

# $f_0(1710)$

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

See our mini-review in the 2004 edition of this *Review*, Physics Letters **B592** 1 (2004). See also the mini-review on scalar mesons under  $f_0(500)$  (see the index for the page number).

## $f_0(1710)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1720 ± 6</b>	<b>OUR AVERAGE</b>	Error includes scale factor of 1.6. See the ideogram below.		
1701 ± 5	$\begin{matrix} +9 \\ -2 \end{matrix}$	4k 1 CHEKANOV	08 ZEUS	$e p \rightarrow K_S^0 K_S^0 X$
1765 $\begin{matrix} +4 \\ -3 \end{matrix}$	±13	ABLIKIM	06V BES2	$e^+ e^- \rightarrow J/\psi \rightarrow \gamma \pi^+ \pi^-$
1760 ± 15	$\begin{matrix} +15 \\ -10 \end{matrix}$	2 ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$
1738 ± 30		ABLIKIM	04E BES2	$J/\psi \rightarrow \omega K^+ K^-$
1740 ± 4	$\begin{matrix} +10 \\ -25 \end{matrix}$	3 BAI	03G BES	$J/\psi \rightarrow \gamma K \bar{K}$
1740 $\begin{matrix} +30 \\ -25 \end{matrix}$		3 BAI	00A BES	$J/\psi \rightarrow \gamma(\pi^+ \pi^- \pi^+ \pi^-)$
1698 ± 18		4 BARBERIS	00E	450 $p p \rightarrow p_f \eta \eta p_S$
1710 ± 12	±11	5 BARBERIS	99D OMEG	450 $p p \rightarrow K^+ K^-, \pi^+ \pi^-$
1710 ± 25		6 FRENCH	99	300 $p p \rightarrow p_f(K^+ K^-) p_S$
1707 ± 10		7 AUGUSTIN	88 DM2	$J/\psi \rightarrow \gamma K^+ K^-, K_S^0 K_S^0$
1698 ± 15		7 AUGUSTIN	87 DM2	$J/\psi \rightarrow \gamma \pi^+ \pi^-$
1720 ± 10	±10	8 BALTRUSAIT..	87 MRK3	$J/\psi \rightarrow \gamma K^+ K^-$
1742 ± 15		7 WILLIAMS	84 MPSF	200 $\pi^- N \rightarrow 2K_S^0 X$
1670 ± 50		BLOOM	83 CBAL	$J/\psi \rightarrow \gamma 2\eta$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1750 ± 13		AMSLER	06 CBAR	1.64 $\bar{p} p \rightarrow K^+ K^- \pi^0$
1747 ± 5	80k	9,10 UMAN	06 E835	5.2 $\bar{p} p \rightarrow \eta \eta \pi^0$
1776 ± 15		VLADIMIRSK...	06 SPEC	40 $\pi^- p \rightarrow K_S^0 K_S^0 n$
1790 $\begin{matrix} +40 \\ -30 \end{matrix}$		2 ABLIKIM	05 BES2	$J/\psi \rightarrow \phi \pi^+ \pi^-$
1670 ± 20		9 BINON	05 GAMS	33 $\pi^- p \rightarrow \eta \eta n$
1726 ± 7	74	10 CHEKANOV	04 ZEUS	$e p \rightarrow K_S^0 K_S^0 X$
1732 ± 15		11 ANISOVICH	03 RVUE	
1682 ± 16		TIKHOMIROV	03 SPEC	40.0 $\pi^- C \rightarrow K_S^0 K_S^0 K_L^0 X$
1670 ± 26	3651	3,12 NICHITIU	02 OBLX	
1770 ± 12		13,14 ANISOVICH	99B SPEC	0.6–1.2 $p \bar{p} \rightarrow \eta \eta \pi^0$
1730 ± 15		3 BARBERIS	99 OMEG	450 $p p \rightarrow p_S p_f K^+ K^-$
1750 ± 20		3 BARBERIS	99B OMEG	450 $p p \rightarrow p_S p_f \pi^+ \pi^-$
1750 ± 30		15 ANISOVICH	98B RVUE	Compilation
1720 ± 39		BAI	98H BES	$J/\psi \rightarrow \gamma \pi^0 \pi^0$
1775 ± 1.5	57	16 BARKOV	98	$\pi^- p \rightarrow K_S^0 K_S^0 n$
1690 ± 11		17 ABREU	96C DLPH	$Z^0 \rightarrow K^+ K^- + X$
1696 ± 5	$\begin{matrix} +9 \\ -34 \end{matrix}$	8 BAI	96C BES	$J/\psi \rightarrow \gamma K^+ K^-$

