

**$\rho(1450)$** 

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

See our mini-review under the  $\rho(1700)$ . **$\rho(1450)$  MASS**VALUE (MeV)DOCUMENT ID**1465±25 OUR ESTIMATE** This is only an educated guess; the error given is larger than the error on the average of the published values. **$\eta\rho^0$  MODE**VALUE (MeV)DOCUMENT IDTECNCOMMENT

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

1497±14	<sup>1</sup> AKHMETSHIN 01B	CMD2	$e^+e^- \rightarrow \eta\gamma$
1421±15	<sup>2</sup> AKHMETSHIN 00D	CMD2	$e^+e^- \rightarrow \eta\pi^+\pi^-$
1470±20	ANTONELLI 88	DM2	$e^+e^- \rightarrow \eta\pi^+\pi^-$
1446±10	FUKUI 88	SPEC	$8.95 \pi^- p \rightarrow \eta\pi^+\pi^- n$

<sup>1</sup> Using the data of AKHMETSHIN 01B on  $e^+e^- \rightarrow \eta\gamma$ , AKHMETSHIN 00D and ANTONELLI 88 on  $e^+e^- \rightarrow \eta\pi^+\pi^-$ .<sup>2</sup> Using the data of ANTONELLI 88, DOLINSKY 91, and AKHMETSHIN 00D. The energy-independent width of the  $\rho(1450)$  and  $\rho(1700)$  mesons assumed. **$\omega\pi$  MODE**VALUE (MeV)EVTSDOCUMENT IDTECNCOMMENT

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

1491±19	7815	<sup>1</sup> ACHASOV 13	SND	$1.05\text{--}2.00 e^+e^- \rightarrow \pi^0\pi^0\gamma$
1582±17±25	2382	<sup>2</sup> AKHMETSHIN 03B	CMD2	$e^+e^- \rightarrow \pi^0\pi^0\gamma$
1349±25 <sup>+10</sup> <sub>-5</sub>	341	<sup>3</sup> ALEXANDER 01B	CLE2	$B \rightarrow D^{(*)}\omega\pi^-$
1523±10		<sup>4</sup> EDWARDS 00A	CLE2	$\tau^- \rightarrow \omega\pi^- \nu_\tau$
1463±25		<sup>5</sup> CLEGG 94	RVUE	
1250		<sup>6</sup> ASTON 80C	OMEG	$20\text{--}70 \gamma p \rightarrow \omega\pi^0 p$
1290±40		<sup>6</sup> BARBER 80C	SPEC	$3\text{--}5 \gamma p \rightarrow \omega\pi^0 p$

<sup>1</sup> From a phenomenological model based on vector meson dominance with the interfering  $\rho(1450)$  and  $\rho(1700)$  and their widths fixed at 400 and 250 MeV, respectively. Systematic uncertainty not estimated.<sup>2</sup> Using the data of AKHMETSHIN 03B and BISELLO 91B assuming the  $\omega\pi^0$  and  $\pi^+\pi^-$  mass dependence of the total width.  $\rho(1700)$  mass and width fixed at 1700 MeV and 240 MeV, respectively.<sup>3</sup> Using Breit-Wigner parameterization of the  $\rho(1450)$  and assuming the  $\omega\pi^-$  mass dependence for the total width.<sup>4</sup> Mass-independent width parameterization.  $\rho(1700)$  mass and width fixed at 1700 MeV and 235 MeV respectively.<sup>5</sup> Using data from BISELLO 91B, DOLINSKY 86 and ALBRECHT 87L.<sup>6</sup> Not separated from  $b_1(1235)$ , not pure  $J^P = 1^-$  effect.

