

$\omega(1420)$

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

See also the $\omega(1650)$ particle listing.

NODE=M125

NODE=M125

NODE=M125M

NODE=M125M

→ UNCHECKED ←

 $\omega(1420)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
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1410± 60 OUR ESTIMATE

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

1418± 30± 10	824	¹ AKHMETSHIN 17A	CMD3	1.4–2.0 $e^+e^- \rightarrow \omega\eta$
1470± 50	13.1k	² AULCHENKO 15A	SND	1.05–1.80 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
1382± 23± 70		AUBERT 07AU	BABR	10.6 $e^+e^- \rightarrow \omega\pi^+\pi^-\gamma$
1350± 20± 20		AUBERT,B 04N	BABR	10.6 $e^+e^- \rightarrow \pi^+\pi^-\pi^0\gamma$
1400± 50± 130	1.2M	³ ACHASOV 03D	RVUE	0.44–2.00 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
1450± 10		⁴ HENNER 02	RVUE	1.2–2.0 $e^+e^- \rightarrow \rho\pi, \omega\pi\pi$
1373± 70	177	⁵ 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}		⁶ ACHASOV 98H	RVUE	$e^+e^- \rightarrow \pi^+\pi^-\pi^0$
~ 1400		⁷ ACHASOV 98H	RVUE	$e^+e^- \rightarrow \omega\pi^+\pi^-$
~ 1460		⁸ ACHASOV 98H	RVUE	$e^+e^- \rightarrow K^+K^-$
1440± 70		⁹ CLEGG 94	RVUE	
1419± 31	315	¹⁰ ANTONELLI 92	DM2	1.34–2.4 $e^+e^- \rightarrow \rho\pi$

OCCUR=2

OCCUR=3

¹ From a fit of the interfering $\omega(1420)$ and $\omega(1650)$ with a relative phase of π and other parameters floating.² From a fit with contributions from $\omega(782)$, $\phi(1020)$, $\omega(1420)$, and $\omega(1650)$. See ACHASOV 20A for a further analysis of the $\pi^+\pi^-\pi^0$ data.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 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.⁶ Using data from BARKOV 87, DOLINSKY 91, and ANTONELLI 92.⁷ Using the data from ANTONELLI 92.⁸ Using the data from IVANOV 81 and BISELLO 88B.⁹ From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.¹⁰ From a fit to two Breit-Wigner functions interfering between them and with the ω, ϕ tails with fixed (+, –, +) phases.

NODE=M125M;LINKAGE=F

NODE=M125M;LINKAGE=E

NODE=M125M;LINKAGE=VH

NODE=M125M;LINKAGE=AB

NODE=M125M;LINKAGE=KL

NODE=M125M;LINKAGE=L1

NODE=M125M;LINKAGE=L2

NODE=M125M;LINKAGE=L3

NODE=M125M;LINKAGE=AD

NODE=M125M;LINKAGE=B

 $\omega(1420)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
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290±190 OUR ESTIMATE

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

440±125	267	¹ ACHASOV 20B	SND	$e^+e^- \rightarrow \omega\eta \rightarrow \eta\pi^0\gamma$
104± 35± 10	824	² AKHMETSHIN 17A	CMD3	1.4–2.0 $e^+e^- \rightarrow \omega\eta$
880±170	13.1k	³ AULCHENKO 15A	SND	1.05–1.80 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
480±180		⁴ ACHASOV 10D	SND	1.075–2.0 $e^+e^- \rightarrow \pi^0\gamma$
130± 50± 100		AUBERT 07AU	BABR	10.6 $e^+e^- \rightarrow \omega\pi^+\pi^-\gamma$
450± 70± 70		AUBERT,B 04N	BABR	10.6 $e^+e^- \rightarrow \pi^+\pi^-\pi^0\gamma$
870 ⁺⁵⁰⁰ _{–300} ±450	1.2M	⁵ ACHASOV 03D	RVUE	0.44–2.00 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
199± 15		⁶ HENNER 02	RVUE	1.2–2.0 $e^+e^- \rightarrow \rho\pi, \omega\pi\pi$
188± 45	177	⁷ 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		⁸ CLEGG 94	RVUE	
174± 59	315	⁹ ANTONELLI 92	DM2	1.34–2.4 $e^+e^- \rightarrow \rho\pi$