1781 ± 8	<sup>+10</sup> <sub>-31</sub>	3 BAI	96C BES	$J/\psi \rightarrow \gamma K^+ K^-$
1768 ± 14		BALOSHIN	95 SPEC	$40 \pi^- C \rightarrow K_S^0 K_S^0 X$
1750 ± 15		18 BUGG	95 MRK3	$J/\psi \rightarrow \gamma \pi^+ \pi^- \pi^+ \pi^-$
1620 ± 16		8 BUGG	95 MRK3	$J/\psi \rightarrow \gamma \pi^+ \pi^- \pi^+ \pi^-$
1748 ± 10		7 ARMSTRONG	93C E760	$\bar{p} p \rightarrow \pi^0 \eta \eta \rightarrow 6\gamma$
~ 1750		BREAKSTONE	93 SFM	$p p \rightarrow p p \pi^+ \pi^- \pi^+ \pi^-$
1744 ± 15		19 ALDE	92D GAM2	$38 \pi^- p \rightarrow \eta \eta n$
1713 ± 10		20 ARMSTRONG	89D OMEG	$300 p p \rightarrow p p K^+ K^-$
1706 ± 10		20 ARMSTRONG	89D OMEG	$300 p p \rightarrow p p K_S^0 K_S^0$
1700 ± 15		8 BOLONKIN	88 SPEC	$40 \pi^- p \rightarrow K_S^0 K_S^0 n$
1720 ± 60		3 BOLONKIN	88 SPEC	$40 \pi^- p \rightarrow K_S^0 K_S^0 n$
1638 ± 10		21 FALVARD	88 DM2	$J/\psi \rightarrow \phi K^+ K^-, K_S^0 K_S^0$
1690 ± 4		22 FALVARD	88 DM2	$J/\psi \rightarrow \phi K^+ K^-, K_S^0 K_S^0$
1755 ± 8		23 ALDE	86C GAM2	$38 \pi^- p \rightarrow n 2\eta$
1730 <sup>+</sup> <sub>-10</sub>	<sup>2</sup>	24 LONGACRE	86 RVUE	$22 \pi^- p \rightarrow n 2K_S^0$
1650 ± 50		BURKE	82 MRK2	$J/\psi \rightarrow \gamma 2\rho$
1640 ± 50		25,26 EDWARDS	82D CBAL	$J/\psi \rightarrow \gamma 2\eta$
1730 ± 10	± 20	27 ETKIN	82C MPS	$23 \pi^- p \rightarrow n 2K_S^0$

<sup>1</sup> In the SU(3) based model with a specific interference pattern of the  $f_2(1270)$ ,  $a_2^0(1320)$ , and  $f_2'(1525)$  mesons incoherently added to the  $f_0(1710)$  and non-resonant background.

<sup>2</sup> This state may be different from  $f_0(1710)$ , see CLOSE 05.

<sup>3</sup>  $J^P = 0^+$ .

<sup>4</sup> T-matrix pole.

<sup>5</sup> Supersedes BARBERIS 99 and BARBERIS 99B.

<sup>6</sup>  $J^P = 0^+$ , superseded by ARMSTRONG 89D.

<sup>7</sup> No  $J^{PC}$  determination.

<sup>8</sup>  $J^P = 2^+$ .

<sup>9</sup> Breit-Wigner mass.

<sup>10</sup> Systematic errors not estimated.

