NODE=M011

$b_1(1235)$

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

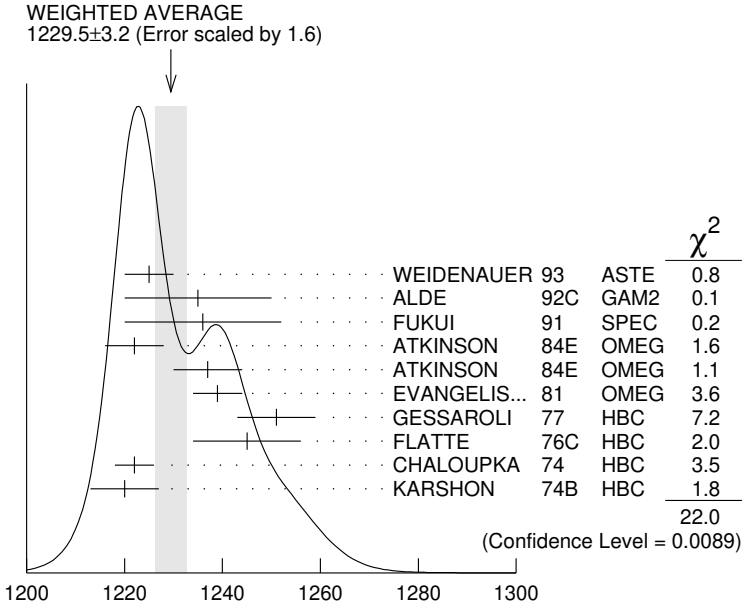
$b_1(1235)$ MASS

NODE=M011M

NODE=M011M

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
1229.5± 3.2 OUR AVERAGE		Error includes scale factor of 1.6. See the ideogram below.				
1225 ± 5		WEIDENAUER	93	ASTE		$\overline{p}p \rightarrow 2\pi^+2\pi^-\pi^0$
1235 ±15		ALDE	92C	GAM2		38,100 $\pi^- p \rightarrow \omega\pi^0 n$
1236 ±16		FUKUI	91	SPEC		8.95 $\pi^- p \rightarrow \omega\pi^0 n$
1222 ± 6		ATKINSON	84E	OMEG	±	25–55 $\gamma p \rightarrow \omega\pi X$
1237 ± 7		ATKINSON	84E	OMEG	0	25–55 $\gamma p \rightarrow \omega\pi X$
1239 ± 5		EVANGELIS...	81	OMEG	−	12 $\pi^- p \rightarrow \omega\pi p$
1251 ± 8	450	GESSAROLI	77	HBC	−	11 $\pi^- p \rightarrow \pi^-\omega p$
1245 ±11	890	FLATTE	76C	HBC	−	4.2 $K^- p \rightarrow \pi^-\omega\Sigma^+$
1222 ± 4	1400	CHALOUPKA	74	HBC	−	3.9 $\pi^- p$
1220 ± 7	600	KARSHON	74B	HBC	+	4.9 $\pi^+ p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1190 ±10		AUGUSTIN	89	DM2	±	$e^+e^- \rightarrow 5\pi$
1213 ± 5		ATKINSON	84C	OMEG	0	20–70 γp
1271 ±11		COLLICK	84	SPEC	+	200 $\pi^+ Z \rightarrow Z\pi\omega$

OCCUR=2



$b_1(1235)$ WIDTH

NODE=M011W

NODE=M011W

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
142± 9 OUR AVERAGE		Error includes scale factor of 1.2.				
113±12		WEIDENAUER	93	ASTE		$\overline{p}p \rightarrow 2\pi^+2\pi^-\pi^0$
160±30		ALDE	92C	GAM2		38,100 $\pi^- p \rightarrow \omega\pi^0 n$
151±31		FUKUI	91	SPEC		8.95 $\pi^- p \rightarrow \omega\pi^0 n$
170±15		EVANGELIS...	81	OMEG	−	12 $\pi^- p \rightarrow \omega\pi p$
170±50	225	BALTAY	78B	HBC	+	15 $\pi^+ p \rightarrow p4\pi$
155±32	450	GESSAROLI	77	HBC	−	11 $\pi^- p \rightarrow \pi^-\omega p$
182±45	890	FLATTE	76C	HBC	−	4.2 $K^- p \rightarrow \pi^-\omega\Sigma^+$
135±20	1400	CHALOUPKA	74	HBC	−	3.9 $\pi^- p$
156±22	600	KARSHON	74B	HBC	+	4.9 $\pi^+ p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
210±19		AUGUSTIN	89	DM2	±	$e^+e^- \rightarrow 5\pi$
231±14		ATKINSON	84C	OMEG	0	20–70 γp
232±29		COLLICK	84	SPEC	+	200 $\pi^+ Z \rightarrow Z\pi\omega$

