$f_2(1640)$ BRANCHING RATIOS

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

VALUE	DOCUMENT ID		TECN	COMMENT
seen	ALDE	89B	GAM2	38 $\pi^- p \to n\omega\omega$

$f_2(1640)$ REFERENCES

ADAMO	92	PL B287 368	+Agnello, Balestra+	(OBELIX Collab.)
BELADIDZE	92B	ZPHY C54 367	+Bityukov, Borisov+	(VES Collab.)
ALDE	90	PL B241 600	+Binon+	(SERP, BELG, LANL, LAPP, PISA, KEK)
ALDE	89B	PL B216 451	+Binon, Bricman+	(SERP, BELG, LANL, LAPP, TBIL) IGJPC

$\omega_3(1670)$

$I^G(J^{PC}) = 0^-(3^{--})$

$\omega_3(1670)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1668 ± 5 OUR AVERAGE					
1685.0±20.0	60	BAUBILLIER	79	HBC	8.2 $K^- p$ backward
1673.0±12.0	430	[1,2] BALTAY	78E	HBC	15 $\pi^+ p \to \Delta 3\pi$
1650.0±12.0		CORDEN	78B	OMEG	8–12 $\pi^- p \to N 3\pi$
1669 ±11	600	[2] WAGNER	75	HBC	7 $\pi^+ p \to \Delta^{++} 3\pi$
1678 ±14	500	DIAZ	74	DBC	6 $\pi^+ n \to p 3\pi^0$
1660 ±13	200	DIAZ	74	DBC	6 $\pi^+ n \to p\omega\pi^0\pi^0$
1679 ±17	200	MATTHEWS	71D	DBC	7.0 $\pi^+ n \to p 3\pi^0$
1670 ±20		KENYON	69	DBC	8 $\pi^+ n \to p 3\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 1700.0	110	[1] CERRADA	77B	HBC	4.2 $K^- p \to \Lambda 3\pi$
1695.0±20.0		BARNES	69B	HBC	4.6 $K^- p \to \omega 2\pi X$
1636 ±20		ARMENISE	68B	DBC	5.1 $\pi^+ n \to p 3\pi^0$

[1] Phase rotation seen for $J^P = 3^-$ $\rho\pi$ wave.
[2] From a fit to $I(J^P) = 0(3^-)$ $\rho\pi$ partial wave.

$\omega_3(1670)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
173 ±11 OUR AVERAGE					
160.0±80.0	60	[3] BAUBILLIER	79	HBC	8.2 $K^- p$ backward
173.0±16.0	430	[4,5] BALTAY	78E	HBC	15 $\pi^+ p \to \Delta 3\pi$
253.0±39.0		CORDEN	78B	OMEG	8–12 $\pi^- p \to N 3\pi$
173 ±28	600	[3,5] WAGNER	75	HBC	7 $\pi^+ p \to \Delta^{++} 3\pi$
167 ±40	500	DIAZ	74	DBC	6 $\pi^+ n \to p 3\pi^0$
122 ±39	200	DIAZ	74	DBC	6 $\pi^+ n \to p\omega\pi^0\pi^0$
155 ±40	200	[3] MATTHEWS	71D	DBC	7.0 $\pi^+ n \to p 3\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
90 ±20		BARNES	69B	HBC	4.6 $K^- p \to \omega 2\pi$
100 ±40		KENYON	69	DBC	8 $\pi^+ n \to p 3\pi^0$
112 ±60		ARMENISE	68B	DBC	5.1 $\pi^+ n \to p 3\pi^0$

[3] Width errors enlarged by us to $4\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.
[4] Phase rotation seen for $J^P = 3^-$ $\rho\pi$ wave.
[5] From a fit to $I(J^P) = 0(3^-)$ $\rho\pi$ partial wave.

$\omega_3(1670)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$\rho\pi$	seen
Γ_2	$\omega\pi\pi$	seen
Γ_3	$b_1(1235)\pi$	possibly seen

$\omega_3(1670)$ BRANCHING RATIOS

$\Gamma(\omega\pi\pi)/\Gamma(\rho\pi)$ Γ_2/Γ_1

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.71±0.27	100	DIAZ	74	DBC	6 $\pi^+ n \to p 5\pi^0$

$\Gamma(b_1(1235)\pi)/\Gamma(\rho\pi)$ Γ_3/Γ_1

VALUE	DOCUMENT ID		TECN	COMMENT
possibly seen	DIAZ	74	DBC	6 $\pi^+ n \to p 5\pi^0$

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
>0.75	68	BAUBILLIER	79	HBC	8.2 $K^- p$ backward