<sup>11</sup> K-matrix pole, assuming  $J^P = 0^+$ , from combined analysis of  $\pi^- p \rightarrow \pi^0 \pi^0 n$ ,  $\pi^- p \rightarrow K \bar{K} n$ ,  $\pi^+ \pi^- \rightarrow \pi^+ \pi^-$ ,  $\bar{p} p \rightarrow \pi^0 \pi^0 \pi^0$ ,  $\pi^0 \eta \eta$ ,  $\pi^0 \pi^0 \eta$ ,  $\pi^+ \pi^- \pi^0$ ,  $K^+ K^- \pi^0$ ,  $K_S^0 K_S^0 \pi^0$ ,  $K^+ K_S^0 \pi^-$  at rest,  $\bar{p} n \rightarrow \pi^- \pi^- \pi^+$ ,  $K_S^0 K^- \pi^0$ ,  $K_S^0 K_S^0 \pi^-$  at rest.

<sup>12</sup> Decaying to  $f_0(1370) \pi \pi$ .

<sup>13</sup>  $J^P = 0^+$ .

<sup>14</sup> Not seen by AMSLER 02.

<sup>15</sup> T-matrix pole, assuming  $J^P = 0^+$

<sup>16</sup> No  $J^{PC}$  determination.

<sup>17</sup> No  $J^{PC}$  determination, width not determined.

<sup>18</sup> From a fit to the  $0^+$  partial wave.

<sup>19</sup> ALDE 92D combines all the GAMS-2000 data.

<sup>20</sup>  $J^P = 2^+$ , superseded by FRENCH 99.

<sup>21</sup> From an analysis ignoring interference with  $f_2'(1525)$ .

<sup>22</sup> From an analysis including interference with  $f_2'(1525)$ .

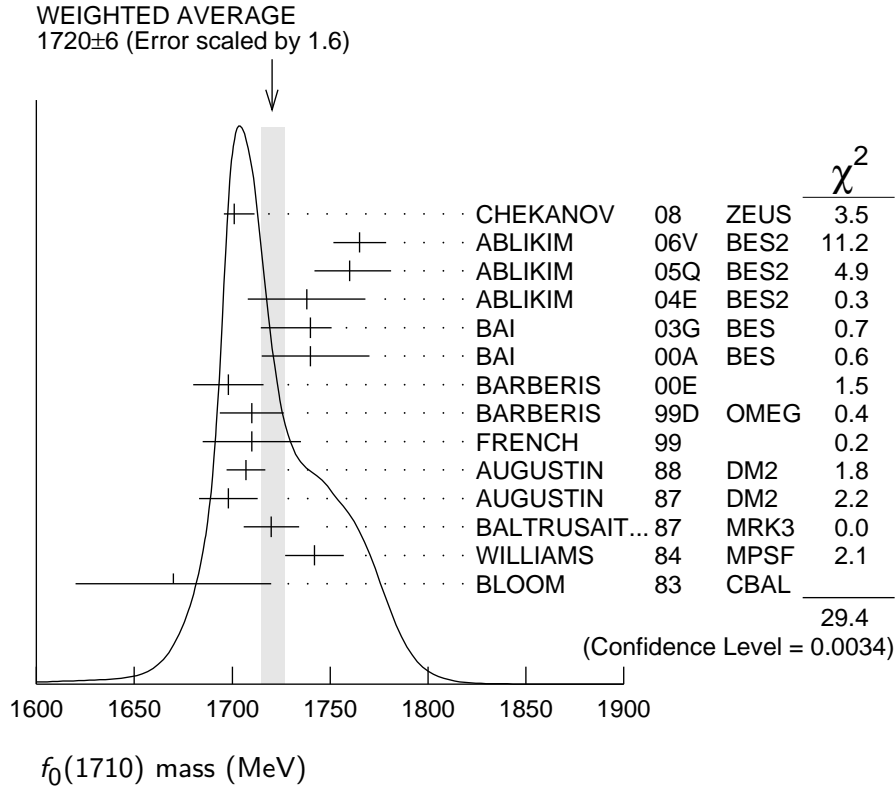
<sup>23</sup> Superseded by ALDE 92D.

<sup>24</sup> Uses MRK3 data. From a partial-wave analysis of data using a K-matrix formalism with 5 poles, but assuming spin 2. Fit with constrained inelasticity.

<sup>25</sup>  $J^P = 2^+$  preferred.

<sup>26</sup> From fit neglecting nearby  $f_2'(1525)$ . Replaced by BLOOM 83.