NODE=M125W

NODE=M125W

→ UNCHECKED ←

- ¹ From a fit with contributions from $\omega(1420)$, $\omega(1650)$, and $\phi(1680)$. The mass of $\omega(1420)$ is fixed to the PDG 18 value of 1420 MeV.
- ² From a fit of the interfering $\omega(1420)$ and $\omega(1650)$ with a relative phase of π and other parameters floating.
- ³ From a fit with contributions from $\omega(782)$, $\phi(1020)$, $\omega(1420)$, and $\omega(1650)$. See ACHASOV 20A for a further analysis of the $\pi^+\pi^-\pi^0$ data.
- ⁴ From a fit of a VMD model with two effective resonances with masses of 1450 MeV and 1700 MeV to describe the excited vector states $\omega(1420)$, $\rho(1450)$, $\omega(1650)$, and $\rho(1700)$. Systematic errors not evaluated.
- ⁵ 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.
- ⁶ Using results of CORDIER 81 and preliminary data of DOLINSKY 91 and ANTONELLI 92.
- ⁷ 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.
- 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.

$\omega(1420)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $\rho\pi$	seen
Γ_2 $\omega\pi\pi$	seen
Γ_3 $\omega\eta$	
Γ_4 $b_1(1235)\pi$	seen
Γ_5 e^+e^-	seen
Γ_6 $\pi^0\gamma$	

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

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

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	¹ AULCHENKO	15A	SND $1.05-1.80 e^+e^- \rightarrow \pi^+\pi^-\pi^0$
$0.82 \pm 0.05 \pm 0.06$		AUBERT, B	04N	BABR $10.6 e^+e^- \rightarrow \pi^+\pi^-\pi^0\gamma$
$0.65 \pm 0.13 \pm 0.21$	1.2M	^{2,3} ACHASOV	03D	RVUE $0.44-2.00 e^+e^- \rightarrow \pi^+\pi^-\pi^0$
0.625 ± 0.160		^{4,5} CLEGG	94	RVUE
0.466 ± 0.178		^{6,7} ANTONELLI	92	DM2 $1.34-2.4 e^+e^- \rightarrow \rho\pi$

- ¹ From a fit with contributions from $\omega(782)$, $\phi(1020)$, $\omega(1420)$, and $\omega(1650)$. See ACHASOV 20A for a further analysis of the $\pi^+\pi^-\pi^0$ data.
- ² Calculated by us from the cross section at the peak.
- 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 From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.
- ⁵ From the partial and leptonic width given by the authors.
- ⁶ From a fit to two Breit-Wigner functions interfering between them and with the ω, ϕ tails with fixed (+, -, +) phases.
- ⁷ From the product of the leptonic width and partial branching ratio given by the authors.

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

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 $10.6 e^+e^- \rightarrow \omega\pi^+\pi^-\gamma$
1.9 ± 1.9	¹ AKHMETSHIN 00D	CMD2	$1.2-2.4 e^+e^- \rightarrow \omega\pi^+\pi^-$

- 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.

