Citation: W.-M. Yao et al. (Particle Data Group), J. Phys. G 33, 1 (2006) and 2007 partial update for edition 2008 (URL: http://pdg.lbl.gov)

$f_1(1285)$	
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$$I^{G}(J^{PC}) = 0^{+}(1^{++})$$

f₁(1285) MASS

VALUE (MeV)		EVTS	DOCUMENT ID		TECN	COMMENT
$1281.8\pm$	0.6 OUR	AVERAGE	Error includes s	cale f	actor of	1.6. See the ideogram
below.						
$1276.1\pm$	$8.1\pm$ 8.0	203	BAI	04J	BES2	$J/\psi \to \gamma \gamma \pi^+ \pi^-$
1274 \pm	6	237	ABDALLAH	03H	DLPH	91.2 $e^+ e^- \rightarrow K^0_S K^\pm \pi^\mp + X$
1280 \pm	4		ACCIARRI	01 G	L3	5
1288 ±	4 ± 5	20k	ADAMS	01 B	B852	18 GeV $\pi^- p \rightarrow \kappa^+ \kappa^- \pi^0 p$
1284 \pm	6	1400	ALDE	97 B	GAM4	$100 \pi^- p \rightarrow \eta \pi^0 \pi^0 n$
1281 \pm	1		BARBERIS	97 B	OMEG	450 $pp \rightarrow pp2(\pi^+\pi^-)$
1281 \pm	1		BARBERIS	97 C	OMEG	450 $pp \rightarrow pp K_c^0 K^{\pm} \pi^{\mp}$
1280 \pm	2	1	ANTINORI	95	OMEG	$300.450 \ p p \rightarrow$
						$pp2(\pi^{+}\pi^{-})$
$1282.2\pm$	1.5		LEE	94	MPS2	$18 \pi^- p \rightarrow K^+ \overline{K}^0 2\pi^- p$
1279 \pm	5		FUKUI	91 C	SPEC	8.95 $\pi^- p \rightarrow \eta \pi^+ \pi^- n$
1278 \pm	2	140	ARMSTRONG	89	OMEG	$300 pp \rightarrow K \overline{K} \pi pp$
1278 ±	2		ARMSTRONG	89 G	OMEG	85 $\pi^+ p \rightarrow 4\pi \pi p, pp \rightarrow 4\pi pp$
$1280.1\pm$	2.1	60	RATH	89	MPS	21.4 $\pi^- p \to K^0_S K^0_S \pi^0 n$
1285 \pm	1	4750 2	BIRMAN	88	MPS	$8 \pi^- p \rightarrow K^+ \overline{K}^0 \pi^- n$
1280 \pm	1	504	BITYUKOV	88	SPEC	$32.5 \pi^{-} p \rightarrow \qquad \qquad$
1280 \pm	4		ANDO	86	SPEC	$8 \pi^- p \rightarrow \eta \pi^+ \pi^- n$
1277 \pm	2	420	REEVES	86	SPEC	6.6 $p \overline{p} \rightarrow K K \pi X$
1285 \pm	2		CHUNG	85	SPEC	$8 \pi^- p \rightarrow N K \overline{K} \pi$
1279 \pm	2	604	ARMSTRONG	84	OMEG	$85 \pi^+ p \to \frac{K}{K} \overline{K} \pi \pi p,$ $pp \to \frac{K}{K} \overline{K} \pi pp$
1286 \pm	1		CHAUVAT	84	SPEC	ISR 31.5 <i>pp</i>
1278 \pm	4		EVANGELIS	81	OMEG	$12 \pi^- p \rightarrow \eta \pi^+ \pi^- \pi^- p$
1283 \pm	3	103	DIONISI	80	НВС	$4 \pi^- p \rightarrow K \overline{K} \pi n$
1282 \pm	2	320	NACASCH	78	HBC	0.7,0.76 $\overline{p}p \rightarrow K\overline{K}3\pi$
1279 \pm	5	210	GRASSLER	77	HBC	16 $\pi^{\mp} p$
1286 \pm	3	180	DUBOC	72	HBC	$1.2 \overline{p} p \rightarrow 2K4\pi$
1283 \pm	5		DAHL	67	HBC	$1.6-4.2 \pi^{-} p$
• • • We d	o not use	the following	g data for averag	ges, fi	ts, limits	, etc. • • •
$1281.9\pm$	0.5	3	SOSA	99	SPEC	$pp \rightarrow p_{slow}$ $(K^0 K^+ \pi^-) p_{slow}$
$1282.8\pm$	0.6	3	SOSA	99	SPEC	$(K_{S}^{o}K^{-}\pi^{+}) p_{\text{fast}}$ $(K_{C}^{o}K^{-}\pi^{+}) p_{\text{fast}}$
1270 ±1	10		AMELIN	95	VES	$37 \frac{\pi^{-} N}{\pi^{-} \pi^{+} \pi^{-} \sim N}$
1280 +	2		ABATZIS	94	OMEG	450 $pp \rightarrow pp2(\pi^+\pi^-)$
1282 ±	4		ARMSTRONG	93 C	E760	$\overline{p}p \rightarrow \pi^0 \eta \eta \rightarrow 6\gamma$