27 Superseded by LONGACRE 86.



### $f_0(1710)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>135 ± 8</b>	<b>OUR AVERAGE</b>	Error includes scale factor of 1.1.		
100 ± 24	$\begin{smallmatrix} +7 \\ -22 \end{smallmatrix}$	28 CHEKANOV	08 ZEUS	$e p \rightarrow K_S^0 K_S^0 X$
145 ± 8	±69	ABLIKIM	06V BES2	$e^+ e^- \rightarrow J/\psi \rightarrow \gamma \pi^+ \pi^-$
125 ± 25	$\begin{smallmatrix} +10 \\ -15 \end{smallmatrix}$	29 ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$
125 ± 20		ABLIKIM	04E BES2	$J/\psi \rightarrow \omega K^+ K^-$
166	$\begin{smallmatrix} +5 \\ -8 \end{smallmatrix}$	30 BAI	03G BES	$J/\psi \rightarrow \gamma K \bar{K}$
120	$\begin{smallmatrix} +50 \\ -40 \end{smallmatrix}$	30 BAI	00A BES	$J/\psi \rightarrow \gamma (\pi^+ \pi^- \pi^+ \pi^-)$
120 ± 26		31 BARBERIS	00E	$450 p p \rightarrow p_f \eta \eta p_S$
126 ± 16	±18	32 BARBERIS	99D OMEG	$450 p p \rightarrow K^+ K^-, \pi^+ \pi^-$
105 ± 34		33 FRENCH	99	$300 p p \rightarrow p_f (K^+ K^-) p_S$
166.4 ± 33.2		34 AUGUSTIN	88 DM2	$J/\psi \rightarrow \gamma K^+ K^-, K_S^0 K_S^0$
136 ± 28		34 AUGUSTIN	87 DM2	$J/\psi \rightarrow \gamma \pi^+ \pi^-$
130 ± 20		35 BALTRUSAIT..	87 MRK3	$J/\psi \rightarrow \gamma K^+ K^-$
57 ± 38		36 WILLIAMS	84 MPSF	$200 \pi^- N \rightarrow 2 K_S^0 X$
160 ± 80		BLOOM	83 CBAL	$J/\psi \rightarrow \gamma 2\eta$

