

$\omega(1420)$ 

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

### $\omega(1420)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>(1400–1450) OUR ESTIMATE</b>				
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$1382 \pm 23 \pm 70$		AUBERT	07AU BABR	$10.6 e^+ e^- \rightarrow \omega \pi^+ \pi^- \gamma$
$1350 \pm 20 \pm 20$		AUBERT,B	04N BABR	$10.6 e^+ e^- \rightarrow \pi^+ \pi^- \pi^0 \gamma$
$1400 \pm 50 \pm 130$	1.2M	<sup>1</sup> ACHASOV	03D RVUE	$0.44\text{--}2.00 e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$
$1450 \pm 10$		<sup>2</sup> HENNER	02 RVUE	$1.2\text{--}2.0 e^+ e^- \rightarrow \rho \pi, \omega \pi \pi$
$1373 \pm 70$	177	<sup>3</sup> AKHMETSHIN	00D CMD2	$1.2\text{--}1.38 e^+ e^- \rightarrow \omega \pi^+ \pi^-$
$1370 \pm 25$	5095	ANISOVICH	00H SPEC	$0.0 \rho \bar{p} \rightarrow \omega \pi^0 \pi^0 \pi^0$
$1400^{+100}_{-200}$		<sup>4</sup> ACHASOV	98H RVUE	$e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$
$\sim 1400$		<sup>5</sup> ACHASOV	98H RVUE	$e^+ e^- \rightarrow \omega \pi^+ \pi^-$
$\sim 1460$		<sup>6</sup> ACHASOV	98H RVUE	$e^+ e^- \rightarrow K^+ K^-$
$1440 \pm 70$		<sup>7</sup> CLEGG	94 RVUE	
$1419 \pm 31$	315	<sup>8</sup> ANTONELLI	92 DM2	$1.34\text{--}2.4 e^+ e^- \rightarrow \rho \pi$
<sup>1</sup> From the combined fit of ANTONELLI 92, ACHASOV 01E, ACHASOV 02E, and ACHASOV 03D data on the $\pi^+ \pi^- \pi^0$ and ANTONELLI 92 on the $\omega \pi^+ \pi^-$ final states. Supersedes ACHASOV 99E and ACHASOV 02E.				
<sup>2</sup> Using results of CORDIER 81 and preliminary data of DOLINSKY 91 and ANTONELLI 92.				
<sup>3</sup> Using the data of AKHMETSHIN 00D and ANTONELLI 92. The $\rho \pi$ dominance for the energy dependence of the $\omega(1420)$ and $\omega(1650)$ width assumed.				
<sup>4</sup> Using data from BARKOV 87, DOLINSKY 91, and ANTONELLI 92.				
<sup>5</sup> Using the data from ANTONELLI 92.				
<sup>6</sup> Using the data from IVANOV 81 and BISELLO 88B.				
<sup>7</sup> From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.				
<sup>8</sup> From a fit to two Breit-Wigner functions interfering between them and with the $\omega, \phi$ tails with fixed (+, -, +) phases.				

### $\omega(1420)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>(180–250) OUR ESTIMATE</b>				
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$130 \pm 50 \pm 100$		AUBERT	07AU BABR	$10.6 e^+ e^- \rightarrow \omega \pi^+ \pi^- \gamma$
$450 \pm 70 \pm 70$		AUBERT,B	04N BABR	$10.6 e^+ e^- \rightarrow \pi^+ \pi^- \pi^0 \gamma$
$870^{+500}_{-300} \pm 450$	1.2M	<sup>9</sup> ACHASOV	03D RVUE	$0.44\text{--}2.00 e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$
$199 \pm 15$		<sup>10</sup> HENNER	02 RVUE	$1.2\text{--}2.0 e^+ e^- \rightarrow \rho \pi, \omega \pi \pi$
$188 \pm 45$	177	<sup>11</sup> AKHMETSHIN	00D CMD2	$1.2\text{--}1.38 e^+ e^- \rightarrow \omega \pi^+ \pi^-$
$360^{+100}_{-60}$	5095	ANISOVICH	00H SPEC	$0.0 \rho \bar{p} \rightarrow \omega \pi^0 \pi^0 \pi^0$
$240 \pm 70$		<sup>12</sup> CLEGG	94 RVUE	
$174 \pm 59$	315	<sup>13</sup> ANTONELLI	92 DM2	$1.34\text{--}2.4 e^+ e^- \rightarrow \rho \pi$