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	1270	\pm 6	± 10		ARMSTRONG	9 2C	OMEG	$300 \ pp \rightarrow \ pp \pi^+ \pi^- \gamma$
	1281	\pm 1			ARMSTRONG	89E	OMEG	$300 \ pp \rightarrow \ pp2(\pi^+\pi^-)$
	1279	\pm 6	± 10	16	BECKER	87	MRK3	$e^+e^- \rightarrow \phi K \overline{K} \pi$
	1286	\pm 9			GIDAL	87	MRK2	$e^+e^ \rightarrow$
								$e^+e^-\eta\pi^+\pi^-$
	1287	\pm 5		353	BITYUKOV	84 B	SPEC	$32 \pi^- p \rightarrow K^+ K^- \pi^0 n$
\sim	1279				⁴ TORNQVIST	8 2B	RVUE	
	1275	\pm 6		31	BROMBERG	80	SPEC	$100 \ \pi^- p \rightarrow \ K \overline{K} \pi X$
	1288	\pm 9		200	GURTU	79	HBC	4.2 $K^- p \rightarrow n \eta 2\pi$
\sim	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 $\pi^- p \rightarrow n5\pi$
	1292	± 10		150	DEFOIX	72	HBC	$0.7 \ \overline{p} p \rightarrow 7\pi$
	1280	\pm 3		500	⁶ THUN	72	MMS	13.4 $\pi^{-}p$
	1303	\pm 8			BARDADIN	71	HBC	$8 \pi^+ p \rightarrow p 6 \pi$
	1283	\pm 6			BOESEBECK	71	HBC	16.0 $\pi p \rightarrow p 5 \pi$
	1270	± 10			CAMPBELL	69	DBC	2.7 $\pi^+ d$
	1285	\pm 7			LORSTAD	69	HBC	0.7 <i>pp</i> , 4,5-body
	1290	± 7			D'ANDLAU	68	HBC	1.2 pp, 5–6 body

¹ Supersedes ABATZIS 94, ARMSTRONG 89E. ² From partial wave analysis of $K^+\overline{K}^0\pi^-$ 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.



 $f_1(1285)$ mass (MeV)

f₁(1285) WIDTH

Only experiments giving width error less than 20 $\,{\rm MeV}$ are kept for averaging.

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
24.2± 1.1 OUR A	VERAGE	Error includes scale	factor	of 1.3.	See the ideogram below.
$40.0\pm~8.6\pm~9.3$	203	BAI	04J	BES2	$J/\psi \rightarrow \gamma \gamma \pi^+ \pi^-$
29 ±12	237	ABDALLAH	03н	DLPH	91.2 $e^+ e^- \rightarrow K^0_S K^\pm \pi^\mp + X$
$45~\pm~9~\pm~7$	20k	ADAMS	01 B	B852	18 GeV $\pi^- p \rightarrow K^+ K^- \pi^0 n$
55 ± 18	1400	ALDE	97 B	GAM4	$100 \ \pi^- p \rightarrow \eta \pi^0 \pi^0 n$
24 ± 3		BARBERIS	97 B	OMEG	450 $pp \rightarrow$
20 ± 2		BARBERIS	97 C	OMEG	$pp2(\pi^{+}\pi^{-})$ $450 pp \rightarrow ppK_{S}^{0}K^{\pm}\pi^{\mp}$