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

148	+ 40 - 30		AMSLER	06	CBAR	1.64	$\bar{p}p \rightarrow K^+ K^- \pi^0$
188	$\pm 13$	80k 29,37	UMAN	06	E835	5.2	$\bar{p}p \rightarrow \eta\eta\pi^0$
250	$\pm 30$		VLADIMIRSK...	06	SPEC	40	$\pi^- p \rightarrow K_S^0 K_S^0 n$
270	+ 60 - 30		38 ABLIKIM	05	BES2		$J/\psi \rightarrow \phi\pi^+\pi^-$
260	$\pm 50$		29 BINON	05	GAMS	33	$\pi^- p \rightarrow \eta\eta n$
38	+ 20 - 14	74	37 CHEKANOV	04	ZEUS		$e p \rightarrow K_S^0 K_S^0 X$
144	$\pm 30$		39,40 ANISOVICH	03	RVUE		
320	+ 50 - 20		40,41 ANISOVICH	03	RVUE		
102	$\pm 26$		TIKHOMIROV	03	SPEC	40.0	$\pi^- C \rightarrow K_S^0 K_S^0 K_L^0 X$
267	$\pm 44$	3651	30,42 NICHITIU	02	OBLX		
220	$\pm 40$		43,44 ANISOVICH	99B	SPEC	0.6-1.2	$p\bar{p} \rightarrow \eta\eta\pi^0$
100	$\pm 25$		30 BARBERIS	99	OMEG	450	$pp \rightarrow p_S p_f K^+ K^-$
160	$\pm 30$		30 BARBERIS	99B	OMEG	450	$pp \rightarrow p_S p_f \pi^+ \pi^-$
250	$\pm 140$		45 ANISOVICH	98B	RVUE		Compilation
30	$\pm 7$	57	46 BARKOV	98			$\pi^- p \rightarrow K_S^0 K_S^0 n$
103	$\pm 18$	+30 -11	35 BAI	96C	BES		$J/\psi \rightarrow \gamma K^+ K^-$
85	$\pm 24$	+22 -19	30 BAI	96C	BES		$J/\psi \rightarrow \gamma K^+ K^-$
56	$\pm 19$		BALOSHIN	95	SPEC	40	$\pi^- C \rightarrow K_S^0 K_S^0 X$
160	$\pm 40$		47 BUGG	95	MRK3		$J/\psi \rightarrow \gamma\pi^+\pi^-\pi^+\pi^-$
160	+ 60 - 20		35 BUGG	95	MRK3		$J/\psi \rightarrow \gamma\pi^+\pi^-\pi^+\pi^-$
264	$\pm 25$		34 ARMSTRONG	93C	E760		$\bar{p}p \rightarrow \pi^0\eta\eta \rightarrow 6\gamma$
200	to 300		BREAKSTONE	93	SFM		$pp \rightarrow pp\pi^+\pi^-\pi^+\pi^-$
< 80	90% CL		48 ALDE	92D	GAM2	38	$\pi^- p \rightarrow \eta\eta N^*$
181	$\pm 30$		49 ARMSTRONG	89D	OMEG	300	$pp \rightarrow ppK^+ K^-$
104	$\pm 30$		49 ARMSTRONG	89D	OMEG	300	$pp \rightarrow ppK_S^0 K_S^0$
30	$\pm 20$		35 BOLONKIN	88	SPEC	40	$\pi^- p \rightarrow K_S^0 K_S^0 n$
350	$\pm 150$		30 BOLONKIN	88	SPEC	40	$\pi^- p \rightarrow K_S^0 K_S^0 n$
148	$\pm 17$		50 FALVARD	88	DM2		$J/\psi \rightarrow \phi K^+ K^-, K_S^0 K_S^0$
184	$\pm 6$		51 FALVARD	88	DM2		$J/\psi \rightarrow \phi K^+ K^-, K_S^0 K_S^0$
122	+ 74 - 15		52 LONGACRE	86	RVUE	22	$\pi^- p \rightarrow n2K_S^0$
200	$\pm 100$		BURKE	82	MRK2		$J/\psi \rightarrow \gamma 2\rho$
220	+100 - 70		53,54 EDWARDS	82D	CBAL		$J/\psi \rightarrow \gamma 2\eta$
200	+156 - 9		55 ETKIN	82B	MPS	23	$\pi^- p \rightarrow n2K_S^0$

<sup>28</sup>In the SU(3) based model with a specific interference pattern of the  $f_2(1270)$ ,  $a_2^0(1320)$ , and  $f_2'(1525)$  mesons incoherently added to the  $f_0(1710)$  and non-resonant background.

<sup>29</sup>Breit-Wigner width.

<sup>30</sup> $J^P = 0^+$ .

<sup>31</sup>T-matrix pole.

<sup>32</sup>Supersedes BARBERIS 99 and BARBERIS 99B.

<sup>33</sup> $J^P = 0^+$ , supersedes by ARMSTRONG 89D.

- 34 No  $J^{PC}$  determination.  
 35  $J^P = 2^+$ .  
 36 No  $J^{PC}$  determination.  
 37 Systematic errors not estimated.  
 38 This state may be different from  $f_0(1710)$ , see CLOSE 05.  
 39 (Solution I)  
 40 K-matrix pole, assuming  $J^P = 0^+$ , from combined analysis of  $\pi^- p \rightarrow \pi^0 \pi^0 n$ ,  $\pi^- p \rightarrow K \bar{K} n$ ,  $\pi^+ \pi^- \rightarrow \pi^+ \pi^-$ ,  $\bar{p} p \rightarrow \pi^0 \pi^0 \pi^0$ ,  $\pi^0 \eta \eta$ ,  $\pi^0 \pi^0 \eta$ ,  $\pi^+ \pi^- \pi^0$ ,  $K^+ K^- \pi^0$ ,  $K_S^0 K_S^0 \pi^0$ ,  $K^+ K_S^0 \pi^-$  at rest,  $\bar{p} n \rightarrow \pi^- \pi^- \pi^+$ ,  $K_S^0 K^- \pi^0$ ,  $K_S^0 K_S^0 \pi^-$  at rest.  
 41 (Solution I)  
 42 Decaying to  $f_0(1370) \pi \pi$ .  
 43  $J^P = 0^+$ .  
 44 Not seen by AMSLER 02.  
 45 T-matrix pole, assuming  $J^P = 0^+$   
 46 No  $J^{PC}$  determination.  
 47 From a fit to the  $0^+$  partial wave.  
 48 ALDE 92D combines all the GAMS-2000 data.  
 49  $J^P = 2^+$ , ( $0^+$  excluded).  
 50 From an analysis ignoring interference with  $f_2'(1525)$ .  
 51 From an analysis including interference with  $f_2'(1525)$ .  
 52 Uses MRK3 data. From a partial-wave analysis of data using a K-matrix formalism with 5 poles, but assuming spin 2. Fit with constrained inelasticity.  
 53  $J^P = 2^+$  preferred.  
 54 From fit neglecting nearby  $f_2'(1525)$ . Replaced by BLOOM 83.  
 55 From an amplitude analysis of the  $K_S^0 K_S^0$  system, superseded by LONGACRE 86.