### 4 $\pi$ MODE

VALUE (MeV)		DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1435 ± 40		ABELE	01B CBAR	0.0 $\bar{p}n \rightarrow 2\pi^- 2\pi^0 \pi^+$
1350 ± 50		ACHASOV	97 RVUE	$e^+ e^- \rightarrow 2(\pi^+ \pi^-)$
1449 ± 4		<sup>1</sup> ARMSTRONG	89E OMEG 300	$pp \rightarrow p\rho 2(\pi^+ \pi^-)$

<sup>1</sup> Not clear whether this observation has  $l=1$  or 0.

### $\pi\pi$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1350 ± 20	$\begin{smallmatrix} +20 \\ -30 \end{smallmatrix}$ 63.5k	<sup>1</sup> ABRAMOWICZ12	ZEUS	$e\rho \rightarrow e\pi^+ \pi^- \rho$
1493 ± 15		<sup>2</sup> LEES	12G BABR	$e^+ e^- \rightarrow \pi^+ \pi^- \gamma$
1446 ± 7	$\pm 28$ 5.4M	<sup>3,4</sup> FUJIKAWA	08 BELL	$\tau^- \rightarrow \pi^- \pi^0 \nu_\tau$
1328 ± 15		<sup>5</sup> SCHAEEL	05C ALEP	$\tau^- \rightarrow \pi^- \pi^0 \nu_\tau$
1406 ± 15	87k	<sup>3,6</sup> ANDERSON	00A CLE2	$\tau^- \rightarrow \pi^- \pi^0 \nu_\tau$
~ 1368		<sup>7</sup> ABELE	99C CBAR	0.0 $\bar{p}d \rightarrow \pi^+ \pi^- \pi^- p$
1348 ± 33		BERTIN	98 OBLX	0.05–0.405 $\bar{p}p \rightarrow 2\pi^+ \pi^-$
1411 ± 14		<sup>8</sup> ABELE	97 CBAR	$\bar{p}n \rightarrow \pi^- \pi^0 \pi^0$
1370 $\begin{smallmatrix} +90 \\ -70 \end{smallmatrix}$		ACHASOV	97 RVUE	$e^+ e^- \rightarrow \pi^+ \pi^-$
1359 ± 40		<sup>6</sup> BERTIN	97C OBLX	0.0 $\bar{p}p \rightarrow \pi^+ \pi^- \pi^0$
1282 ± 37		BERTIN	97D OBLX	0.05 $\bar{p}p \rightarrow 2\pi^+ 2\pi^-$
1424 ± 25		BISELLO	89 DM2	$e^+ e^- \rightarrow \pi^+ \pi^-$
1265.5 ± 75.3		DUBNICKA	89 RVUE	$e^+ e^- \rightarrow \pi^+ \pi^-$
1292 ± 17		<sup>9</sup> KURDADZE	83 OLYA	0.64–1.4 $e^+ e^- \rightarrow \pi^+ \pi^-$

<sup>1</sup> Using the KUHN 90 parametrization of the pion form factor, neglecting  $\rho$ – $\omega$  interference.

<sup>2</sup> Using the GOUNARIS 68 parametrization of the pion form factor leaving the masses and widths of the  $\rho(1450)$ ,  $\rho(1700)$ , and  $\rho(2150)$  resonances as free parameters of the fit.

<sup>3</sup> From the GOUNARIS 68 parametrization of the pion form factor.

<sup>4</sup>  $|F_\pi(0)|^2$  fixed to 1.

<sup>5</sup> From the combined fit of the  $\tau^-$  data from ANDERSON 00A and SCHAEEL 05C and  $e^+ e^-$  data from the compilation of BARKOV 85, AKHMETSHIN 04, and ALOISIO 05.  $\rho(1700)$  mass and width fixed at 1713 MeV and 235 MeV, respectively. Supersedes BARATE 97M.

<sup>6</sup>  $\rho(1700)$  mass and width fixed at 1700 MeV and 235 MeV, respectively.

<sup>7</sup>  $\rho(1700)$  mass and width fixed at 1780 MeV and 275 MeV respectively.

<sup>8</sup> T-matrix pole.