36	\pm 5			7	ANTINORI	95	OMEG	300,450 $pp \rightarrow$
29.0	0± 4.1				LEE	94	MPS2	$pp2(\pi + \pi)$ $18 \pi^{-} p \rightarrow$
						~ ~		$K^{+}K^{0}2\pi^{-}p$
25	± 4		140	0	ARMSTRONG	89	OMEG	$300 \ pp \rightarrow \ KK\pi pp$
22	± 2		4750	0	BIRMAN	88	MPS	$8 \pi^- p \rightarrow \frac{1}{2}$
25	1 4		F04			00	CDEC	$K^{+}K^{0}\pi^{-}n$
25	士 4		504		DITTUKUV	00	SPEC	$52.5 \pi p \rightarrow \mu + \mu = 0$
19	+ 5				ANDO	86	SPEC	$8 \pi^- p \rightarrow n \pi^+ \pi^- n$
32	+ 8		420		REEVES	86	SPEC	$6.6 \ p \overline{p} \rightarrow KK\pi X$
22	+ 2				CHUNG	85	SPEC	$8 \pi^- p \rightarrow N K \overline{K} \pi$
32	+ 3		604		ARMSTRONG	84	OMEG	$85 \pi^+ p \to K \overline{K} \pi \pi p$
02	ŦŨ					0.	0	$pp \rightarrow K\overline{K}\pi pp$
24	\pm 3				CHAUVAT	84	SPEC	ISR 31.5 pp
29	± 10		103		DIONISI	80	HBC	$4 \pi^- p \rightarrow K \overline{K} \pi n$
28.3	3± 6.7		320		NACASCH	78	HBC	$0.7, 0.76 \ \overline{p}p \rightarrow K\overline{K}3\pi$
• • •	We do	not use the	following	g d	ata for averages	, fits,	limits, e	tc. • • •
18 ′	2 + 12		-	9	SOSA	00	SPEC	$nn \rightarrow n$
10.2	<u> </u>				3037	99	JILC	$p p \rightarrow p_{slow}$
				٥		~ ~		$(\kappa_{S} \kappa + \pi) p_{\text{fast}}$
19.4	4 ± 1.5			9	SOSA	99	SPEC	$pp \rightarrow p_{slow}$
								$(K^0_S K^- \pi^+) p_{fast}$
40	\pm 5				ABATZIS	94	OMEG	450 $p p \rightarrow$
								pp2($\pi^+\pi^-$)
31	\pm 5				ARMSTRONG	89E	OMEG	$300 pp \rightarrow$
								$pp2(\pi^{+}\pi^{-})$
41	± 12				ARMSTRONG	89 G	OMEG	85 $\pi^+ p \rightarrow 4\pi \pi p$,
17/	0 1 1 0 0		60		DATU	00		$pp \rightarrow 4\pi pp$
17.9	9 ± 10.9		60		RATH	89	MPS	21.4 π $p \rightarrow$
								$K_S^0 K_S^0 \pi^0 n$
14	+20	± 10	16		BECKER	87	MRK3	$e^+e^- \rightarrow \phi K \overline{K} \pi$
26	-14 +12				EVANCEUS	Q1	OMEC	$12 \pi^{-} n$
20	± 12				EVANGELIS	01	OWLG	$p \rightarrow p \rightarrow p \rightarrow p \rightarrow p$
25	+15		200		GURTH	70	HBC	$42 K^{-} n \rightarrow nn2\pi$
~ 10	\pm 15		200	10	STANTON	70		$4.2 \times p$ $n_{1/2}$
24	+18		210		CRASSLER	77	HBC	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
24	⊥ 10 + 5		210 150	11		72	HBC	$10\pi p$ 0.7 \overline{p} $x 7\pi$
20 46	± 0		190	11		72	HBC	$0.1 \ pp \rightarrow 1\%$ $1.2 \ \overline{p}p \rightarrow 2KA\pi$
40 27	⊥ 9 ⊥ Б		500	12		72		$12 \mu p \rightarrow 2R 4\pi$
10	± 10		500		BOESEBECK	72	HBC	$15.4 \pi p$ $16.0 \pi p > p5\pi$
20	± 10 ± 15					60		$10.0 \ \pi p \rightarrow p 5 \pi$
50 60	± 15 ± 15			11		60		2.1π d
25	± 10			11		67		0.7 pp, 4, 5-body
35	± 10				DAHL	07	HBC	$1.0-4.2 \pi p$
[′] Sι	persed	es ABATZIS	94, ARN	1S	TRONG 89E.			
⁸ Fr	om par	tial wave and	alysis of <i>i</i>	K^+	$K^{0}\pi^{-}$ system.			
⁹ N	o syster	natic error g	iven.	,				
¹⁰ Fr	om pha	ise shift anal	ysis of η	π^+	π^- system.			
$\frac{11}{12}$ Re	esolutio	n is not unfo	olded.					
±∠ Se	en in t	he missing m	ass spec	tru	m.			