### $f_0(1710)$ DECAY MODES

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1$ $K \bar{K}$	seen
$\Gamma_2$ $\eta \eta$	seen
$\Gamma_3$ $\pi \pi$	seen
$\Gamma_4$ $\gamma \gamma$	
$\Gamma_5$ $\omega \omega$	seen

### $f_0(1710)$ $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

$\Gamma(K\bar{K}) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$					$\Gamma_1\Gamma_4/\Gamma$
VALUE (eV)	CL%	DOCUMENT ID	TECN	COMMENT	
<110	95	56 BEHREND	89C CELL	$\gamma\gamma \rightarrow K_S^0 K_S^0$	
<480	95	ALBRECHT	90G ARG	$\gamma\gamma \rightarrow K^+ K^-$	
<280	95	56 ALTHOFF	85B TASS	$\gamma\gamma \rightarrow K \bar{K} \pi$	

• • • We do not use the following data for averages, fits, limits, etc. • • •  
 56 Assuming helicity 2.

$\Gamma(\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$					$\Gamma_3\Gamma_4/\Gamma$
VALUE (keV)	CL%	DOCUMENT ID	TECN	COMMENT	
<b>&lt;0.82</b>	95	57 BARATE	00E ALEP	$\gamma\gamma \rightarrow \pi^+\pi^-$	
<sup>57</sup> Assuming spin 0.					

### $f_0(1710)$ BRANCHING RATIOS

$\Gamma(K\bar{K})/\Gamma_{\text{total}}$					$\Gamma_1/\Gamma$
VALUE		DOCUMENT ID	TECN	COMMENT	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.36 \pm 0.12$		ALBALADEJO 08	RVUE		
$0.38^{+0.09}_{-0.19}$		58,59 LONGACRE 86	MPS	$22 \pi^- p \rightarrow n 2K_S^0$	

$\Gamma(\eta\eta)/\Gamma_{\text{total}}$					$\Gamma_2/\Gamma$
VALUE		DOCUMENT ID	TECN	COMMENT	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.22 \pm 0.12$		ALBALADEJO 08	RVUE		
$0.18^{+0.03}_{-0.13}$		58,59 LONGACRE 86	RVUE		

$\Gamma(\pi\pi)/\Gamma_{\text{total}}$					$\Gamma_3/\Gamma$
VALUE		DOCUMENT ID	TECN	COMMENT	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
not seen		AMSLER 02	CBAR	$0.9 \bar{p}p \rightarrow \pi^0\eta\eta, \pi^0\pi^0\pi^0$	
$0.039^{+0.002}_{-0.024}$		58,59 LONGACRE 86	RVUE		

$\Gamma(\pi\pi)/\Gamma(K\bar{K})$					$\Gamma_3/\Gamma_1$
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
<b><math>0.41^{+0.11}_{-0.17}</math></b>		ABLIKIM 06V	BES2	$e^+e^- \rightarrow J/\psi \rightarrow \gamma\pi^+\pi^-$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.32 \pm 0.14$		ALBALADEJO 08	RVUE		
$< 0.11$	95	60 ABLIKIM 04E	BES2	$J/\psi \rightarrow \omega K^+K^-$	
$5.8^{+9.1}_{-5.5}$		61 ANISOVICH 02D	SPEC	Combined fit	
$0.2 \pm 0.024 \pm 0.036$		BARBERIS 99D	OMEG 450	$pp \rightarrow K^+K^-, \pi^+\pi^-$	
$0.39 \pm 0.14$		ARMSTRONG 91	OMEG 300	$pp \rightarrow pp\pi\pi, ppK\bar{K}$	

