

$$\Xi(1530) 3/2^+$$

$$I(J^P) = \frac{1}{2}(3/2^+) \text{ Status: } ****$$

This is the only Ξ resonance whose properties are all reasonably well known. Assuming that the Λ_c^+ has $J^P = 1/2^+$, AUBERT 08AK, in a study of $\Lambda_c^+ \rightarrow \Xi^- \pi^+ K^+$, finds conclusively that the spin of the $\Xi(1530)^0$ is $3/2$. In conjunction with SCHLEIN 63B and BUTTON-SHAFFER 66, this proves also that the parity is $+$.

We use only those determinations of the mass and width that are accompanied by some discussion of systematics and resolution.

$\Xi(1530)$ POLE POSITIONS

$\Xi(1530)^0$ REAL PART

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>COMMENT</u>
1531.6 ± 0.4	LICHTENBERG74	Using HABIBI 73

$\Xi(1530)^0$ IMAGINARY PART

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>COMMENT</u>
4.45 ± 0.35	LICHTENBERG74	Using HABIBI 73

$\Xi(1530)^-$ REAL PART

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>COMMENT</u>
1534.4 ± 1.1	LICHTENBERG74	Using HABIBI 73

$\Xi(1530)^-$ IMAGINARY PART

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>COMMENT</u>
3.9 ^{+1.75} _{-3.9}	LICHTENBERG74	Using HABIBI 73

$\Xi(1530)$ MASSES

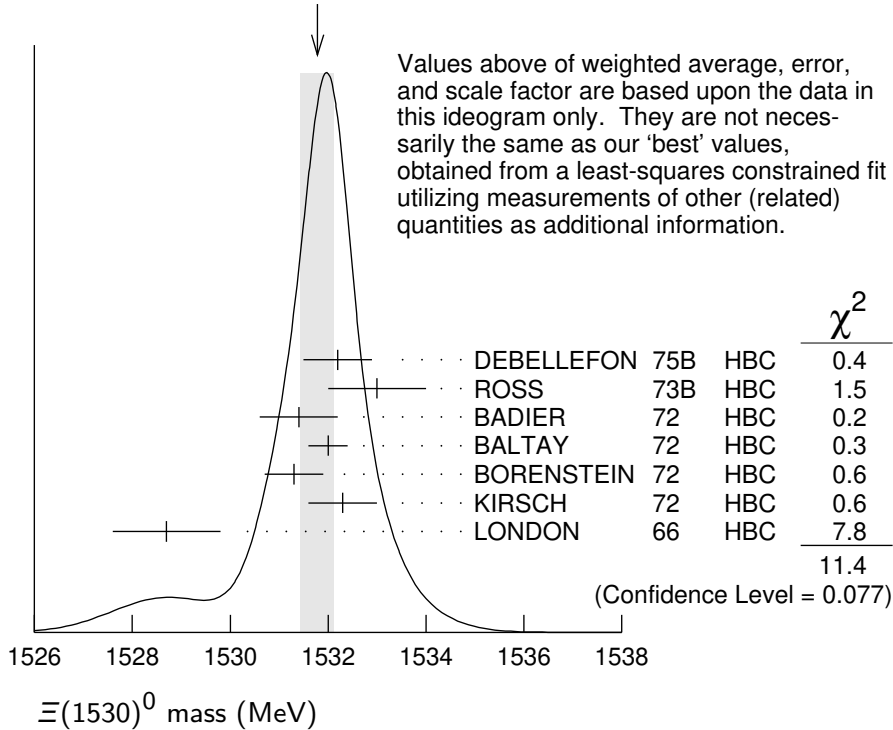
$\Xi(1530)^0$ MASS

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1531.80 ± 0.32 OUR FIT				Error includes scale factor of 1.3.
1531.78 ± 0.34 OUR AVERAGE				Error includes scale factor of 1.4. See the ideogram below.
1532.2 ± 0.7		DEBELLEFON 75B	HBC	$K^- p \rightarrow \Xi^- \bar{K} \pi$
1533 ± 1		ROSS 73B	HBC	$K^- p \rightarrow \Xi^- \bar{K} \pi(\pi)$
1531.4 ± 0.8	59	BADIER 72	HBC	$K^- p$ 3.95 GeV/c
1532.0 ± 0.4	1262	BALTAY 72	HBC	$K^- p$ 1.75 GeV/c
1531.3 ± 0.6	324	BORENSTEIN 72	HBC	$K^- p$ 2.2 GeV/c
1532.3 ± 0.7	286	KIRSCH 72	HBC	$K^- p$ 2.87 GeV/c
1528.7 ± 1.1	76	LONDON 66	HBC	$K^- p$ 2.24 GeV/c

