

$\omega(1420)$

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

 $\omega(1420)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
(1400–1450) OUR ESTIMATE				
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$1382 \pm 23 \pm 70$		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	¹ ACHASOV	03D RVUE	$0.44\text{--}2.00 e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$
1450 ± 10		² HENNER	02 RVUE	$1.2\text{--}2.0 e^+ e^- \rightarrow \rho \pi, \omega \pi \pi$
1373 ± 70	177	³ AKHMETSHIN	00D CMD2	$1.2\text{--}1.38 e^+ e^- \rightarrow \omega \pi^+ \pi^-$
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	$1.34\text{--}2.4 e^+ e^- \rightarrow \rho \pi$
¹ 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.				
² Using results of CORDIER 81 and preliminary data of DOLINSKY 91 and ANTONELLI 92.				
³ 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.				
⁴ Using data from BARKOV 87, DOLINSKY 91, and ANTONELLI 92.				
⁵ Using the data from ANTONELLI 92.				
⁶ Using the data from IVANOV 81 and BISELLO 88B.				
⁷ From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.				
⁸ 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. ● ● ●				
$130 \pm 50 \pm 100$		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	⁹ ACHASOV	03D RVUE	$0.44\text{--}2.00 e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$
199 ± 15		¹⁰ HENNER	02 RVUE	$1.2\text{--}2.0 e^+ e^- \rightarrow \rho \pi, \omega \pi \pi$
188 ± 45	177	¹¹ 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 ± 70		¹² CLEGG	94 RVUE	
174 ± 59	315	¹³ ANTONELLI	92 DM2	$1.34\text{--}2.4 e^+ e^- \rightarrow \rho \pi$

- 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 $\pi^0\gamma$	

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

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

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	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.

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

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

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

VALUE (units 10^{-8})	DOCUMENT ID	TECN	COMMENT
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• • • 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 $e^+e^- \rightarrow \pi^0\gamma$
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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
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• • • We do not use the following data for averages, fits, limits, etc. • • •

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

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.60 ± 0.16	5095	ANISOVICH	00H	SPEC 0.0 $\rho\bar{p} \rightarrow \omega\pi^0\pi^0\pi^0$
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 $\Gamma(\rho\pi)/\Gamma_{\text{total}}$ Γ_1/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.699 ± 0.029	²² HENNER	02	RVUE 1.2-2.0 $e^+e^- \rightarrow \rho\pi, \omega\pi\pi$
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 $\Gamma(e^+e^-)/\Gamma_{\text{total}}$ Γ_4/Γ

VALUE (units 10^{-7})	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

~ 6.6	1.2M	^{23,24} ACHASOV	03D	RVUE 0.44-2.00 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
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23 ± 1	²² HENNER	02	RVUE	1.2-2.0 $e^+e^- \rightarrow \rho\pi, \omega\pi\pi$
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²² Assuming that the $\omega(1420)$ decays into $\rho\pi$ and $\omega\pi\pi$ only.

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

²⁴ 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)