NODE=M125W;LINKAGE=H

NODE=M125W;LINKAGE=F

NODE=M125W;LINKAGE=E

NODE=M125W;LINKAGE=G

NODE=M125W;LINKAGE=VH

NODE=M125W;LINKAGE=AB

NODE=M125W;LINKAGE=KL

NODE=M125W;LINKAGE=AD

NODE=M125W;LINKAGE=B

NODE=M125215;NODE=M125

DESIG=1;OUR EST;→ UNCHECKED ←

DESIG=4;OUR EST;→ UNCHECKED ←

DESIG=7

DESIG=5;OUR EST;→ UNCHECKED ←

DESIG=3;OUR EST;→ UNCHECKED ←

DESIG=6

NODE=M125230

NODE=M125G3
NODE=M125G3

NODE=M125G3;LINKAGE=A

NODE=M125G;LINKAGE=AW

NODE=M125G;LINKAGE=VH

NODE=M125G;LINKAGE=AD

NODE=M125G;LINKAGE=SE

NODE=M125G;LINKAGE=A

NODE=M125G;LINKAGE=ES

NODE=M125G4
NODE=M125G4

NODE=M125G;LINKAGE=KL

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

$$\Gamma_3/\Gamma \times \Gamma_5/\Gamma$$

VALUE (units 10^{-8})	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.5 ± 0.6	267	¹ ACHASOV	20B SND	$e^+e^- \rightarrow \omega\eta \rightarrow \eta\pi^0\gamma$
$2.1^{+1.0}_{-0.8}$		ACHASOV	19 SND	$e^+e^- \rightarrow \pi^+\pi^-\pi^0\eta$
$5.0 \pm 2.6 \pm 0.3$	824	² AKHMETSHIN	17A CMD3	$1.4-2.0 e^+e^- \rightarrow \omega\eta$
$1.6^{+0.9}_{-0.7}$	898	³ ACHASOV	16B SND	$1.34-2.00 e^+e^- \rightarrow \omega\eta$

¹ From a fit with contributions from $\omega(1420)$, $\omega(1650)$, and $\phi(1680)$. The mass of $\omega(1420)$ is fixed to the PDG 18 value of 1420 MeV. Fixing also the width of $\omega(1420)$ to the PDG 18 value of 220 MeV results in $(3.0 \pm 1.6) \times 10^{-8}$ measurement.

² From a fit of the interfering $\omega(1420)$ and $\omega(1650)$ with a relative phase of π and other parameters floating. From an alternative fit $\Gamma(\omega(1420) \rightarrow \omega\eta)/\Gamma_{\text{total}} \times \Gamma(\omega(1420) \rightarrow e^+e^-) = 5.3 \pm 1.6$ eV.

³ 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.

NODE=M125G6;LINKAGE=C

NODE=M125G6;LINKAGE=B

NODE=M125G6;LINKAGE=A

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

$$\Gamma_6/\Gamma \times \Gamma_5/\Gamma$$

VALUE (units 10^{-8})	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.23 ± 0.14	¹ ACHASOV	10D SND	$1.075-2.0 e^+e^- \rightarrow \pi^0\gamma$
$2.03^{+0.70}_{-0.75}$	² AKHMETSHIN	05 CMD2	$0.60-1.38 e^+e^- \rightarrow \pi^0\gamma$

¹ From a fit of a VMD model with two effective resonances with masses of 1450 MeV and 1700 MeV to describe the excited vector states $\omega(1420)$, $\rho(1450)$, $\omega(1650)$, and $\rho(1700)$. Systematic errors not evaluated.

² Using 1420 MeV and 220 MeV for the $\omega(1420)$ mass and width.

NODE=M125G5
NODE=M125G5

NODE=M125G5;LINKAGE=A

NODE=M125G5;LINKAGE=AK

$\omega(1420)$ BRANCHING RATIOS

NODE=M125225

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

$$\Gamma_2/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.301 ± 0.029	¹ HENNER	02 RVUE	$1.2-2.0 e^+e^- \rightarrow \rho\pi, \omega\pi\pi$
possibly seen	AKHMETSHIN	00D CMD2	$e^+e^- \rightarrow \omega\pi^+\pi^-$

NODE=M125R2
NODE=M125R2

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

$$\Gamma_2/\Gamma_4$$

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	$0.0 p\bar{p} \rightarrow \omega\pi^0\pi^0\pi^0$

NODE=M125R1
NODE=M125R1

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

$$\Gamma_1/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
seen	ACHASOV	20A SND	$1.15-2.00 e^+e^- \rightarrow \pi^+\pi^-\pi^0$
0.699 ± 0.029	¹ HENNER	02 RVUE	$1.2-2.0 e^+e^- \rightarrow \rho\pi, \omega\pi\pi$

NODE=M125R3
NODE=M125R3

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

$$\Gamma_5/\Gamma$$

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	^{2,3} ACHASOV	03D RVUE	$0.44-2.00 e^+e^- \rightarrow \pi^+\pi^-\pi^0$
23 ± 1		¹ HENNER	02 RVUE	$1.2-2.0 e^+e^- \rightarrow \rho\pi, \omega\pi\pi$

NODE=M125R4
NODE=M125R4

¹ Assuming that the $\omega(1420)$ decays into $\rho\pi$ and $\omega\pi\pi$ only.