$b_1(1235)$ DECAY MODES

NODE=M011215;NODE=M011

	Mode	Fraction (Γ_i/Γ)	Confidence level	
Γ_1	$\omega\pi$ [D/S amplitude ratio = 0.277 ± 0.027]	seen		DESIG=1;OUR EST;→ UNCHECKED ←
Γ_2	$\pi^\pm\gamma$	$(1.6\pm0.4)\times10^{-3}$		DESIG=9
Γ_3	$\eta\rho$	seen		DESIG=8;OUR EST;→ UNCHECKED ←
Γ_4	$\pi^+\pi^+\pi^-\pi^0$	< 50 %	84%	DESIG=2;OUR EST;→ UNCHECKED ←
Γ_5	$K^*(892)^\pm K^\mp$	seen		DESIG=74
Γ_6	$(K\overline{K})^\pm\pi^0$	< 8 %	90%	DESIG=71;OUR EST;→ UNCHECKED ←
Γ_7	$K^0_S K^0_L \pi^\pm$	< 6 %	90%	DESIG=73;OUR EST;→ UNCHECKED ←
Γ_8	$K^0_S K^0_S \pi^\pm$	< 2 %	90%	DESIG=72;OUR EST;→ UNCHECKED ←
Γ_9	$\phi\pi$	< 1.5 %	84%	DESIG=5;OUR EST;→ UNCHECKED ←

$b_1(1235)$ PARTIAL WIDTHS

NODE=M011220

$\Gamma(\pi^\pm\gamma)$ Γ_2

NODE=M011W3
NODE=M011W3

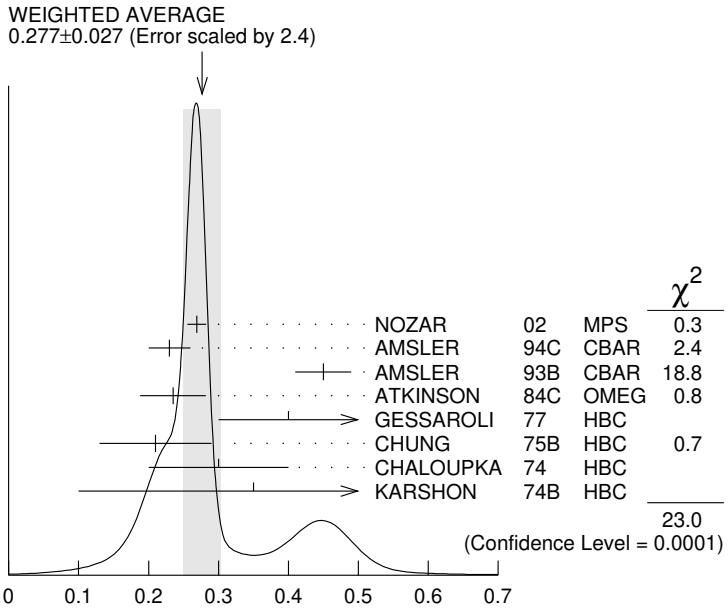
VALUE (keV)	DOCUMENT ID		TECN	CHG	COMMENT
230±60	COLLICK	84	SPEC	+	200 π^+ Z → Z$\pi\omega$

$b_1(1235)$ D-wave/S-wave AMPLITUDE RATIO IN DECAY OF $b_1(1235) \to \omega\pi$

NODE=M011DS

NODE=M011DS

VALUE	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
0.277±0.027 OUR AVERAGE		Error includes scale factor of 2.4. See the ideogram below.				
0.269±0.009±0.010		NOZAR	02	MPS	−	18 $\pi^- p \to \omega\pi^- p$
0.23 ±0.03		AMSLER	94C	CBAR		0.0 $\overline{p}p \to \omega\eta\pi^0$
0.45 ±0.04		AMSLER	93B	CBAR		0.0 $\overline{p}p \to \omega\pi^0\pi^0$
0.235±0.047		ATKINSON	84C	OMEG		20–70 γp
0.4 $^{+0.1}_{-0.1}$		GESSAROLI	77	HBC	−	11 $\pi^- p \to \pi^-\omega p$
0.21 ±0.08		CHUNG	75B	HBC	+	7.1 $\pi^+ p$
0.3 ±0.1		CHALOUPKA	74	HBC	−	3.9–7.5 $\pi^- p$
0.35 ±0.25	600	KARSHON	74B	HBC	+	4.9 $\pi^+ p$



$b_1(1235)$ D-wave/S-wave amplitude ratio in decay of $b_1(1235) \to \omega\pi$

$b_1(1235)$ D-wave/S-wave AMPLITUDE PHASE DIFFERENCE IN DECAY OF $b_1(1235) \to \omega\pi$

NODE=M011PH

NODE=M011PH

VALUE (°)	DOCUMENT ID		TECN	CHG	COMMENT
10.5±2.4±3.9	NOZAR	02	MPS	−	18 $\pi^- p \to \omega\pi^- p$

$b_1(1235)$ BRANCHING RATIOS

NODE=M011230

$\Gamma(\eta\rho)/\Gamma(\omega\pi)$ Γ_3/Γ_1

NODE=M011R9
NODE=M011R9

VALUE	DOCUMENT ID		TECN	COMMENT
<0.10	ATKINSON	84D	OMEG	20–70 γ p

$\Gamma(\pi^+\pi^+\pi^-\pi^0)/\Gamma(\omega\pi)$ Γ_4/Γ_1

NODE=M011R1
NODE=M011R1

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
<0.5	ABOLINS	63	HBC	+	3.5 π^+ p

$\Gamma(K^*(892)^\pm K^\mp)/\Gamma_{\text{total}}$ Γ_5/Γ

NODE=M011R10
NODE=M011R10

VALUE	DOCUMENT ID		TECN	COMMENT
seen	[1] ABLIKIM	10E	BES2	$J/\psi \to K^\pm K^0_S \pi^\mp \pi^0$

[1] From a fit including ten additional resonances and energy-independent Breit-Wigner width.