<sup>9</sup> Using for  $\rho(1700)$  mass and width  $1600 \pm 20$  and  $300 \pm 10$  MeV respectively.

### $K\bar{K}$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
1422.8 ± 6.5	27k	<sup>1</sup> ABELE	99D CBAR	±	0.0 $\bar{p}p \rightarrow K^+ K^- \pi^0$

<sup>1</sup> K-matrix pole. Isospin not determined, could be  $\omega(1420)$ .

**$K\bar{K}^*(892) + \text{c.c. MODE}$** 

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$1505 \pm 19 \pm 7$	AUBERT	08S BABR	$10.6 e^+ e^- \rightarrow K\bar{K}^*(892)\gamma$

 **$\rho(1450)$  WIDTH**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>
<b><math>400 \pm 60</math> OUR ESTIMATE</b>	This is only an educated guess; the error given is larger than the error on the average of the published values.

 **$\eta\rho^0$  MODE**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$226 \pm 44$	<sup>1</sup> AKHMETSHIN 01B	CMD2	$e^+ e^- \rightarrow \eta\gamma$
$211 \pm 31$	<sup>2</sup> AKHMETSHIN 00D	CMD2	$e^+ e^- \rightarrow \eta\pi^+\pi^-$
$230 \pm 30$	ANTONELLI 88	DM2	$e^+ e^- \rightarrow \eta\pi^+\pi^-$
$60 \pm 15$	FUKUI 88	SPEC	$8.95 \pi^- p \rightarrow \eta\pi^+\pi^- n$

<sup>1</sup> Using the data of AKHMETSHIN 01B on  $e^+ e^- \rightarrow \eta\gamma$ , AKHMETSHIN 00D and ANTONELLI 88 on  $e^+ e^- \rightarrow \eta\pi^+\pi^-$ .

<sup>2</sup> Using the data of ANTONELLI 88, DOLINSKY 91, and AKHMETSHIN 00D. The energy-independent width of the  $\rho(1450)$  and  $\rho(1700)$  mesons assumed.

 **$\omega\pi$  MODE**

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$429 \pm 42 \pm 10$	2382	<sup>1</sup> AKHMETSHIN 03B	CMD2	$e^+ e^- \rightarrow \pi^0\pi^0\gamma$
$547 \pm 86^{+46}_{-45}$	341	<sup>2</sup> ALEXANDER 01B	CLE2	$B \rightarrow D^{(*)}\omega\pi^-$
$400 \pm 35$		<sup>3</sup> EDWARDS 00A	CLE2	$\tau^- \rightarrow \omega\pi^- \nu_\tau$
$311 \pm 62$		<sup>4</sup> CLEGG 94	RVUE	
300		<sup>5</sup> ASTON 80C	OMEG	$20-70 \gamma p \rightarrow \omega\pi^0 p$
$320 \pm 100$		<sup>5</sup> BARBER 80C	SPEC	$3-5 \gamma p \rightarrow \omega\pi^0 p$

<sup>1</sup> Using the data of AKHMETSHIN 03B and BISELLO 91B assuming the  $\omega\pi^0$  and  $\pi^+\pi^-$  mass dependence of the total width.  $\rho(1700)$  mass and width fixed at 1700 MeV and 240 MeV, respectively.

<sup>2</sup> Using Breit-Wigner parameterization of the  $\rho(1450)$  and assuming the  $\omega\pi^-$  mass dependence for the total width.

<sup>3</sup> Mass-independent width parameterization.  $\rho(1700)$  mass and width fixed at 1700 MeV and 235 MeV respectively.

<sup>4</sup> Using data from BISELLO 91B, DOLINSKY 86 and ALBRECHT 87L.

<sup>5</sup> Not separated from  $b_1(1235)$ , not pure  $J^P = 1^-$  effect.

