $a_0(980)\pi$ [ignoring $a_0(980) \rightarrow K\bar{K}$]	$(36 \pm 7)\%$	
Γ_9 $\eta\pi\pi$ [excluding $a_0(980)\pi$]	$(16 \pm 7)\%$	
Γ_{10} $K\bar{K}\pi$	$(9.0 \pm 0.4)\%$	S=1.1
Γ_{11} $K\bar{K}^*(892)$	not seen	
Γ_{12} $\gamma\rho^0$	$(5.5 \pm 1.3)\%$	S=2.8

Γ_{13}	$\phi\gamma$	$(7.4 \pm 2.6) \times 10^{-4}$
Γ_{14}	$\gamma\gamma^*$	
Γ_{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 $\langle \delta x_i \delta x_j \rangle / (\delta x_i \cdot \delta x_j)$, 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	
<0.62	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)	EVTS	DOCUMENT ID	TECN	COMMENT	
1.4 ± 0.4 OUR AVERAGE		Error includes scale factor of 1.4.			
1.18 ± 0.25 ± 0.20	26	^{13,14} AIHARA	88B	TPC $e^+e^- \rightarrow e^+e^-\eta\pi^+\pi^-$	
2.30 ± 0.61 ± 0.42		^{13,15} 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	¹⁶ ACHARD	02B	L3	183–209 $e^+e^- \rightarrow e^+e^-\eta\pi^+\pi^-$

¹³ Assuming a ρ -pole form factor.

¹⁴ Published value multiplied by $\eta\pi\pi$ branching ratio 0.49.

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

¹⁶ Published value multiplied by the $\eta\pi\pi$ branching ratio 0.52.

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

$\Gamma(K\bar{K}\pi)/\Gamma(4\pi)$					Γ_{10}/Γ_1
VALUE		DOCUMENT ID	TECN	COMMENT	
0.271 ± 0.016 OUR FIT		Error includes scale factor of 1.3.			
0.271 ± 0.016 OUR AVERAGE		Error includes scale factor of 1.2.			
0.265 ± 0.014		¹⁷ BARBERIS	97C	OMEG 450	$pp \rightarrow p\rho K_S^0 K^\pm \pi^\mp$
0.28 ± 0.05		¹⁸ ARMSTRONG	89E	OMEG 300	$pp \rightarrow p\rho f_1(1285)$
0.37 ± 0.03 ± 0.05		¹⁹ ARMSTRONG	89G	OMEG 85	$\pi p \rightarrow 4\pi X$

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

¹⁸ Assuming $\rho\pi\pi$ and $a_0(980)\pi$ intermediate states.

¹⁹ 4π 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^{+0.014}_{-0.012} 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^{+0.007}_{-0.006} 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^{+0.007}_{-0.006} 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 $pp \rightarrow p_f 4\pi p_s$

$$\Gamma(4\pi^0) / \Gamma_{\text{total}} \qquad \Gamma_6 / \Gamma$$

VALUE (units 10⁻⁴) CL% DOCUMENT ID TECN COMMENT

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

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

VALUE DOCUMENT ID TECN COMMENT

0.171 ± 0.013 OUR FIT Error includes scale factor of 1.1.

0.170 ± 0.012 OUR AVERAGE

0.166 ± 0.01 ± 0.008 BARBERIS 98C OMEG 450 $pp \rightarrow p_f f_1(1285) p_s$

0.42 ± 0.15 GURTU 79 HBC 4.2 $K^- p$

0.5 ± 0.2 ²⁰ CORDEN 78 OMEG 12–15 $\pi^- p$

0.20 ± 0.08 ²¹ DEFOIX 72 HBC 0.7 $\bar{p} p \rightarrow 7\pi$

0.16 ± 0.08 CAMPBELL 69 DBC 2.7 $\pi^+ d$

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

²¹ $K\bar{K}$ 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 ± 0.13 OUR FIT

0.69^{+0.13}_{-0.12} OUR AVERAGE

0.72 ± 0.15 GURTU 79 HBC 4.2 $K^- p$

0.6 ^{+0.3}_{-0.2} 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±0.07		1400	ALDE	97B	GAM4	100 $\pi^-p \rightarrow \eta\pi^0\pi^0n$
1.0 ±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
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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		²² GRASSLER	77	HBC	16 $\pi^\mp p$
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²² Assuming $\rho\pi\pi$ and $a_0(980)\pi$ intermediate states.

