

$\omega(1420)$

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

 $\omega(1420)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
(1400–1450) OUR ESTIMATE				
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$1350 \pm 20 \pm 20$		AUBERT,B	04N BABR	$10.6 e^+ e^- \rightarrow \pi^+ \pi^- \pi^0 \gamma$
$1400 \pm 50 \pm 130$	1.2M	¹ ACHASOV	03D RVUE	$0.44-2.00 e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$
1450 ± 10		² HENNER	02 RVUE	$1.2-2.0 e^+ e^- \rightarrow \rho\pi,$
1373 ± 70	177	³ AKHMETSHIN	00D CMD2	$1.2-1.38 e^+ e^- \rightarrow \omega\pi\pi$
1370 ± 25	5095	ANISOVICH	00H SPEC	$0.0 \rho\bar{p} \rightarrow \omega\pi^0\pi^0\pi^0$
1400^{+100}_{-200}		⁴ ACHASOV	98H RVUE	$e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$
~ 1400		⁵ ACHASOV	98H RVUE	$e^+ e^- \rightarrow \omega\pi^+ \pi^-$
~ 1460		⁶ ACHASOV	98H RVUE	$e^+ e^- \rightarrow K^+ K^-$
1440 ± 70		⁷ CLEGG	94 RVUE	
1419 ± 31	315	⁸ ANTONELLI	92 DM2	$1.34-2.4 e^+ e^- \rightarrow \rho\pi$

¹From 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.

²Using results of CORDIER 81 and preliminary data of DOLINSKY 91 and ANTONELLI 92.

³Using 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.

⁴Using data from BARKOV 87, DOLINSKY 91, and ANTONELLI 92.

⁵Using the data from ANTONELLI 92.

⁶Using the data from IVANOV 81 and BISELLO 88B.

⁷From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.

⁸From a fit to two Breit-Wigner functions interfering between them and with the ω, ϕ tails with fixed (+, -, +) phases.

 $\omega(1420)$ WIDTH

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

- ⁹ 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.
- ¹⁰ Using results of CORDIER 81 and preliminary data of DOLINSKY 91 and ANTONELLI 92.
- ¹¹ 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.
- ¹² From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.
- ¹³ From a fit to two Breit-Wigner functions interfering between them and with the ω,ϕ tails with fixed (+,-,+) phases.

$\omega(1420)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $\rho\pi$	dominant
Γ_2 $\omega\pi\pi$	seen
Γ_3 $b_1(1235)\pi$	seen
Γ_4 e^+e^-	seen
Γ_5 $\pi^0\gamma$	

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

$$\Gamma(\rho\pi) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}^2 \qquad \Gamma_1\Gamma_4/\Gamma^2$$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.82 \pm 0.05 \pm 0.06$		AUBERT,B	04N BABR	$10.6 e^+e^- \rightarrow \pi^+\pi^-\pi^0\gamma$
$0.65 \pm 0.13 \pm 0.21$	1.2M	^{14,15} ACHASOV	03D RVUE	$0.44-2.00 e^+e^- \rightarrow \pi^+\pi^-\pi^0$
0.625 ± 0.160		^{16,17} CLEGG	94 RVUE	
0.466 ± 0.178		^{18,19} ANTONELLI	92 DM2	$1.34-2.4 e^+e^- \rightarrow \rho\pi$

¹⁴ Calculated by us from the cross section at the peak.

¹⁵ 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.

¹⁶ From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.

¹⁷ From the partial and leptonic width given by the authors.

¹⁸ From a fit to two Breit-Wigner functions interfering between them and with the ω,ϕ tails with fixed (+,-,+) phases.

¹⁹ From the product of the leptonic width and partial branching ratio given by the authors.

$$\Gamma(\omega\pi\pi) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}^2 \qquad \Gamma_2\Gamma_4/\Gamma^2$$

VALUE (units 10^{-8})	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

1.3 ± 1.3	612	²⁰ AKHMETSHIN 00D	CMD2	$1.2-2.4 e^+e^- \rightarrow \omega\pi^+\pi^-$
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²⁰ 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.

$\Gamma(\pi^0\gamma) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}^2$ $\Gamma_5\Gamma_4/\Gamma^2$

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

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

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

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

$\omega(1420)$ BRANCHING RATIOS

$\Gamma(\omega\pi\pi)/\Gamma_{\text{total}}$ Γ_2/Γ

VALUE DOCUMENT ID TECN COMMENT

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

0.301 ± 0.029 ²³ HENNER 02 RVUE $1.2-2.0 e^+e^- \rightarrow \rho\pi,$
possibly seen AKHMETSHIN 00D CMD2 $e^+e^- \rightarrow \omega\pi^+\pi^-$

$\Gamma(\omega\pi\pi)/\Gamma(b_1(1235)\pi)$ Γ_2/Γ_3

VALUE EVTS DOCUMENT ID TECN COMMENT

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

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

$\Gamma(\rho\pi)/\Gamma_{\text{total}}$ Γ_1/Γ

VALUE DOCUMENT ID TECN COMMENT

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

0.699 ± 0.029 ²³ 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. • • •

~ 6.6 1.2M ^{22,24} ACHASOV 03D RVUE $0.44-2.00 e^+e^- \rightarrow \pi^+\pi^-\pi^0$
 23 ± 1 ²³ HENNER 02 RVUE $1.2-2.0 e^+e^- \rightarrow \rho\pi,$
 $\omega\pi\pi$

²² Assuming that the $\omega(1420)$ decays into $\rho\pi$ only.

²³ Assuming that the $\omega(1420)$ decays into $\rho\pi$ and $\omega\pi\pi$ only.

²⁴ Calculated by us from the cross section at the peak.

$\omega(1420)$ REFERENCES

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