 **$4\pi$  MODE**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$325 \pm 100$	ABELE	01B CBAR	$0.0 \bar{p}n \rightarrow 2\pi^- 2\pi^0\pi^+$

### $\pi\pi$ MODE

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$460 \pm 30^{+40}_{-45}$	63.5k	<sup>1</sup> ABRAMOWICZ12	ZEUS	$e p \rightarrow e \pi^+ \pi^- p$
$427 \pm 31$		<sup>2</sup> LEES	12G BABR	$e^+ e^- \rightarrow \pi^+ \pi^- \gamma$
$434 \pm 16 \pm 60$	5.4M	<sup>3,4</sup> FUJIKAWA	08 BELL	$\tau^- \rightarrow \pi^- \pi^0 \nu_\tau$
$468 \pm 41$		<sup>5</sup> SCHAEEL	05C ALEP	$\tau^- \rightarrow \pi^- \pi^0 \nu_\tau$
$455 \pm 41$	87k	<sup>3,6</sup> ANDERSON	00A CLE2	$\tau^- \rightarrow \pi^- \pi^0 \nu_\tau$
$\sim 374$		<sup>7</sup> ABELE	99C CBAR	$0.0 \bar{p} d \rightarrow \pi^+ \pi^- \pi^- p$
$275 \pm 10$		BERTIN	98 OBLX	$0.05-0.405 \bar{n} p \rightarrow \pi^+ \pi^+ \pi^-$
$343 \pm 20$		<sup>8</sup> ABELE	97 CBAR	$\bar{p} n \rightarrow \pi^- \pi^0 \pi^0$
$310 \pm 40$		<sup>6</sup> BERTIN	97C OBLX	$0.0 \bar{p} p \rightarrow \pi^+ \pi^- \pi^0$
$236 \pm 36$		BERTIN	97D OBLX	$0.05 \bar{p} p \rightarrow 2\pi^+ 2\pi^-$
$269 \pm 31$		BISELLO	89 DM2	$e^+ e^- \rightarrow \pi^+ \pi^-$
$391 \pm 70$		DUBNICKA	89 RVUE	$e^+ e^- \rightarrow \pi^+ \pi^-$
$218 \pm 46$		<sup>9</sup> KURDADZE	83 OLYA	$0.64-1.4 e^+ e^- \rightarrow \pi^+ \pi^-$

<sup>1</sup> Using the KUHN 90 parametrization of the pion form factor, neglecting  $\rho-\omega$  interference.

<sup>2</sup> Using the GOUNARIS 68 parametrization of the pion form factor leaving the masses and widths of the  $\rho(1450)$ ,  $\rho(1700)$ , and  $\rho(2150)$  resonances as free parameters of the fit.

<sup>3</sup> From the GOUNARIS 68 parametrization of the pion form factor.

<sup>4</sup>  $|F_\pi(0)|^2$  fixed to 1.

<sup>5</sup> From the combined fit of the  $\tau^-$  data from ANDERSON 00A and SCHAEEL 05C and  $e^+ e^-$  data from the compilation of BARKOV 85, AKHMETSHIN 04, and ALOISIO 05.  $\rho(1700)$  mass and width fixed at 1713 MeV and 235 MeV, respectively. Supersedes BARATE 97M.

<sup>6</sup>  $\rho(1700)$  mass and width fixed at 1700 MeV and 235 MeV, respectively.

<sup>7</sup>  $\rho(1700)$  mass and width fixed at 1780 MeV and 275 MeV respectively.

<sup>8</sup> T-matrix pole.

<sup>9</sup> Using for  $\rho(1700)$  mass and width  $1600 \pm 20$  and  $300 \pm 10$  MeV respectively.

### $K\bar{K}$ MODE

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
$146.5 \pm 10.5$	27k	<sup>1</sup> ABELE	99D CBAR	$\pm$	$0.0 \bar{p} p \rightarrow K^+ K^- \pi^0$

<sup>1</sup> K-matrix pole. Isospin not determined, could be  $\omega(1420)$ .