$\Gamma(\eta\eta)/\Gamma(K\bar{K})$					$\Gamma_2/\Gamma_1$
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
<b><math>0.48 \pm 0.15</math></b>		BARBERIS 00E		$450 pp \rightarrow p_f\eta\eta p_S$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.46^{+0.70}_{-0.38}$		61 ANISOVICH 02D	SPEC	Combined fit	
$< 0.02$	90	62 PROKOSHKIN 91	GA24	$300 \pi^- p \rightarrow \pi^- p\eta\eta$	

$\Gamma(\omega\omega)/\Gamma_{\text{total}}$

$\Gamma_5/\Gamma$

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>seen</b>	180	ABLIKIM	06H BES	$J/\psi \rightarrow \gamma\omega\omega$
58	From a partial-wave analysis of data using a K-matrix formalism with 5 poles, but assuming spin 2.			
59	Fit with constrained inelasticity.			
60	Using data from ABLIKIM 04A.			
61	From a combined K-matrix analysis of Crystal Barrel ( $0. \rho\bar{p} \rightarrow \pi^0\pi^0\pi^0, \pi^0\eta\eta, \pi^0\pi^0\eta$ ), GAMS ( $\pi p \rightarrow \pi^0\pi^0 n, \eta\eta n, \eta\eta' n$ ), and BNL ( $\pi p \rightarrow K\bar{K} n$ ) data.			
62	Combining results of GAM4 with those of ARMSTRONG 89D.			

### $f_0(1710)$ REFERENCES

ALBALADEJO	08	PRL 101 252002	M. Albaladejo, J.A. Oller	
CHEKANOV	08	PRL 101 112003	S. Chekanov <i>et al.</i>	(ZEUS Collab.)
ABLIKIM	06H	PR D73 112007	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	06V	PL B642 441	M. Ablikim <i>et al.</i>	(BES Collab.)
AMSLER	06	PL B639 165	C. Amsler <i>et al.</i>	(CBAR Collab.)
UMAN	06	PR D73 052009	I. Uman <i>et al.</i>	(FNAL E835)
VLADIMIRSK...	06	PAN 69 493	V.V. Vladimirovsky <i>et al.</i>	(ITEP, Moscow)
		Translated from YAF 69 515.		
ABLIKIM	05	PL B607 243	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	05Q	PR D72 092002	M. Ablikim <i>et al.</i>	(BES Collab.)
BINON	05	PAN 68 960	F. Binon <i>et al.</i>	
		Translated from YAF 68 998.		
CLOSE	05	PR D71 094022	F.E. Close, Q. Zhao	
ABLIKIM	04A	PL B598 149	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	04E	PL B603 138	M. Ablikim <i>et al.</i>	(BES Collab.)
CHEKANOV	04	PL B578 33	S. Chekanov <i>et al.</i>	(ZEUS Collab.)
PDG	04	PL B592 1	S. Eidelman <i>et al.</i>	(PDG Collab.)
ANISOVICH	03	EPJ A16 229	V.V. Anisovich <i>et al.</i>	
BAI	03G	PR D68 052003	J.Z. Bai <i>et al.</i>	(BES Collab.)
TIKHOMIROV	03	PAN 66 828	G.D. Tikhomirov <i>et al.</i>	
		Translated from YAF 66 860.		
AMSLER	02	EPJ C23 29	C. Amsler <i>et al.</i>	
ANISOVICH	02D	PAN 65 1545	V.V. Anisovich <i>et al.</i>	
		Translated from YAF 65 1583.		
NICHITIU	02	PL B545 261	F. Nichitiu <i>et al.</i>	(OBELIX Collab.)
BAI	00A	PL B472 207	J.Z. Bai <i>et al.</i>	(BES Collab.)
BARATE	00E	PL B472 189	R. Barate <i>et al.</i>	(ALEPH Collab.)
BARBERIS	00E	PL B479 59	D. Barberis <i>et al.</i>	(WA 102 Collab.)
ANISOVICH	99B	PL B449 154	A.V. Anisovich <i>et al.</i>	
BARBERIS	99	PL B453 305	D. Barberis <i>et al.</i>	(Omega Expt.)
BARBERIS	99B	PL B453 316	D. Barberis <i>et al.</i>	(Omega Expt.)
BARBERIS	99D	PL B462 462	D. Barberis <i>et al.</i>	(Omega Expt.)
FRENCH	99	PL B460 213	B. French <i>et al.</i>	(WA76 Collab.)
ANISOVICH	98B	SPU 41 419	V.V. Anisovich <i>et al.</i>	
		Translated from UFN 168 481.		
BAI	98H	PRL 81 1179	J.Z. Bai <i>et al.</i>	(BES Collab.)
BARKOV	98	JETPL 68 764	B.P. Barkov <i>et al.</i>	
ABREU	96C	PL B379 309	P. Abreu <i>et al.</i>	(DELPHI Collab.)
BAI	96C	PRL 77 3959	J.Z. Bai <i>et al.</i>	(BES Collab.)
BALOSHIN	95	PAN 58 46	O.N. Baloshin <i>et al.</i>	(ITEP)
		Translated from YAF 58 50.		
BUGG	95	PL B353 378	D.V. Bugg <i>et al.</i>	(LOQM, PNPI, WASH)
ARMSTRONG	93C	PL B307 394	T.A. Armstrong <i>et al.</i>	(FNAL, FERR, GENO+)
BREAKSTONE	93	ZPHY C58 251	A.M. Breakstone <i>et al.</i>	(IOWA, CERN, DORT+)
ALDE	92D	PL B284 457	D.M. Alde <i>et al.</i>	(GAM2 Collab.)
Also		SJNP 54 451	D.M. Alde <i>et al.</i>	(GAM2 Collab.)
		Translated from YAF 54 745.		
ARMSTRONG	91	ZPHY C51 351	T.A. Armstrong <i>et al.</i>	(ATHU, BARI, BIRM+)
PROKOSHKIN	91	SPD 36 155	Y.D. Prokoshkin	(GAM2, GAM4 Collab.)
		Translated from DANS 316 900.		