$f_1(1285)$ 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	$\pi^{0}\pi^{0}\pi^{+}\pi^{-}$	$(22.0 {+} {1.4 \atop -} {1.2}) \%$	S=1.3
Γ ₃	$2\pi^+ 2\pi^-$	$(11.0 {+} {0.7 \atop -} {0.6}) \%$	S=1.3
Γ ₄	$ ho^{0} \pi^{+} \pi^{-}$	$(11.0 {+} {0.7 \atop -} {0.6}) \%$	S=1.3
Γ ₅	$ ho^{0} ho^{0}$	seen	
Γ ₆	$4\pi^0$	< 7 × 10	⁻⁴ CL=90%
Γ ₇	$\eta \pi \pi$	(52 ± 16)%	
Г ₈	$a_0(980)\pi$ [ignoring $a_0(980) ightarrow K\overline{K}$]	(36 ± 7) %	
Γ9	$\eta \pi \pi$ [excluding $a_0(980)\pi$]	$(16 \pm 7)\%$	
Γ ₁₀	$K\overline{K}\pi$	(9.0± 0.4) %	S=1.1
Γ ₁₁	K K *(892)	not seen	
Γ ₁₂	$\gamma \rho^{0}$	($5.5\pm~1.3)$ %	S=2.8

Γ_{13}	$\phi\gamma$	$(7.4\pm2.6) imes10^{-4}$
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.

<i>x</i> 8	-17			
xg	-8	-95		
<i>x</i> ₁₀	46	_9	-4	
<i>x</i> ₁₂	-36	-4	-2	-34
	<i>x</i> ₁	<i>x</i> 8	x ₉	<i>x</i> ₁₀

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

$\Gamma(\eta\pi\pi)$ × $\Gamma(\gamma\gamma)$)/Γ _{total}			Γ ₇ Γ ₁	$_{15}/\Gamma = (\Gamma_8 + \Gamma_9)\Gamma_{15}/\Gamma$
VALUE (keV)	<u>CL%</u>	DOCUMENT ID		TECN	COMMENT
<0.62	95	GIDAL	87	MRK2	$e^+e^{e^+e^-\eta\pi^+\pi^-}$
$\Gamma(\eta\pi\pi)$ × $\Gamma(\gamma\gamma)$	*)/Г _{total}			Γ ₇ Γ ₁	$_{14}/\Gamma = (\Gamma_8 + \Gamma_9)\Gamma_{14}/\Gamma$
VALUE (keV)	EVTS	DOCUMENT ID		TECN	COMMENT
1.4 \pm 0.4 OUR AV	ERAGE Erro	or includes scale f	actor o	of 1.4.	
$1.18 \pm 0.25 \pm 0.20$	26 ¹³	^{,14} AIHARA	88 B	TPC	$e^+e^{e^+e^-n\pi^+\pi^-}$
$2.30\!\pm\!0.61\!\pm\!0.42$	13	^{,15} GIDAL	87	MRK2	$e^+e^- \rightarrow e^+e^- n\pi^+\pi^-$
• • • We do not use	e the following	g data for average	es, fits,	limits, e	etc. $\bullet \bullet \bullet$
$1.8 \ \pm 0.3 \ \pm 0.3$	420	¹⁶ ACHARD	0 2B	L3	$183-209 \ e^{+} e^{-} _{\sigma^{+} e^{-} \eta \pi^{+} \pi^{-}} _{\sigma^{-}}$
¹³ Assuming a ρ -po ¹⁴ Published value r	le form facto multiplied by	r. $\eta\pi\pi$ branching ra	ntio 0.4	ŀ9.	