### $K\bar{K}^*(892) + \text{c.c.}$ MODE

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$418 \pm 25 \pm 4$	AUBERT	08S BABR	$10.6 e^+ e^- \rightarrow K\bar{K}^*(892)\gamma$

## $\rho(1450)$ DECAY MODES

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1$ $\pi\pi$	seen
$\Gamma_2$ $4\pi$	seen
$\Gamma_3$ $\omega\pi$	
$\Gamma_4$ $a_1(1260)\pi$	
$\Gamma_5$ $h_1(1170)\pi$	
$\Gamma_6$ $\pi(1300)\pi$	
$\Gamma_7$ $\rho\rho$	
$\Gamma_8$ $\rho(\pi\pi)_{S\text{-wave}}$	
$\Gamma_9$ $e^+e^-$	seen
$\Gamma_{10}$ $\eta\rho$	seen
$\Gamma_{11}$ $a_2(1320)\pi$	not seen
$\Gamma_{12}$ $K\bar{K}$	not seen
$\Gamma_{13}$ $K\bar{K}^*(892) + \text{c.c.}$	possibly seen
$\Gamma_{14}$ $\eta\gamma$	seen
$\Gamma_{15}$ $f_0(500)\gamma$	not seen
$\Gamma_{16}$ $f_0(980)\gamma$	not seen
$\Gamma_{17}$ $f_0(1370)\gamma$	not seen
$\Gamma_{18}$ $f_2(1270)\gamma$	not seen

### $\rho(1450) \Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$

#### $\Gamma(\pi\pi) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_1\Gamma_9/\Gamma$

VALUE (keV)	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
0.12	<sup>1</sup> DIEKMAN	88	RVUE $e^+e^- \rightarrow \pi^+\pi^-$
$0.027^{+0.015}_{-0.010}$	<sup>2</sup> KURDADZE	83	OLYA $0.64\text{--}1.4 e^+e^- \rightarrow \pi^+\pi^-$

#### $\Gamma(\eta\rho) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_{10}\Gamma_9/\Gamma$

VALUE (eV)	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$74 \pm 20$	<sup>3</sup> AKHMETSHIN 00D	CMD2	$e^+e^- \rightarrow \eta\pi^+\pi^-$
$91 \pm 19$	ANTONELLI	88 DM2	$e^+e^- \rightarrow \eta\pi^+\pi^-$

#### $\Gamma(\eta\gamma) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_{14}\Gamma_9/\Gamma$

VALUE (eV)	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$<16.4$	<sup>4</sup> AKHMETSHIN 05	CMD2	$0.60\text{--}1.38 e^+e^- \rightarrow \eta\gamma$
$2.2 \pm 0.5 \pm 0.3$	<sup>5</sup> AKHMETSHIN 01B	CMD2	$e^+e^- \rightarrow \eta\gamma$

$\Gamma(K\bar{K}^*(892)+c.c.)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$   $\Gamma_{13}\Gamma_9/\Gamma$

VALUE (eV)                      DOCUMENT ID              TECN      COMMENT

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

127±15±6                      AUBERT              08S    BABR    10.6  $e^+e^- \rightarrow K\bar{K}^*(892)\gamma$

<sup>1</sup> Using total width = 235 MeV.

<sup>2</sup> Using for  $\rho(1700)$  mass and width 1600 ± 20 and 300 ± 10 MeV respectively.

<sup>3</sup> Using the data of ANTONELLI 88, DOLINSKY 91, and AKHMETSHIN 00D. The energy-independent width of the  $\rho(1450)$  and  $\rho(1700)$  mesons assumed.

<sup>4</sup> From  $2\gamma$  decay mode of  $\eta$  using 1465 MeV and 310 MeV for the  $\rho(1450)$  mass and width. Recalculated by us.