² Calculated by us from the cross section at the peak.

³ Assuming that the $\omega(1420)$ decays into $\rho\pi$ only.

NODE=M125R;LINKAGE=AC
NODE=M125R;LINKAGE=AW
NODE=M125R;LINKAGE=GS

$\omega(1420)$ REFERENCES

NODE=M125

ACHASOV	20A	EPJ C80 993	M.N. Achasov <i>et al.</i>	(SND Collab.)	REFID=60923
ACHASOV	20B	EPJ C80 1008	M.N. Achasov <i>et al.</i>	(SND Collab.)	REFID=60924
ACHASOV	19	PR D99 112004	M.N. Achasov <i>et al.</i>	(SND Collab.)	REFID=59887
PDG	18	PR D98 030001	M. Tanabashi <i>et al.</i>	(PDG Collab.)	REFID=59304
AKHMETSHIN	17A	PL B773 150	R.R. Akhmetshin <i>et al.</i>	(CMD-3 Collab.)	REFID=58239
ACHASOV	16B	PR D94 092002	M.N. Achasov <i>et al.</i>	(SND Collab.)	REFID=57537
AULCHENKO	15A	JETP 121 27	V.M. Aulchenko <i>et al.</i>	(SND Collab.)	REFID=56843
		Translated from ZETF 148 34.			
PDG	14	CP C38 070001	K. Olive <i>et al.</i>	(PDG Collab.)	REFID=55687
ACHASOV	10D	PR D98 112001	M.N. Achasov <i>et al.</i>	(SND Collab.)	REFID=59494
AUBERT	07AU	PR D76 092005	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=52049
AKHMETSHIN	05	PL B605 26	R.R. Akhmetshin <i>et al.</i>	(Novosibirsk CMD-2 Collab.)	REFID=50330
AUBERT,B	04N	PR D70 072004	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=50184
ACHASOV	03D	PR D68 052006	M.N. Achasov <i>et al.</i>	(Novosibirsk SND Collab.)	REFID=49577
ACHASOV	02E	PR D66 032001	M.N. Achasov <i>et al.</i>	(Novosibirsk SND Collab.)	REFID=48815
HENNER	02	EPJ C26 3	V.K. Henner <i>et al.</i>		REFID=49177
ACHASOV	01E	PR D63 072002	M.N. Achasov <i>et al.</i>	(Novosibirsk SND Collab.)	REFID=48311
AKHMETSHIN	00D	PL B489 125	R.R. Akhmetshin <i>et al.</i>	(Novosibirsk CMD-2 Collab.)	REFID=47935
ANISOVICH	00H	PL B485 341	A.V. Anisovich <i>et al.</i>		REFID=47948
ACHASOV	99E	PL B462 365	M.N. Achasov <i>et al.</i>	(Novosibirsk SND Collab.)	REFID=47391
ACHASOV	98H	PR D57 4334	N.N. Achasov, A.A. Kozhevnikov		REFID=46323
CLEGG	94	ZPHY C62 455	A.B. Clegg, A. Donnachie	(LANC, MCHS)	REFID=44081
ANTONELLI	92	ZPHY C56 15	A. Antonelli <i>et al.</i>	(DM2 Collab.)	REFID=43168
DOLINSKY	91	PRPL 202 99	S.I. Dolinsky <i>et al.</i>	(NOVO)	REFID=41369
BISELLO	88B	ZPHY C39 13	D. Bisello <i>et al.</i>	(PADO, CLER, FRAS+)	REFID=40581
BARKOV	87	JETPL 46 164	L.M. Barkov <i>et al.</i>	(NOVO)	REFID=40280
		Translated from ZETFP 46 132.			
CORDIER	81	PL 106B 155	A. Cordier <i>et al.</i>	(ORSAY)	REFID=21586
IVANOV	81	PL 107B 297	P.M. Ivanov <i>et al.</i>	(NOVO)	REFID=20553