

$\omega(1650)$
was $\omega(1600)$

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

$\omega(1650)$ MASS

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
1670 ± 30 OUR ESTIMATE					
1660 ± 10 ± 2		AUBERT,B	04N	BABR	10.6 $e^+e^- \rightarrow \pi^+\pi^-\pi^0\gamma$
1700 ± 20		EUGENIO	01	SPEC	18 $\pi^-p \rightarrow \omega\eta n$
1705 ± 26	612	¹ AKHMETSHIN 00D	CMD2		$e^+e^- \rightarrow \omega\pi^+\pi^-$
1662 ± 13	750	² ANTONELLI 92	DM2		1.34–2.4 $e^+e^- \rightarrow \rho\pi, \omega\pi\pi$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
1770 ± 50 ± 60	1.2M	³ ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
1619 ± 5		⁴ HENNER	02	RVUE	1.2–2.0 $e^+e^- \rightarrow \rho\pi, \omega\pi\pi$
1820 ⁺¹⁹⁰ _{–150}		⁵ ACHASOV	98H	RVUE	$e^+e^- \rightarrow \pi^+\pi^-\pi^0$
1840 ⁺¹⁰⁰ _{–70}		⁶ ACHASOV	98H	RVUE	$e^+e^- \rightarrow \omega\pi^+\pi^-$
1780 ⁺¹⁷⁰ _{–300}		⁷ ACHASOV	98H	RVUE	$e^+e^- \rightarrow K^+K^-$
~ 2100		⁸ ACHASOV	98H	RVUE	$e^+e^- \rightarrow K_S^0 K^\pm \pi^\mp$
1606 ± 9		⁹ CLEGG	94	RVUE	
1670 ± 20		ATKINSON	83B	OMEG	20–70 $\gamma p \rightarrow 3\pi X$
1657 ± 13		CORDIER	81	DM1	$e^+e^- \rightarrow \omega 2\pi$
1679 ± 34	21	ESPOSITO	80	FRAM	$e^+e^- \rightarrow 3\pi$
1652 ± 17		COSME	79	OSPK 0	$e^+e^- \rightarrow 3\pi$

¹ 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.

² From the combined fit of the $\rho\pi$ and $\omega\pi\pi$ final states.

³ 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.

⁴ Using results of CORDIER 81 and preliminary data of DOLINSKY 91 and ANTONELLI 92.

⁵ Using data from BARKOV 87, DOLINSKY 91, and ANTONELLI 92.

⁶ Using the data from ANTONELLI 92.

⁷ Using the data from IVANOV 81 and BISELLO 88B.

⁸ Using the data from BISELLO 91C.

⁹ From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.

$\omega(1650)$ WIDTH

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
315 ± 35 OUR ESTIMATE					
230 ± 30 ± 20		AUBERT,B	04N	BABR	10.6 $e^+e^- \rightarrow \pi^+\pi^-\pi^0\gamma$
250 ± 50		EUGENIO	01	SPEC	18 $\pi^-p \rightarrow \omega\eta n$
370 ± 25	612	¹⁰ AKHMETSHIN	00D	CMD2	$e^+e^- \rightarrow \omega\pi^+\pi^-$
280 ± 24	750	¹¹ ANTONELLI	92	DM2	1.34–2.4 $e^+e^- \rightarrow \rho\pi, \omega\pi\pi$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
490 ⁺²⁰⁰ ₋₁₅₀ ± 130	1.2M	¹² ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
250 ± 14		¹³ HENNER	02	RVUE	1.2–2.0 $e^+e^- \rightarrow \rho\pi, \omega\pi\pi$
113 ± 20		¹⁴ CLEGG	94	RVUE	
160 ± 20		ATKINSON	83B	OMEG	20–70 $\gamma p \rightarrow 3\pi X$
136 ± 46		CORDIER	81	DM1	$e^+e^- \rightarrow \omega 2\pi$
99 ± 49	21	ESPOSITO	80	FRAM	$e^+e^- \rightarrow 3\pi$
42 ± 17		COSME	79	OSPK 0	$e^+e^- \rightarrow 3\pi$

¹⁰ 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.

¹¹ From the combined fit of the $\rho\pi$ and $\omega\pi\pi$ final states.