<sup>5</sup> Using the data of AKHMETSHIN 01B on  $e^+e^- \rightarrow \eta\gamma$ , AKHMETSHIN 00D and ANTONELLI 88 on  $e^+e^- \rightarrow \eta\pi^+\pi^-$ . Recalculated by us using width of 226 MeV.

$\rho(1450) \Gamma(i)/\Gamma(\text{total}) \times \Gamma(e^+e^-)/\Gamma(\text{total})$

$\Gamma(\omega\pi)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$   $\Gamma_3/\Gamma \times \Gamma_9/\Gamma$

VALUE (units 10<sup>-6</sup>)      EVTS              DOCUMENT ID              TECN      COMMENT

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

5.3±0.4                      7815              <sup>1</sup>ACHASOV              13      SND      1.05–2.00  $e^+e^- \rightarrow \pi^0\pi^0\gamma$

$\Gamma(f_0(500)\gamma)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$   $\Gamma_{15}/\Gamma \times \Gamma_9/\Gamma$

VALUE (units 10<sup>-9</sup>)              CL%              DOCUMENT ID              TECN      COMMENT

<4.0                      90              ACHASOV              11      SND       $e^+e^- \rightarrow \pi^0\pi^0\gamma$

$\Gamma(f_0(980)\gamma)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$   $\Gamma_{16}/\Gamma \times \Gamma_9/\Gamma$

VALUE (units 10<sup>-9</sup>)              CL%              DOCUMENT ID              TECN      COMMENT

<2.6                      90              ACHASOV              11      SND       $e^+e^- \rightarrow \pi^0\pi^0\gamma$

$\Gamma(f_0(1370)\gamma)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$   $\Gamma_{17}/\Gamma \times \Gamma_9/\Gamma$

VALUE (units 10<sup>-9</sup>)              CL%              DOCUMENT ID              TECN      COMMENT

<3.5                      90              ACHASOV              11      SND       $e^+e^- \rightarrow \pi^0\pi^0\gamma$

$\Gamma(f_2(1270)\gamma)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$   $\Gamma_{18}/\Gamma \times \Gamma_9/\Gamma$

VALUE (units 10<sup>-9</sup>)              CL%              DOCUMENT ID              TECN      COMMENT

<0.8                      90              <sup>2</sup>ACHASOV              11      SND       $e^+e^- \rightarrow \pi^0\pi^0\gamma$

<sup>1</sup> From a phenomenological model based on vector meson dominance with the interfering  $\rho(1450)$  and  $\rho(1700)$  and their widths fixed at 400 and 250 MeV, respectively. Systematic uncertainty not estimated.

<sup>2</sup> Using Breit-Wigner parametrization of the  $\rho(1450)$  with mass and width of 1465 MeV and 400 MeV, respectively.

$\rho(1450)$  BRANCHING RATIOS

$\Gamma(\pi\pi)/\Gamma(4\pi)$   $\Gamma_1/\Gamma_2$

VALUE                      DOCUMENT ID              TECN      COMMENT

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

0.37±0.10                      <sup>1,2</sup>ABELE              01B    CBAR    0.0  $\bar{p}n \rightarrow 5\pi$