 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.

f1(1285) BRANCHING RATIOS

$\Gamma(K\overline{K}\pi)/\Gamma(4\pi)$	Γ ₁₀ /	/Γ1
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 $pp \rightarrow$	
	$ppK_{S}^{0}K^{\pm}\pi^{+}$	
0.28 ± 0.05	¹⁸ ARMSTRONG 89E OMEG 300 $pp \rightarrow ppf_1(12)$	85)
$0.37 \pm 0.03 \pm 0.05$	¹⁹ ARMSTRONG 89G OMEG 85 $\pi p \rightarrow 4\pi X$	
17 Using 2($\pi^+\pi^-$) data from 18 Assuming $ ho\pi\pi$ and $_{0}$ (980 19 4 π consistent with being er	BARBERIS 97B.) π intermediate states. htirely $\rho \pi \pi$.	
$\Gamma(\pi^0\pi^0\pi^+\pi^-)/\Gamma_{\text{total}}$	$\Gamma_2/\Gamma = \frac{2}{3}\Gamma_1$	/Γ
	DOCLIMENT ID	./ •
10.014		
0.220+0.014 OUR FIT Error	includes scale factor of 1.3.	
$\Gamma(2\pi^+2\pi^-)/\Gamma_{total}$	$\Gamma_2/\Gamma = \frac{1}{2}\Gamma_1$	/Г
	DOCLIMENT ID	./ -
	Decoment in	
0.110+0.007 OUR FIT Error	includes scale factor of 1.3.	
$\Gamma(a^{0} - \pi^{-})/\Gamma$	г. /г., 1г.	/г
$(\rho^{\circ}\pi^{\circ}\pi^{\circ})/(\text{total})$	$14/1 = \frac{1}{3}11$./•
VALUE	DOCUMENT ID	
0.110 ^{+0.007} _{-0.006} OUR FIT Error	includes scale factor of 1.3.	
Г(00) /Г	r.	/г
$(\rho^{\circ}\rho^{\circ})/1$ total		;/1
VALUE	DOCUMENT ID COMMENT	
• • • We do not use the follow	ving data for averages, fits, limits, etc. $ullet$ $ullet$	
seen	BARBERIS 00C 450 $pp \rightarrow p_f 4\pi p_s$	
$\Gamma(K\overline{K}\pi)/\Gamma(\eta\pi\pi)$	$\Gamma_{10}/\Gamma_7 = \Gamma_{10}/(\Gamma_8 + 1)$	(وا
VALUE	DOCUMENT ID TECN COMMENT	
0.171±0.013 OUR FIT Error	includes scale factor of 1.1.	
0.170 ± 0.012 OUR AVERAGE		
$0.166 \pm 0.01 \pm 0.008$	BARBERIS 98C OMEG 450 $pp \rightarrow pc f_1(1285) p$	
0 42 +0 15	$\begin{array}{ccc} & & & & & \\ & & & & \\ & & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & & \\ & & & \\ &$	
0.42 ± 0.13 0.5 ± 0.2	20 CORDEN 78 OMEG 12–15 $\pi^- p$	
0.20 ± 0.08	$\frac{21}{\text{DEFOIX}} = \frac{72}{72} + \frac{10}{12} + \frac{10}{12}$	
0.16 ± 0.08	CAMPBELL 69 DBC 2.7 $\pi^+ d$	
20 CORDEN 78 assumes low	mass $n\pi\pi$ region is dominantly 1 ⁺⁺ See RAPREPIS	<u>08</u> 0
and MANAK 00A for discus	ssion.))
K K system characterized b	by the $i = 1$ threshold enhancement. (See under $a_{0}(980)$).