- <sup>9</sup> From the combined fit of ANTONELLI 92, ACHASOV 01E, ACHASOV 02E, and ACHASOV 03D data on the  $\pi^+\pi^-\pi^0$  and ANTONELLI 92 on the  $\omega\pi^+\pi^-$  final states. Supersedes ACHASOV 99E and ACHASOV 02E.
- <sup>10</sup> Using results of CORDIER 81 and preliminary data of DOLINSKY 91 and ANTONELLI 92.
- <sup>11</sup> Using the data of AKHMETSHIN 00D and ANTONELLI 92. The  $\rho\pi$  dominance for the energy dependence of the  $\omega(1420)$  and  $\omega(1650)$  width assumed.
- <sup>12</sup> From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.
- <sup>13</sup> From a fit to two Breit-Wigner functions interfering between them and with the  $\omega,\phi$  tails with fixed (+,-,+) phases.

## $\omega(1420)$ DECAY MODES

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1$ $\rho\pi$	dominant
$\Gamma_2$ $\omega\pi\pi$	seen
$\Gamma_3$ $b_1(1235)\pi$	seen
$\Gamma_4$ $e^+e^-$	seen
$\Gamma_5$ $\pi^0\gamma$	

### $\omega(1420) \Gamma(i)\Gamma(e^+e^-)/\Gamma^2(\text{total})$

$\Gamma(\rho\pi)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$   $\Gamma_1/\Gamma \times \Gamma_4/\Gamma$

VALUE (units $10^{-6}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
0.82 ± 0.05 ± 0.06		AUBERT,B	04N BABR	10.6 $e^+e^- \rightarrow \pi^+\pi^-\pi^0\gamma$
0.65 ± 0.13 ± 0.21	1.2M	<sup>14,15</sup> ACHASOV	03D RVUE	0.44–2.00 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
0.625 ± 0.160		<sup>16,17</sup> CLEGG	94 RVUE	
0.466 ± 0.178		<sup>18,19</sup> ANTONELLI	92 DM2	1.34–2.4 $e^+e^- \rightarrow \rho\pi$

- <sup>14</sup> Calculated by us from the cross section at the peak.
- <sup>15</sup> From the combined fit of ANTONELLI 92, ACHASOV 01E, ACHASOV 02E, and ACHASOV 03D data on the  $\pi^+\pi^-\pi^0$  and ANTONELLI 92 on the  $\omega\pi^+\pi^-$  final states. Supersedes ACHASOV 99E and ACHASOV 02E.
- <sup>16</sup> From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.
- <sup>17</sup> From the partial and leptonic width given by the authors.
- <sup>18</sup> From a fit to two Breit-Wigner functions interfering between them and with the  $\omega,\phi$  tails with fixed (+,-,+) phases.
- <sup>19</sup> From the product of the leptonic width and partial branching ratio given by the authors.

$\Gamma(\omega\pi\pi)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$   $\Gamma_2/\Gamma \times \Gamma_4/\Gamma$

VALUE (units $10^{-8}$ )	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
19.7 ± 5.7	AUBERT	07AU BABR	10.6 $e^+e^- \rightarrow \omega\pi^+\pi^-\gamma$
1.9 ± 1.9	<sup>20</sup> AKHMETSHIN	00D CMD2	1.2–2.4 $e^+e^- \rightarrow \omega\pi^+\pi^-$
<sup>20</sup> Using the data of AKHMETSHIN 00D and ANTONELLI 92. The $\rho\pi$ dominance for the energy dependence of the $\omega(1420)$ and $\omega(1650)$ width assumed.			

$\Gamma(\pi^0\gamma)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$   $\Gamma_5/\Gamma \times \Gamma_4/\Gamma$

VALUE (units  $10^{-8}$ )      DOCUMENT ID      TECN      COMMENT

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

$2.03^{+0.70}_{-0.75}$       <sup>21</sup> AKHMETSHIN 05      CMD2      0.60-1.38  $e^+e^- \rightarrow \pi^0\gamma$

<sup>21</sup> Using 1420 MeV and 220 MeV for the  $\omega(1420)$  mass and width.