$\omega_3(1670)$ REFERENCES

BAUBILLIER	79	PL 89B 131	+	(BIRM, CERN, GLAS, MSU, ORSAY)
BALTAY	78E	PRL 40 87	+Cautis, Kalelkar	(COLU) JP
CORDEN	78B	NP B138 235	+Corbett, Alexander+	(BIRM, RHEL, TELA, LOWC)
CERRADA	77B	NP B126 241	+Blockzijl, Heinen+	(AMST, CERN, NIJM, OXF) JP
WAGNER	75	PL 58B 201	+Tabak, Chew	(LBL) JP
DIAZ	74	PRL 32 260	+Dibianca, Fickinger, Anderson+	(CASE, CMU)
MATTHEWS	71D	PR D3 2561	+Prentice, Yoon, Carroll+	(TNTO, WISC)
BARNES	69B	PRL 23 142	+Chung, Eisner, Flaminio+	(BNL)
KENYON	69	PRL 23 146	+Kinson, Scarr+	(BNL, UCND, ORNL)
ARMENISE	68B	PL 26B 336	+Forino, Cartacci+	(BARI, BGNA, FIRZ, ORSAY)

OTHER RELATED PAPERS

MATTHEWS	71	LNC 1 361	+Prentice, Yoon, Carroll+	(TNTO, WISC)
ARMENISE	70	LNC 4 199	+Ghidini, Foring, Cartacci+	(BARI, BGNA, FIRZ)

$\pi_2(1670)$

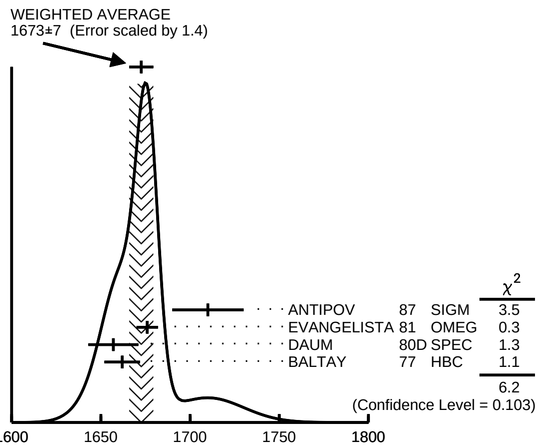
$I^G(J^{PC}) = 1^-(2^{-+})$

Our latest mini-review on this particle can be found in the 1984 edition.

$\pi_2(1670)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
1670 ±20 OUR ESTIMATE		This is only an educated guess; the error given is larger than the error on the average of the published values.				
1673 ± 7 OUR AVERAGE		Error includes scale factor of 1.4. See the ideogram below.				
1710 ±20	700±150	ANTIPOV	87	SIGM	−	50 π^- Cu → $\mu^+\mu^-\pi^-$ Cu
1676 ± 6		[1] EVANGELISTA	81	OMEG	−	12 $\pi^- p \to 3\pi p$
1657.0±14.0		[1,2] DAUM	80D	SPEC	−	63–94 $\pi p \to 3\pi X$
1662.0±10.0	2000	[1] BALTAY	77	HBC	+	15 $\pi^+ p \to p 3\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1742 ±31 ±49		ANTREASYAN	90	CBAL		$e^+e^- \to e^+e^-\pi^0\pi^0\pi^0$
1710.0±20.0		[3] DAUM	81B	SPEC	−	63,94 $\pi^- p$
1640 ±10	575	KALELKAR	75	HBC	+	15 $\pi^+ p \to p\pi^+ f_2$
1660 ±10		[1] ASCOLI	73	HBC	−	5–25 $\pi^- p \to p\pi_2$

[1] From a fit to $J^P = 2^-$ S-wave $f_2(1270)\pi$ partial wave.
[2] Clear phase rotation seen in 2^-S, 2^-P, 2^-D waves. We quote central value and spread of single-resonance fits to three channels.
[3] From a two-resonance fit to four 2^-0^+ waves. This should not be averaged with all the single resonance fits.



$\pi_2(1670)$ mass (MeV)

$\pi_2(1670)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
240 ±15 OUR AVERAGE		Error includes scale factor of 1.1.				
170 ±80	700±150	ANTIPOV	87	SIGM	−	50 π^- Cu → $\mu^+\mu^-\pi^-$ Cu
260 ±20		[4] EVANGELISTA	81	OMEG	−	12 $\pi^- p \to 3\pi p$
219.0±20.0		[4,5] DAUM	80D	SPEC	−	63–94 $\pi p \to 3\pi X$
285.0±60.0	2000	[4] BALTAY	77	HBC	+	15 $\pi^+ p \to p 3\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
236 ±49 ±36		ANTREASYAN	90	CBAL		$e^+e^- \to e^+e^-\pi^0\pi^0\pi^0$
312.0±50.0		[6] DAUM	81B	SPEC	−	63,94 $\pi^- p$
240 ±30	575	KALELKAR	75	HBC	+	15 $\pi^+ p \to p\pi^+ f_2$
270 ±60		[4] ASCOLI	73	HBC	−	5–25 $\pi^- p \to p\pi_2$

[4] From a fit to $J^P = 2^-$ $f_2(1270)\pi$ partial wave.
[5] Clear phase rotation seen in 2^-S, 2^-P, 2^-D waves. We quote central value and spread of single-resonance fits to three channels.
[6] From a two-resonance fit to four 2^-0^+ waves. This should not be averaged with all the single resonance fits.