NODE=M011R10;LINKAGE=AB

$\Gamma((K\overline{K})^\pm\pi^0)/\Gamma(\omega\pi)$ Γ_6/Γ_1

NODE=M011R6
NODE=M011R6

VALUE	CL%	DOCUMENT ID		TECN	CHG	COMMENT
<0.08	90	BALTAY	67	HBC	$\pm$	0.0 $\overline{p}p$

$\Gamma(K^0_S K^0_L \pi^\pm)/\Gamma(\omega\pi)$ Γ_7/Γ_1

NODE=M011R8
NODE=M011R8

VALUE	CL%	DOCUMENT ID		TECN	CHG	COMMENT
<0.06	90	BALTAY	67	HBC	$\pm$	0.0 $\overline{p}p$

$\Gamma(K^0_S K^0_S \pi^\pm)/\Gamma(\omega\pi)$ Γ_8/Γ_1

NODE=M011R7
NODE=M011R7

VALUE	CL%	DOCUMENT ID		TECN	CHG	COMMENT
<0.02	90	BALTAY	67	HBC	$\pm$	0.0 $\overline{p}p$

$\Gamma(\phi\pi)/\Gamma(\omega\pi)$ Γ_9/Γ_1

NODE=M011R4
NODE=M011R4

VALUE	CL%	DOCUMENT ID		TECN	CHG	COMMENT
<0.004	95	VIKTOROV	96	SPEC	0	32.5 π^- $p \to K^+ K^- \pi^0$ n
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.04	95	BIZZARRI	69	HBC	$\pm$	0.0 $\overline{p}p$
<0.015		DAHL	67	HBC		1.6–4.2 π^- p

$b_1(1235)$ REFERENCES

NODE=M011

ABLIKIM	10E	PL B693 88	M. Ablikim *et al.*	(BES II Collab.)
NOZAR	02	PL B541 35	M. Nozar *et al.*	
VIKTOROV	96	PAN 59 1184	V.A. Viktorov *et al.*	(SERP)
		Translated from YAF 59 1239.		
AMSLER	94C	PL B327 425	C. Amsler *et al.*	(Crystal Barrel Collab.)
AMSLER	93B	PL B311 362	C. Amsler *et al.*	(Crystal Barrel Collab.)
WEIDENAUER	93	ZPHY C59 387	P. Weidenauer *et al.*	(ASTERIX Collab.)
ALDE	92C	ZPHY C54 553	D.M. Alde *et al.*	(BELG, SERP, KEK, LANL+)
FUKUI	91	PL B257 241	S. Fukui *et al.*	(SUGI, NAGO, KEK, KYOT+)
AUGUSTIN	89	NP B320 1	J.E. Augustin, G. Cosme	(DM2 Collab.)
ATKINSON	84C	NP B243 1	M. Atkinson *et al.*	(BONN, CERN, GLAS+) JP
ATKINSON	84D	NP B242 269	M. Atkinson *et al.*	(BONN, CERN, GLAS+)
ATKINSON	84E	PL 138B 459	M. Atkinson *et al.*	(BONN, CERN, GLAS+)
COLLICK	84	PRL 53 2374	B. Collick *et al.*	(MINN, ROCH, FNAL)
EVANGELIS...	81	NP B178 197	C. Evangelista *et al.*	(BARI, BONN, CERN+)
BALTAY	78B	PR D17 62	C. Baltay *et al.*	(COLU, BING)
GESSAROLI	77	NP B126 382	R. Gessaroli *et al.*	(BGNA, FIRZ, GENO+) JP
FLATTE	76C	PL 64B 225	S.M. Flatte *et al.*	(CERN, AMST, NIJM+) JP
CHUNG	75B	PR D11 2426	S.U. Chung *et al.*	(BNL, LBL, UCSC) JP
CHALOUPKA	74	PL 51B 407	V. Chaloupka *et al.*	(CERN) JP
KARSHON	74B	PR D10 3608	U. Karshon *et al.*	(REHO) JP
BIZZARRI	69	NP B14 169	R. Bizzarri *et al.*	(CERN, CDEF)
BALTAY	67	PRL 18 93	C. Baltay *et al.*	(COLU)
DAHL	67	PR 163 1377	O.I. Dahl *et al.*	(LRL)
ABOLINS	63	PRL 11 381	M.A. Abolins *et al.*	(UCSD)

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NODE=M011R4

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