$\omega(1420)$

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

$\omega(1420)$ MASS

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
(1400–1450) OUR ESTIMATE					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1470 ± 50	13.1k	[1] AULCHENKO	15A	SND	1.05–1.80 $e^+e^- \to \pi^+\pi^-\pi^0$
$1382 \pm 23 \pm 70$		AUBERT	07AU	BABR	10.6 $e^+e^- \to \omega\pi^+\pi^-\gamma$
$1350 \pm 20 \pm 20$		AUBERT,B	04N	BABR	10.6 $e^+e^- \to \pi^+\pi^-\pi^0\gamma$
$1400 \pm 50 \pm 130$	1.2M	[2] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
1450 ± 10		[3] HENNER	02	RVUE	1.2–2.0 $e^+e^- \to \rho\pi, \omega\pi\pi$
1373 ± 70	177	[4] AKHMETSHIN	00D	CMD2	1.2–1.38 $e^+e^- \to \omega\pi^+\pi^-$
1370 ± 25	5095	ANISOVICH	00H	SPEC	0.0 $p\overline{p} \to \omega\pi^0\pi^0\pi^0$
1400^{+100}_{-200}		[5] ACHASOV	98H	RVUE	$e^+e^- \to \pi^+\pi^-\pi^0$
~ 1400		[6] ACHASOV	98H	RVUE	$e^+e^- \to \omega\pi^+\pi^-$
~ 1460		[7] ACHASOV	98H	RVUE	$e^+e^- \to K^+K^-$
1440 ± 70		[8] CLEGG	94	RVUE	
1419 ± 31	315	[9] ANTONELLI	92	DM2	1.34–2.4 $e^+e^- \to \rho\pi$

[1] From a fit with contributions from $\omega(782)$, $\phi(1020)$, $\omega(1420)$, and $\omega(1650)$.
[2] 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.
[3] Using results of CORDIER 81 and preliminary data of DOLINSKY 91 and ANTONELLI 92.
[4] 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.
[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] From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.
[9] From 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. • • •					
880 ± 170	13.1k	[10] AULCHENKO	15A	SND	1.05–1.80 $e^+e^- \to \pi^+\pi^-\pi^0$
$130 \pm 50 \pm 100$		AUBERT	07AU	BABR	10.6 $e^+e^- \to \omega\pi^+\pi^-\gamma$
$450 \pm 70 \pm 70$		AUBERT,B	04N	BABR	10.6 $e^+e^- \to \pi^+\pi^-\pi^0\gamma$
$870^{+500}_{-300} \pm 450$	1.2M	[11] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
199 ± 15		[12] HENNER	02	RVUE	1.2–2.0 $e^+e^- \to \rho\pi, \omega\pi\pi$

188 ± 45	177	[13] AKHMETSHIN	00D	CMD2	1.2–1.38 $e^+e^- \to \omega\pi^+\pi^-$
360^{+100}_{-60}	5095	ANISOVICH	00H	SPEC	0.0 $p\overline{p} \to \omega\pi^0\pi^0\pi^0$
240 ± 70		[14] CLEGG	94	RVUE	
174 ± 59	315	[15] ANTONELLI	92	DM2	1.34–2.4 $e^+e^- \to \rho\pi$

[10] From a fit with contributions from $\omega(782)$, $\phi(1020)$, $\omega(1420)$, and $\omega(1650)$.
[11] 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.
[12] Using results of CORDIER 81 and preliminary data of DOLINSKY 91 and ANTONELLI 92.
[13] 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.
[14] From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.
[15] 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	$\omega\eta$	
Γ_4	$b_1(1235)\pi$	seen
Γ_5	e^+e^-	seen
Γ_6	$\pi^0\gamma$	

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

$\Gamma(\rho\pi)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\qquad$ $\Gamma_1/\Gamma \times \Gamma_5/\Gamma$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.73 ±0.08	13.1k	[16] AULCHENKO	15A	SND	1.05–1.80 $e^+e^- \to \pi^+\pi^-\pi^0$
0.82 ±0.05 ±0.06		AUBERT,B	04N	BABR	10.6 $e^+e^- \to \pi^+\pi^-\pi^0\gamma$
0.65 ±0.13 ±0.21	1.2M	[17,18] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
0.625±0.160		[19,20] CLEGG	94	RVUE	
0.466±0.178		[21,22] ANTONELLI	92	DM2	1.34–2.4 $e^+e^- \to \rho\pi$

[16] From a fit with contributions from $\omega(782)$, $\phi(1020)$, $\omega(1420)$, and $\omega(1650)$.
[17] Calculated by us from the cross section at the peak.
[18] 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.
[19] From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.
[20] From the partial and leptonic width given by the authors.
[21] From a fit to two Breit-Wigner functions interfering between them and with the ω,ϕ tails with fixed (+,−,+) phases.
[22] From the product of the leptonic width and partial branching ratio given by the authors.

$\Gamma(\omega\pi\pi)/\Gamma_{total} \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_2/\Gamma \times \Gamma_5/\Gamma$

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 $e^+e^- \to \omega\pi^+\pi^-\gamma$
1.9±1.9	[23] AKHMETSHIN	00D	CMD2	1.2–2.4 $e^+e^- \to \omega\pi^+\pi^-$

[23] 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.

$\Gamma(\omega\eta)/\Gamma_{total} \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_3/\Gamma \times \Gamma_5/\Gamma$

VALUE (units 10^{-8})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.6^{+0.9}_{-0.7}$	898	[24] ACHASOV	16B	SND	1.34–2.00 $e^+e^- \to \omega\eta$

[24] From a fit with contributions from $\omega(1420)$, $\omega(1650)$, and $\phi(1680)$. The mass and the width of $\omega(1420)$ are fixed to the 2014 edition (PDG 14) of this review.

$\Gamma(\pi^0\gamma)/\Gamma_{total} \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_6/\Gamma \times \Gamma_5/\Gamma$

VALUE (units 10^{-8})	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$2.03^{+0.70}_{-0.75}$	[25] AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \pi^0\gamma$

[25] Using 1420 MeV and 220 MeV for the $\omega(1420)$ mass and width.

$\omega(1420)$ BRANCHING RATIOS

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

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.301±0.029	[26] HENNER	02	RVUE	1.2–2.0 $e^+e^- \to \rho\pi, \omega\pi\pi$
possibly seen	AKHMETSHIN	00D	CMD2	$e^+e^- \to \omega\pi^+\pi^-$

$\Gamma(\omega\pi\pi)/\Gamma(b_1(1235)\pi)$ Γ_2/Γ_4

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 $p\overline{p} \to \omega\pi^0\pi^0\pi^0$

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

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.699±0.029	[26] HENNER	02	RVUE	1.2–2.0 $e^+e^- \to \rho\pi, \omega\pi\pi$

$\Gamma(e^+e^-)/\Gamma_{total}$ Γ_5/Γ

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	[27,28] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
23 $\pm$1		[26] HENNER	02	RVUE	1.2–2.0 $e^+e^- \to \rho\pi$, $\omega\pi\pi$

[26] Assuming that the $\omega(1420)$ decays into $\rho\pi$ and $\omega\pi\pi$ only.
[27] Calculated by us from the cross section at the peak.
[28] Assuming that the $\omega(1420)$ decays into $\rho\pi$ only.

$\omega(1420)$ REFERENCES

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		Translated from ZETF 148 34.		
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