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

Γ_{11}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
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not seen 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. • • •

seen	²³ ACHARD	07	L3	183–209	$e^+e^- \rightarrow e^+e^-K_S^0K^\pm\pi^\mp$
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²³ A clear signal of 19.8 ± 4.4 events observed at high Q^2 .

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

Γ_4/Γ_3

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

1.0±0.4		GRASSLER	77	HBC	16 GeV $\pi^\pm p$
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$\Gamma(\phi\gamma)/\Gamma(K\bar{K}\pi)$

Γ_{13}/Γ_{10}

VALUE (units 10^{-2})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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0.82±0.21±0.20 19 BITYUKOV 88 SPEC 32.5 $\pi^-p \rightarrow K^+K^-\pi^0n$

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

<0.50	95		BARBERIS	98C	OMEG 450 $pp \rightarrow p_f f_1(1285) p_S$
<0.93	95		AMELIN	95	VES 37 $\pi^-N \rightarrow \pi^-\pi^+\pi^-\gamma N$

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

Γ_{12}/Γ_{10}

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

>0.035	90	²⁴ COFFMAN	90	MRK3	$J/\psi \rightarrow \gamma\gamma\pi^+\pi^-$
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²⁴ 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	²⁵ COFFMAN	90	MRK3 $J/\psi \rightarrow \gamma\gamma\pi^+\pi^-$
²⁵ 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.			

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

$$\Gamma_{12}/\Gamma$$

VALUE (units 10^{-2})	CL%	DOCUMENT ID	TECN	COMMENT
5.5±1.3 OUR FIT	Error includes scale factor of 2.8.			
2.8±0.7±0.6		AMELIN	95	VES 37 $\pi^- N \rightarrow \pi^- \pi^+ \pi^- \gamma N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<5	95	BITYUKOV	91B	SPEC 32 $\pi^- p \rightarrow \pi^+ \pi^- \gamma n$

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

$$\Gamma_7/\Gamma_{12} = (\Gamma_8 + \Gamma_9)/\Gamma_{12}$$

VALUE	DOCUMENT ID	TECN	COMMENT
9.5±2.0 OUR FIT	Error includes scale factor of 2.5.		
7.9±0.9 OUR AVERAGE			
10.0±1.0±2.0	BARBERIS	98C	OMEG 450 $pp \rightarrow p_f f_1(1285) p_s$
7.5±1.0	²⁶ ARMSTRONG	92C	OMEG 300 $pp \rightarrow pp\pi^+\pi^-\gamma, pp\eta\pi^+\pi^-$
²⁶ Published value multiplied by 1.5.			

$f_1(1285)$ REFERENCES

ACHARD	07	JHEP 0703 018	P. Achard <i>et al.</i>	(L3 Collab.)
AUBERT	07AU	PR D76 092005	B. Aubert <i>et al.</i>	(BABAR Collab.)
BAI	04J	PL B594 47	J.Z. Bai <i>et al.</i>	(BES Collab.)
ABDALLAH	03H	PL B569 129	J. Abdallah <i>et al.</i>	(DELPHI Collab.)
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.)
ADAMS	01B	PL B516 264	G.S. Adams <i>et al.</i>	(BNL E852 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>	(BNL E852 Collab.)
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. Bityukov <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+)
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 γ Collab.)
BIRMAN	88	PRL 61 1557	A. Birman <i>et al.</i>	(BNL, FSU, IND, MASD) JP
BITYUKOV	88	PL B203 327	S.I. Bityukov <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. Bityukov <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)
EVANGELIS...	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)
BARDADIN-...	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