Γ(a₀(980)π [igno <u>VALUE</u>	ring <i>a</i> 0(980) - <u>1%_EVTS</u>	→ К <u>К</u>])/Г(η 	ππ)	TECN	$\frac{\Gamma_8/\Gamma_7 = \Gamma_8/(\Gamma_8 + \Gamma_9)}{COMMENT}$
0.69 ± 0.13 OUR F	IT				
$0.69^{+0.13}_{-0.12}$ OUR /	AVERAGE				
0.72±0.15		GURTU	79	HBC	4.2 K ⁻ p
0.6 + 0.3		CORDEN	78	OMEG	12–15 $\pi^- p$
-0.2 • • • We do not us	e the following (data for average	s. fits.	limits.	etc. • • •
>0.69 9	5 318	ACHARD	, 02в	L3	183–209 $e^+e^- \rightarrow$
	1 4 0 0		o -	<i></i>	$e^+e^-\eta\pi^+\pi^-$
0.28 ± 0.07 1.0 +0.3	1400	ALDE GRASSLER	97B 77	GAM4	$100 \pi p \rightarrow \eta \pi^{\circ} \pi^{\circ} n$ $16 \pi^{\mp} p$
1.0 ± 0.5		GIUISSEEIN		nbe	10 // 2
$\Gamma(4\pi)/\Gamma(\eta\pi\pi)$					$\Gamma_1/\Gamma_7 = \Gamma_1/(\Gamma_8 + \Gamma_9)$
	Error include	<u>DOCUMENT ID</u>	1.2	TECN	COMMENT
0.41 ± 0.14 OUR AV		es scale factor of	1.2.		
$0.37\!\pm\!0.11\!\pm\!0.11$		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	e the following o	data for average	s, fits,	limits, e	etc. • • •
0.93 ± 0.30	2	² GRASSLER	77	HBC	16 π^{\mp} p
22 Assuming $ ho\pi\pi$ a	and $a_0(980)\pi$ ir	ntermediate state	es.		
Г <i>(К<mark>К</mark>*(802))/</i> Г.					Γ., /Γ
	otal	DOCUMENT ID		TECN	• 11/• COMMENT
not seen		NACASCH	78	HBC	$0.7, 0.76 \ \overline{p} p \rightarrow K \overline{K} 3\pi$
$\Gamma(0 \pm -)/\Gamma(0)$	+0 -)				F /F
$(\rho^{\circ}\pi^{+}\pi^{-})/(2$	$\pi^+ 2\pi^-$)			TECN	
VALUE		<u>DOCUMENT ID</u>	- fite	limite (
			5, IILS, 77		
1.0 ± 0.4		GRASSLER	11	HBC	10 GeV $\pi^{\perp} p$
$\Gamma(4\pi^0)/\Gamma_{total}$					Г ₆ /Г
VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<7	90	ALDE	87	GAM4	$100 \ \pi^- p \rightarrow 4\pi^0 n$
$\Gamma(\phi\gamma)/\Gamma(K\overline{K}\pi)$					Γ ₁₃ /Γ ₁₀
VALUE (units 10^{-2})	CL% EVTS	DOCUMEN	T ID	TE	COMMENT
$0.82 \pm 0.21 \pm 0.20$	19	BITYUKC	V	88 SF	PEC 32.5 $\pi^- p \rightarrow$
• • • We do not use	e the following (data for average	s, fits,	limits, e	$K^{\top}K^{-}\pi^{0}n$ etc. • • •
<0.50	95	BARBERI	S	98c Ol	MEG 450 pp \rightarrow
					$p_f f_1(1285) p_s$
<0.93	95	AMELIN		95 VE	$\begin{array}{ccc} \text{SS} & 37 \ \pi^{-} N \rightarrow \\ \pi^{-} \pi^{+} \pi^{-} \gamma^{-} \gamma^$
					π π τη γ η