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

1532.1 ± 0.4	1244	ASTON	85B	LASS	$K^- p$ 11 GeV/c
1532.1 ± 0.6	2700	¹ BAUBILLIER	81B	HBC	$K^- p$ 8.25 GeV/c
1530 ± 1	450	BIAGI	81	SPEC	SPS hyperon beam
1527 ± 6	80	SIXEL	79	HBC	$K^- p$ 10 GeV/c
1535 ± 4	100	SIXEL	79	HBC	$K^- p$ 16 GeV/c
1533.6 ± 1.4	97	BERTHON	74	HBC	Quasi-2-body σ

WEIGHTED AVERAGE
1531.78±0.34 (Error scaled by 1.4)



$\Xi(1530)^-$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1535.0±0.6 OUR FIT				
1535.2±0.8 OUR AVERAGE				
1534.5±1.2		DEBELLEFON 75B	HBC	$K^- p \rightarrow \Xi^- \bar{K} \pi$
1535.3±2.0		ROSS 73B	HBC	$K^- p \rightarrow \Xi^- \bar{K} \pi (\pi)$
1536.2±1.6	185	KIRSCH 72	HBC	$K^- p$ 2.87 GeV/c
1535.7±3.2	38	LONDON 66	HBC	$K^- p$ 2.24 GeV/c

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

1540 ± 3	48	BERTHON	74	HBC	Quasi-2-body σ
1534.7±1.1	334	BALTAY	72	HBC	$K^- p$ 1.75 GeV/c

$m_{\Xi(1530)^-} - m_{\Xi(1530)}$

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
3.2±0.6 OUR FIT			
2.9±0.9 OUR AVERAGE			
2.7±1.0	BALTAY 72	HBC	$K^- p$ 1.75 GeV/c
2.0±3.2	MERRILL 66	HBC	$K^- p$ 1.7–2.7 GeV/c
5.7±3.0	PJERROU 65B	HBC	$K^- p$ 1.8–1.95 GeV/c
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
3.9±1.8	² KIRSCH 72	HBC	$K^- p$ 2.87 GeV/c
7 ±4	² LONDON 66	HBC	$K^- p$ 2.24 GeV/c

$\Xi(1530)$ WIDTHS

$\Xi(1530)^0$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
9.1±0.5 OUR AVERAGE				
9.5±1.2		DEBELLEFON 75B	HBC	$K^- p \rightarrow \Xi^- \bar{K} \pi$
9.1±2.4		ROSS 73B	HBC	$K^- p \rightarrow \Xi \bar{K} \pi(\pi)$
11 ±2		BADIER 72	HBC	$K^- p$ 3.95 GeV/c
9.0±0.7		BALTAY 72	HBC	$K^- p$ 1.75 GeV/c
8.4±1.4		BORENSTEIN 72	HBC	$\Xi^- \pi^+$
11.0±1.8		KIRSCH 72	HBC	$\Xi^- \pi^+$
7 ±7		BERGE 66	HBC	$K^- p$ 1.5–1.7 GeV/c
8.5±3.5		LONDON 66	HBC	$K^- p$ 2.24 GeV/c
7 ±2		SCHLEIN 63B	HBC	$K^- p$ 1.8, 1.95 GeV/c
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
12.8±1.0	2700	¹ BAUBILLIER 81B	HBC	$K^- p$ 8.25 GeV/c
19 ±6	80	³ SIXEL 79	HBC	$K^- p$ 10 GeV/c
14 ±5	100	³ SIXEL 79	HBC	$K^- p$ 16 GeV/c

$\Xi(1530)^-$ WIDTH

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
9.9^{+1.7}_{-1.9} OUR AVERAGE			
9.6±2.8	DEBELLEFON 75B	HBC	$K^- p \rightarrow \Xi^- \bar{K} \pi$
8.3±3.6	ROSS 73B	HBC	$K^- p \rightarrow \Xi \bar{K} \pi(\pi)$
7.8 ^{+3.5} _{-7.8}	BALTAY 72	HBC	$K^- p$ 1.75 GeV/c
16.2±4.6	KIRSCH 72	HBC	$\Xi^- \pi^0, \Xi^0 \pi^-$