¹² 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.

¹³ Using results of CORDIER 81 and preliminary data of DOLINSKY 91 and ANTONELLI 92.

¹⁴ From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.

$\omega(1650)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $\rho\pi$	seen
Γ_2 $\omega\pi\pi$	seen
Γ_3 $\omega\eta$	seen
Γ_4 e^+e^-	seen

$\omega(1650)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma^2(\text{total})$

<u>VALUE (units 10^{-6})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	$\Gamma_1\Gamma_4/\Gamma^2$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
1.3 ± 0.1 ± 0.1		AUBERT,B	04N	BABR	10.6 $e^+e^- \rightarrow \pi^+\pi^-\pi^0\gamma$
1.2 ^{+0.4} _{-0.1} ± 0.8	1.2M	^{15,16} ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
0.921 ± 0.230		^{17,18} CLEGG	94	RVUE	
0.479 ± 0.050	750	^{19,20} ANTONELLI	92	DM2	1.34–2.4 $e^+e^- \rightarrow \rho\pi, \omega\pi\pi$

$\Gamma(\omega\pi\pi) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}^2$					$\Gamma_2\Gamma_4/\Gamma^2$
VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.41 \pm 0.09 \pm 0.13$	1.2M	^{15,16} ACHASOV	03D	RVUE	$0.44-2.00 e^+e^- \rightarrow \pi^+\pi^-\pi^0$
0.540 ± 0.095		²¹ AKHMETSHIN	00D	CMD2	$1.2-1.38 e^+e^- \rightarrow \omega\pi^+\pi^-$
0.318 ± 0.080		^{17,18} CLEGG	94	RVUE	
0.607 ± 0.061	750	^{19,20} ANTONELLI	92	DM2	$1.34-2.4e^+e^- \rightarrow \rho\pi, \omega\pi\pi$

$\Gamma(\omega\eta) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}^2$					$\Gamma_3\Gamma_4/\Gamma^2$
VALUE (units 10^{-6})	CL%	DOCUMENT ID	TECN	COMMENT	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<6	90	²² AKHMETSHIN	03B	CMD2	$e^+e^- \rightarrow \eta\pi^0\gamma$
¹⁵ Calculated by us from the cross section at the peak.					
¹⁶ 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.					
¹⁷ From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.					
¹⁸ From the partial and leptonic width given by the authors.					
¹⁹ From the combined fit of the $\rho\pi$ and $\omega\pi\pi$ final states.					
²⁰ From the product of the leptonic width and partial branching ratio given by the authors.					
²¹ 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.					
²² $\omega(1650)$ mass and width fixed at 1700 MeV and 250 MeV, respectively.					

$\omega(1650)$ BRANCHING RATIOS

$\Gamma(\omega\pi\pi)/\Gamma_{\text{total}}$					Γ_2/Γ
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 0.35	1.2M	²⁴ ACHASOV	03D	RVUE	$0.44-2.00 e^+e^- \rightarrow \pi^+\pi^-\pi^0$
0.620 ± 0.014		²⁵ HENNER	02	RVUE	$1.2-2.0 e^+e^- \rightarrow \rho\pi, \omega\pi\pi$

$\Gamma(\rho\pi)/\Gamma_{\text{total}}$					Γ_1/Γ
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 0.65	1.2M	²⁴ ACHASOV	03D	RVUE	$0.44-2.00 e^+e^- \rightarrow \pi^+\pi^-\pi^0$
0.380 ± 0.014		²⁵ HENNER	02	RVUE	$1.2-2.0 e^+e^- \rightarrow \rho\pi, \omega\pi\pi$

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

Γ_4/Γ

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

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

~ 18 1.2M ^{23,25} ACHASOV 03D RVUE 0.44–2.00 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
 32±1 ²⁵ HENNER 02 RVUE 1.2–2.0 $e^+e^- \rightarrow \rho\pi, \omega\pi\pi$

²³ Calculated by us from the cross section at the peak.

²⁴ 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.

²⁵ Assuming that the $\omega(1650)$ decays into $\rho\pi$ and $\omega\pi\pi$ only.

$\omega(1650)$ REFERENCES

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