$\Gamma(\gamma \rho^0) / \Gamma(K \overline{K} \pi)$					Γ ₁₂	/Γ ₁₀
VALUE	<u>CL%</u>	DOCUMENT ID		TECN	COMMENT	
• • • We do not use the	following c	lata for averages	s, fits,	limits, e	etc. ● ● ●	
>0.035	90 23	³ COFFMAN	90	MRK3	$J/\psi \rightarrow \gamma \gamma \pi^+ \pi^-$	
²³ Using B($J/\psi \rightarrow \gamma f$ $\gamma K \overline{K} \pi$)=< 0.72 × 1	$F_1(1285) \rightarrow 0^{-3}$.	$\gamma \gamma \rho^0$)=0.25 :	× 10 ⁻	⁻⁴ and E	$B(J/\psi \rightarrow \gamma f_1(128))$	5) →
$\Gamma(\gamma \rho^0)/\Gamma(2\pi^+ 2\pi^-)$					$\Gamma_{12}/\Gamma_3=\Gamma_{12}/\Gamma_{12}$	/ <u>1</u> 3Γ1
	<u> </u>	DOCUMENT ID	0.5	TECN	<u>COMMENT</u>	
0.45±0.18	rror include 24	s scale factor of ^L COFFMAN	2.5. 90	MRK3	$J/\psi \rightarrow \gamma \gamma \pi^+ \pi^-$	
²⁴ Using B($J/\psi \rightarrow \gamma f$	$F_1(1285) \rightarrow$	$\gamma \gamma \rho^{0} = 0.25$	$\times 10^{-}$	⁻⁴ and E	$3(J/\psi \rightarrow \gamma f_1(128))$	5) →
$\gamma 2\pi^+ 2\pi^-)=0.55 \times$	10 ⁻⁴ given	by MIR 88.			(), ¢ , 1(0	•)
$\Gamma(\gamma ho^0) / \Gamma_{total}$					Γ	₁₂ /Г
VALUE	<u>CL%</u>	DOCUMENT ID		TECN	<u>COMMENT</u>	
0.055 ± 0.013 OUR FIT	F Error ind	cludes scale fact	or of 2	2.8.		
$0.028 \pm 0.007 \pm 0.006$		AMELIN	95	VES	$\begin{array}{c} 37 \ \pi^{-} N \rightarrow \\ \pi^{-} \pi^{+} \pi^{-} \gamma N \end{array}$	
• • • We do not use the	following c	lata for averages	s, fits,	limits, e	etc. • • •	
<0.05	95	BITYUKOV	91 B	SPEC	$32 \pi^- p \rightarrow \pi^+ \pi^-$	γn
$\Gamma(\eta\pi\pi)/\Gamma(\gamma ho^{0})$				Г	γ/Γ ₁₂ = (Γ ₈ +Γ ₉)	/Γ ₁₂
VALUE		DOCUMENT ID		TECN	COMMENT	
9.5±2.0 OUR FIT Err 7.9±0.9 OUR AVERAG	ror includes E	scale factor of 2	2.5.			
$10.0\!\pm\!1.0\!\pm\!2.0$		BARBERIS	98 C	OMEG	$\begin{array}{c} 450 \ p p \rightarrow \\ p_f f_1(1285) p_c \end{array}$	
7.5 ± 1.0	25	ARMSTRONG	92C	OMEG	$300 pp \rightarrow$	
					$p p \pi^+ \pi^- \gamma$,	
					$pp\eta\pi^+\pi^-$	