$\Gamma(\omega\pi)/\Gamma_{\text{total}}$					$\Gamma_3/\Gamma$
<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen	1.6k	ACHASOV	12	SND	$e^+e^- \rightarrow \pi^0\pi^0\gamma$
$\sim 0.21$		CLEGG	94	RVUE	
$\Gamma(\pi\pi)/\Gamma(\omega\pi)$					$\Gamma_1/\Gamma_3$
<u>VALUE</u>		<u>DOCUMENT ID</u>	<u>TECN</u>		
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$\sim 0.32$		CLEGG	94	RVUE	
$\Gamma(\omega\pi)/\Gamma(4\pi)$					$\Gamma_3/\Gamma_2$
<u>VALUE</u>		<u>DOCUMENT ID</u>	<u>TECN</u>		
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<0.14$		CLEGG	88	RVUE	
$\Gamma(a_1(1260)\pi)/\Gamma(4\pi)$					$\Gamma_4/\Gamma_2$
<u>VALUE</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.27 \pm 0.08$		<sup>1</sup> ABELE	01B	CBAR	$0.0 \bar{p}n \rightarrow 5\pi$
$\Gamma(h_1(1170)\pi)/\Gamma(4\pi)$					$\Gamma_5/\Gamma_2$
<u>VALUE</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.08 \pm 0.04$		<sup>1</sup> ABELE	01B	CBAR	$0.0 \bar{p}n \rightarrow 5\pi$
$\Gamma(\pi(1300)\pi)/\Gamma(4\pi)$					$\Gamma_6/\Gamma_2$
<u>VALUE</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.37 \pm 0.13$		<sup>1</sup> ABELE	01B	CBAR	$0.0 \bar{p}n \rightarrow 5\pi$
$\Gamma(\rho\rho)/\Gamma(4\pi)$					$\Gamma_7/\Gamma_2$
<u>VALUE</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.11 \pm 0.05$		<sup>1</sup> ABELE	01B	CBAR	$0.0 \bar{p}n \rightarrow 5\pi$
$\Gamma(\rho(\pi\pi)_{\text{S-wave}})/\Gamma(4\pi)$					$\Gamma_8/\Gamma_2$
<u>VALUE</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.17 \pm 0.09$		<sup>1</sup> ABELE	01B	CBAR	$0.0 \bar{p}n \rightarrow 5\pi$
$\Gamma(\eta\rho)/\Gamma_{\text{total}}$					$\Gamma_{10}/\Gamma$
<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
seen	35	<sup>3</sup> ACHASOV	14	SND	$1.15\text{--}2.00 e^+e^- \rightarrow \eta\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<0.04$		DONNACHIE	87B	RVUE	

$\Gamma(\eta\rho)/\Gamma(\omega\pi)$   $\Gamma_{10}/\Gamma_3$

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$\sim 0.24$	<sup>4</sup> DONNACHIE 91	RVUE	
$> 2$	FUKUI 91	SPEC	$8.95 \pi^- p \rightarrow \omega \pi^0 n$

$\Gamma(a_2(1320)\pi)/\Gamma_{total}$   $\Gamma_{11}/\Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
not seen	AMELIN 00	VES	$37 \pi^- p \rightarrow \eta \pi^+ \pi^- n$

$\Gamma(K\bar{K})/\Gamma(\omega\pi)$   $\Gamma_{12}/\Gamma_3$

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$< 0.08$	<sup>4</sup> DONNACHIE 91	RVUE	

$\Gamma(K\bar{K}^*(892)+c.c.)/\Gamma_{total}$   $\Gamma_{13}/\Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
possibly seen	COAN 04	CLEO	$\tau^- \rightarrow K^- \pi^- K^+ \nu_\tau$

$\Gamma(\eta\gamma)/\Gamma_{total}$   $\Gamma_{14}/\Gamma$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
seen	35	<sup>3</sup> ACHASOV 14	SND	$1.15-2.00 e^+ e^- \rightarrow \eta \gamma$

<sup>1</sup>  $\omega\pi$  not included.

<sup>2</sup> Using ABELE 97.

<sup>3</sup> From a phenomenological model based on vector meson dominance with  $\rho(1450)$  and  $\phi(1680)$  masses and widths from the PDG 12.

<sup>4</sup> Using data from BISELLO 91B, DOLINSKY 86 and ALBRECHT 87L.

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ABELE	99C	PL B450 275	A. Abele <i>et al.</i>	(Crystal Barrel Collab.)
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BISELLO	91B	NPBPS B21 111	D. Bisello	(DM2 Collab.)
DOLINSKY	91	PRPL 202 99	S.I. Dolinsky <i>et al.</i>	(NOVO)
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