**$\omega(1420)$  BRANCHING RATIOS**

$\Gamma(\omega\pi\pi)/\Gamma_{\text{total}}$   $\Gamma_2/\Gamma$

VALUE      DOCUMENT ID      TECN      COMMENT

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

$0.301 \pm 0.029$       <sup>22</sup> HENNER      02      RVUE      1.2-2.0  $e^+e^- \rightarrow \rho\pi, \omega\pi\pi$   
possibly seen      AKHMETSHIN 00D      CMD2       $e^+e^- \rightarrow \omega\pi^+\pi^-$

$\Gamma(\omega\pi\pi)/\Gamma(b_1(1235)\pi)$   $\Gamma_2/\Gamma_3$

VALUE      EVTS      DOCUMENT ID      TECN      COMMENT

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

$0.60 \pm 0.16$       5095      ANISOVICH      00H      SPEC      0.0  $\rho\bar{p} \rightarrow \omega\pi^0\pi^0\pi^0$

$\Gamma(\rho\pi)/\Gamma_{\text{total}}$   $\Gamma_1/\Gamma$

VALUE      DOCUMENT ID      TECN      COMMENT

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

$0.699 \pm 0.029$       <sup>22</sup> HENNER      02      RVUE      1.2-2.0  $e^+e^- \rightarrow \rho\pi, \omega\pi\pi$

$\Gamma(e^+e^-)/\Gamma_{\text{total}}$   $\Gamma_4/\Gamma$

VALUE (units  $10^{-7}$ )      EVTS      DOCUMENT ID      TECN      COMMENT

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

$\sim 6.6$       1.2M <sup>23,24</sup> ACHASOV      03D      RVUE      0.44-2.00  $e^+e^- \rightarrow$   
 $\pi^+\pi^-\pi^0$

$23 \pm 1$       <sup>22</sup> HENNER      02      RVUE      1.2-2.0  $e^+e^- \rightarrow \rho\pi, \omega\pi\pi$

<sup>22</sup> Assuming that the  $\omega(1420)$  decays into  $\rho\pi$  and  $\omega\pi\pi$  only.

<sup>23</sup> Calculated by us from the cross section at the peak.

<sup>24</sup> Assuming that the  $\omega(1420)$  decays into  $\rho\pi$  only.

**$\omega(1420)$  REFERENCES**

AUBERT	07AU	PR D76 092005	B. Aubert <i>et al.</i>	(BABAR Collab.)
AKHMETSHIN	05	PL B605 26	R.R. Akhmetshin <i>et al.</i>	(Novosibirsk CMD-2 Collab.)
AUBERT,B	04N	PR D70 072004	B. Aubert <i>et al.</i>	(BABAR Collab.)
ACHASOV	03D	PR D68 052006	M.N. Achasov <i>et al.</i>	(Novosibirsk SND Collab.)
ACHASOV	02E	PR D66 032001	M.N. Achasov <i>et al.</i>	(Novosibirsk SND Collab.)
HENNER	02	EPJ C26 3	V.K. Henner <i>et al.</i>	
ACHASOV	01E	PR D63 072002	M.N. Achasov <i>et al.</i>	(Novosibirsk SND Collab.)
AKHMETSHIN	00D	PL B489 125	R.R. Akhmetshin <i>et al.</i>	(Novosibirsk CMD-2 Collab.)
ANISOVICH	00H	PL B485 341	A.V. Anisovich <i>et al.</i>	
ACHASOV	99E	PL B462 365	M.N. Achasov <i>et al.</i>	(Novosibirsk SND Collab.)
ACHASOV	98H	PR D57 4334	N.N. Achasov, A.A. Kozhevnikov	
CLEGG	94	ZPHY C62 455	A.B. Clegg, A. Donnachie	(LANC, MCHS)
ANTONELLI	92	ZPHY C56 15	A. Antonelli <i>et al.</i>	(DM2 Collab.)
DOLINSKY	91	PRPL 202 99	S.I. Dolinsky <i>et al.</i>	(NOVO)
BISELLO	88B	ZPHY C39 13	D. Bisello <i>et al.</i>	(PADO, CLER, FRAS+)
BARKOV	87	JETPL 46 164	L.M. Barkov <i>et al.</i>	(NOVO)
Translated from ZETFP 46 132.				

CORDIER	81	PL 106B 155	A. Cordier <i>et al.</i>	(ORSAY)
IVANOV	81	PL 107B 297	P.M. Ivanov <i>et al.</i>	(NOVO)

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