 25 Published value multiplied by 1.5.

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BIT UKUV84BPL144B133S.I. Bityukov et al.(SERP)CHAUVAT84PL148B382P. Chauvat et al.(CERN, CLER, UCLA+)TORNQVIST82BNPB203268N.A. Tornqvist(HELS)EVANGELIS81NPB178197C. Evangelista et al.(BARI, BONN, CERN+)BROMBERG80PRD221513C.M. Bromberg et al.(CIT, FNAL, ILLC+)DIONISI80NPB1691C. Dionisi et al.(CERN, ZEEM, NIJM, OXF)STANTON79PRL 42346N.R. Stanton et al.(OSU, CARL, MCGI+).CORDEN78NPB144253M.J. Corden et al.(BIRM, RHEL, TELA+).NACASCH78NPB121189H. Grassler et al.(PARIS, MADR, CERN)DEFOIX72NPB44125C. Defoix et al.(CDEF, CERN)DUBOC72NPB46429J. Duboc et al.(PARIS, LIVP)THUN72PRL 281733R. Thun et al.(STON, NEAS)BARDADIN71PRD42711M. Bardadin-Otwinowska et al.(WARS)BOESEBECK71PL34B659K. Boesebeck(AACH, BERL, BONN, CERN, CRAC+)CAMPBELL69NPB1463B. Lorstad et al.(CDEF, CERN), ICDF)D'ANDLAU68NPB5693C. d'Andlau et al.(CDEF, CERN, IRAD+)D'ANDLAU67PR1631377 <td>(Mark III Čollab.) (LANL, BRUX, SERP, LAPP) (Mark III Collab.) (LBL, SLAC, HARV) KEK, KYOT, NIRS, SAGA+) IJP (FLOR, BNL, IND+) JP (BNL, FLOR, IND+) JP (ATHU, BARI, BIRM+) JP (SERP) (CERN, CLER, UCLA+) (CERN, CARL, MCGI+) (CERN, ZEEM, NIJM, OXF) (OSU, CARL, MCGI+) JP (BIRM, RHEL, TELA+) JP (PARIS, MADR, CERN) (AACH3, BERL, BONN+) (CDEF, CERN) (VARS) ERL, BONN, CERN, CRAC+) (PURD) (CDEF, CERN, IRAD+) IJP (CDEF, CERN, IRAD+) IJP</td> <td>R. Mir D.M. Alde et al. J.J. Becker et al. G. Gidal et al. A. Ando et al. D.F. Reeves et al. S.U. Chung et al. T.A. Armstrong et al. S.I. Bityukov et al. P. Chauvat et al. N.A. Tornqvist C. Evangelista et al. C.M. Bromberg et al. C. Dionisi et al. A. Gurtu et al. N.R. Stanton et al. M.J. Corden et al. R. Nacasch et al. H. Grassler et al. J. Duboc et al. R. Thun et al. M. Bardadin-Otwinowska K. Boesebeck (AACH, J.H. Campbell et al. B. Lorstad et al. C. d'Andlau et al.</td> <td>Photon-Photon 88, 126 PL B198 286 PRL 59 186 PRL 59 2012 PRL 57 1296 PR D34 1960 PRL 55 779 PL 146B 273 PL 144B 133 PL 144B 133 PL 148B 382 NP B203 268 NP B178 197 PR D22 1513 NP B169 1 NP B151 181 PRL 42 346 NP B144 253 NP B152 03 NP B144 125 NP B44 125 NP B46 429 PRL 28 1733 PR D4 2711 PL 34B 659 PRL 22 1204 NP B14 63 NP B5 693 PR 163 1377</td> <td>88 87 87 86 86 85 84 84 84 84 84 84 80 80 79 79 79 78 78 77 72 72 72 72 71 69 69 68 67</td> <td>MIR Conference ALDE BECKER GIDAL ANDO REEVES CHUNG ARMSTRONG BITYUKOV CHAUVAT TORNQVIST EVANGELIS BROMBERG DIONISI GURTU STANTON CORDEN NACASCH GRASSLER DEFOIX DUBOC THUN BARDADIN BOESEBECK CAMPBELL LORSTAD D'ANDLAU DAHI</td>	(Mark III Čollab.) (LANL, BRUX, SERP, LAPP) (Mark III Collab.) (LBL, SLAC, HARV) KEK, KYOT, NIRS, SAGA+) IJP (FLOR, BNL, IND+) JP (BNL, FLOR, IND+) JP (ATHU, BARI, BIRM+) JP (SERP) (CERN, CLER, UCLA+) (CERN, CARL, MCGI+) (CERN, ZEEM, NIJM, OXF) (OSU, CARL, MCGI+) JP (BIRM, RHEL, TELA+) JP (PARIS, MADR, CERN) (AACH3, BERL, BONN+) (CDEF, CERN) (VARS) ERL, BONN, CERN, CRAC+) (PURD) (CDEF, CERN, IRAD+) IJP (CDEF, CERN, IRAD+) IJP	R. Mir D.M. Alde et al. J.J. Becker et al. G. Gidal et al. A. Ando et al. D.F. Reeves et al. S.U. Chung et al. T.A. Armstrong et al. S.I. Bityukov et al. P. Chauvat et al. N.A. Tornqvist C. Evangelista et al. C.M. Bromberg et al. C. Dionisi et al. A. Gurtu et al. N.R. Stanton et al. M.J. Corden et al. R. Nacasch et al. H. Grassler et al. J. Duboc et al. R. Thun et al. M. Bardadin-Otwinowska K. Boesebeck (AACH, J.H. Campbell et al. B. Lorstad et al. C. d'Andlau et al.	Photon-Photon 88, 126 PL B198 286 PRL 59 186 PRL 59 2012 PRL 57 1296 PR D34 1960 PRL 55 779 PL 146B 273 PL 144B 133 PL 144B 133 PL 148B 382 NP B203 268 NP B178 197 PR D22 1513 NP B169 1 NP B151 181 PRL 42 346 NP B144 253 NP B152 03 NP B144 125 NP B44 125 NP B46 429 PRL 28 1733 PR D4 2711 PL 34B 659 PRL 22 1204 NP B14 63 NP B5 693 PR 163 1377	88 87 87 86 86 85 84 84 84 84 84 84 80 80 79 79 79 78 78 77 72 72 72 72 71 69 69 68 67	MIR Conference ALDE BECKER GIDAL ANDO REEVES CHUNG ARMSTRONG BITYUKOV CHAUVAT TORNQVIST EVANGELIS BROMBERG DIONISI GURTU STANTON CORDEN NACASCH GRASSLER DEFOIX DUBOC THUN BARDADIN BOESEBECK CAMPBELL LORSTAD D'ANDLAU DAHI

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