$\Xi(1530)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)	Confidence level
$\Gamma_1 \Xi \pi$	100 %	
$\Gamma_2 \Xi \gamma$	<3.7 %	90%

$\Xi(1530)$ BRANCHING RATIOS

$\Gamma(\Xi\gamma)/\Gamma_{\text{total}}$					Γ_2/Γ
<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<0.037	90	ABLIKIM 20	BES3	$J/\psi \rightarrow \Xi(1530)^- \Xi^+$	
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
<0.04	90	KALBFLEISCH 75	HBC	$K^- p$ 2.18 GeV/c	

$\Xi(1530)$ FOOTNOTES

- ¹ BAUBILLIER 81B is a fit to the inclusive spectrum. The resolution (5 MeV) is not unfolded.
² Redundant with data in the mass Listings.
³ SIXEL 79 doesn't unfold the experimental resolution of 15 MeV.

$\Xi(1530)$ REFERENCES

ABLIKIM 20	PR D101 012004	M. Ablikim <i>et al.</i>	(BESIII Collab.)
AUBERT 08AK	PR D78 034008	B. Aubert <i>et al.</i>	(BABAR Collab.)
ASTON 85B	PR D32 2270	D. Aston <i>et al.</i>	(SLAC, CARL, CNRC, CINC)
BAUBILLIER 81B	NP B192 1	M. Baubillier <i>et al.</i>	(BIRM, CERN, GLAS+)
BIAGI 81	ZPHY C9 305	S.F. Biagi <i>et al.</i>	(BRIS, CAVE, GEVA+)
SIXEL 79	NP B159 125	P. Sixel <i>et al.</i>	(AACH3, BERL, CERN, LOIC+)
DEBELLEFON 75B	NC 28A 289	A. de Bellefon <i>et al.</i>	(CDEF, SACL)
KALBFLEISCH 75	PR D11 987	G.R. Kalbfleisch, R.C. Strand, J.W. Chapman	(BNL+)
BERTHON 74	NC 21A 146	A. Berthon <i>et al.</i>	(CDEF, RHEL, SACL+)
LICHTENBERG 74	PR D10 3865	D.B. Lichtenberg	(IND)
Also	Private Comm.	D.B. Lichtenberg	(IND)
HABIBI 73	Thesis Nevis 199	M. Habibi	(COLU)
ROSS 73B	Purdue Conf. 355	R.T. Ross, J.L. Lloyd, D. Radojicic	(OXF)
BADIER 72	NP B37 429	J. Badier <i>et al.</i>	(EPOL)
BALTAY 72	PL 42B 129	C. Baltay <i>et al.</i>	(COLU, BING)
BORENSTEIN 72	PR D5 1559	S.R. Borenstein <i>et al.</i>	(BNL, MICH) I
KIRSCH 72	NP B40 349	L.E. Kirsch <i>et al.</i>	(BRAN, UMD, SYRA+) I
BERGE 66	PR 147 945	J.P. Berge <i>et al.</i>	(LRL) I
BUTTON-... 66	PR 142 883	J. Button-Shafer <i>et al.</i>	(LRL) JP
LONDON 66	PR 143 1034	G.W. London <i>et al.</i>	(BNL, SYRA) IJ
MERRILL 66	Thesis UCRL 16455	D.W. Merrill	(LRL) JP
PJERROU 65B	PRL 14 275	G.M. Pjerrou <i>et al.</i>	(UCLA)
SCHLEIN 63B	PRL 11 167	P.E. Schlein <i>et al.</i>	(UCLA) IJP

OTHER RELATED PAPERS

MAZZUCATO 81	NP B178 1	M. Mazzucato <i>et al.</i>	(AMST, CERN, NIJM+)
BRIEFEL 77	PR D16 2706	E. Briefel <i>et al.</i>	(BRAN, UMD, SYRA+)
BRIEFEL 75	PR D12 1859	E. Briefel <i>et al.</i>	(BRAN, UMD, SYRA+)
HUNGERBU... 74	PR D10 2051	V. Hungerbuhler <i>et al.</i>	(YALE, FNAL, BNL+)
BUTTON-... 66	PR 142 883	J. Button-Shafer <i>et al.</i>	(LRL) JP