ALBRECHT	90G	ZPHY C48 183	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ARMSTRONG	89D	PL B227 186	T.A. Armstrong, M. Benayoun	(ATHU, BARI, BIRM+)
BEHREND	89C	ZPHY C43 91	H.J. Behrend <i>et al.</i>	(CELLO Collab.)
AUGUSTIN	88	PRL 60 2238	J.E. Augustin <i>et al.</i>	(DM2 Collab.)
BOLONKIN	88	NP B309 426	B.V. Bolonkin <i>et al.</i>	(ITEP, SERP)
FALVARD	88	PR D38 2706	A. Falvard <i>et al.</i>	(CLER, FRAS, LALO+)
AUGUSTIN	87	ZPHY C36 369	J.E. Augustin <i>et al.</i>	(LALO, CLER, FRAS+)
BALTRUSAIT...	87	PR D35 2077	R.M. Baltrusaitis <i>et al.</i>	(Mark III Collab.)
ALDE	86C	PL B182 105	D.M. Alde <i>et al.</i>	(SERP, BELG, LANL, LAPP)
LONGACRE	86	PL B177 223	R.S. Longacre <i>et al.</i>	(BNL, BRAN, CUNY+)
ALTHOFF	85B	ZPHY C29 189	M. Althoff <i>et al.</i>	(TASSO Collab.)
WILLIAMS	84	PR D30 877	E.G.H. Williams <i>et al.</i>	(VAND, NDAM, TUFTS+)
BLOOM	83	ARNS 33 143	E.D. Bloom, C. Peck	(SLAC, CIT)
BURKE	82	PRL 49 632	D.L. Burke <i>et al.</i>	(LBL, SLAC)
EDWARDS	82D	PRL 48 458	C. Edwards <i>et al.</i>	(CIT, HARV, PRIN+)
ETKIN	82B	PR D25 1786	A. Etkin <i>et al.</i>	(BNL, CUNY, TUFTS, VAND)
ETKIN	82C	PR D25 2446	A. Etkin <i>et al.</i>	(BNL, CUNY, TUFTS, VAND)

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