

**$\Xi(1690)$** 

$$I(J^P) = \frac{1}{2}(??) \quad \text{Status: } ***$$

AUBERT 08AK, in a study of  $\Lambda_c^+ \rightarrow \Xi^- \pi^+ K^+$ , finds some evidence that the  $\Xi(1690)$  has  $J^P = 1/2^-$ .

DIONISI 78 sees a threshold enhancement in both the neutral and negatively charged  $\Sigma \bar{K}$  mass spectra in  $K^- p \rightarrow (\Sigma \bar{K}) K \pi$  at 4.2 GeV/c. The data from the  $\Sigma \bar{K}$  channels alone cannot distinguish between a resonance and a large scattering length. Weaker evidence at the same mass is seen in the corresponding  $\Lambda \bar{K}$  channels, and a coupled-channel analysis yields results consistent with a new  $\Xi$ .

BIAGI 81 sees an enhancement at 1700 MeV in the diffractively produced  $\Lambda K^-$  system. A peak is also observed in the  $\Lambda \bar{K}^0$  mass spectrum at 1660 MeV that is consistent with a 1720 MeV resonance decaying to  $\Sigma^0 \bar{K}^0$ , with the  $\gamma$  from the  $\Sigma^0$  decay not detected.

BIAGI 87 provides further confirmation of this state in diffractive dissociation of  $\Xi^-$  into  $\Lambda K^-$ . The significance claimed is 6.7 standard deviations.

ADAMOVICH 98 sees a peak of  $1400 \pm 300$  events in the  $\Xi^- \pi^+$  spectrum produced by 345 GeV/c  $\Sigma^-$ -nucleus interactions.

## $\Xi(1690)$ MASSES

### MIXED CHARGES

VALUE (MeV)DOCUMENT ID

**1690 ± 10 OUR ESTIMATE** This is only an educated guess; the error given is larger than the error on the average of the published values.

### $\Xi(1690)^0$ MASS

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1686 ± 4	1400	ADAMOVICH 98	WA89	$\Sigma^-$ nucleus, 345 GeV/c
1699 ± 5	175	<sup>1</sup> DIONISI 78	HBC	$K^- p$ 4.2 GeV/c
1684 ± 5	183	<sup>2</sup> DIONISI 78	HBC	$K^- p$ 4.2 GeV/c

### $\Xi(1690)^-$ MASS

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1691.1 ± 1.9 ± 2.0	104	BIAGI 87	SPEC	$\Xi^-$ Be 116 GeV
1700 ± 10	150	<sup>3</sup> BIAGI 81	SPEC	$\Xi^-$ H 100, 135 GeV
1694 ± 6	45	<sup>4</sup> DIONISI 78	HBC	$K^- p$ 4.2 GeV/c

## $\Xi(1690)$ WIDTHS

### MIXED CHARGES

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>
<b>&lt;30 OUR ESTIMATE</b>	

### $\Xi(1690)^0$ WIDTH

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
10 ± 6	1400	ADAMOVICH 98	WA89	$\Sigma^-$ nucleus, 345 GeV/c
44 ± 23	175	<sup>1</sup> DIONISI 78	HBC	$K^- p$ 4.2 GeV/c
20 ± 4	183	<sup>2</sup> DIONISI 78	HBC	$K^- p$ 4.2 GeV/c

### $\Xi(1690)^-$ WIDTH

<u>VALUE (MeV)</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
< 8	90	104	BIAGI 87	SPEC	$\Xi^-$ Be 116 GeV
47 ± 14		150	<sup>3</sup> BIAGI 81	SPEC	$\Xi^-$ H 100, 135 GeV
26 ± 6		45	<sup>4</sup> DIONISI 78	HBC	$K^- p$ 4.2 GeV/c

## $\Xi(1690)$ DECAY MODES

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1 \quad \Lambda \bar{K}$	seen
$\Gamma_2 \quad \Sigma \bar{K}$	seen
$\Gamma_3 \quad \Xi \pi$	seen
$\Gamma_4 \quad \Xi^- \pi^+ \pi^0$	
$\Gamma_5 \quad \Xi^- \pi^+ \pi^-$	possibly seen
$\Gamma_6 \quad \Xi(1530) \pi$	

## $\Xi(1690)$ BRANCHING RATIOS

$\Gamma(\Lambda \bar{K})/\Gamma_{\text{total}}$	<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>	$\Gamma_1/\Gamma$
<b>seen</b>		104	BIAGI 87	SPEC	–	$\Xi^-$ Be 116 GeV	

$\Gamma(\Sigma \bar{K})/\Gamma(\Lambda \bar{K})$	<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>	$\Gamma_2/\Gamma_1$
0.75 ± 0.39		75	ABE 02C	BELL		$e^+ e^- \approx \Upsilon(4S)$	
2.7 ± 0.9			DIONISI 78	HBC	0	$K^- p$ 4.2 GeV/c	
3.1 ± 1.4			DIONISI 78	HBC	–	$K^- p$ 4.2 GeV/c	

$\Gamma(\Xi \pi)/\Gamma(\Sigma \bar{K})$	<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>	$\Gamma_3/\Gamma_2$
< 0.09		DIONISI 78	HBC	0	$K^- p$ 4.2 GeV/c	

$\Gamma(\Xi \pi)/\Gamma_{\text{total}}$	<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	$\Gamma_3/\Gamma$
<b>seen</b>		ADAMOVICH 98	WA89	$\Sigma^-$ nucleus, 345 GeV/c	

$\Gamma(\Xi^- \pi^+ \pi^0)/\Gamma(\Sigma \bar{K})$						$\Gamma_4/\Gamma_2$
<u>VALUE</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>	
<0.04		DIONISI	78	HBC	0	$K^- p$ 4.2 GeV/ $c$

  

$\Gamma(\Xi^- \pi^+ \pi^-)/\Gamma_{\text{total}}$						$\Gamma_5/\Gamma$
<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>	
<b>possibly seen</b>	4	BIAGI	87	SPEC	–	$\Xi^- \text{Be}$ 116 GeV

  

$\Gamma(\Xi^- \pi^+ \pi^-)/\Gamma(\Sigma \bar{K})$						$\Gamma_5/\Gamma_2$
<u>VALUE</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>	
<0.03		DIONISI	78	HBC	–	$K^- p$ 4.2 GeV/ $c$

  

$\Gamma(\Xi(1530)\pi)/\Gamma(\Sigma \bar{K})$						$\Gamma_6/\Gamma_2$
<u>VALUE</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>	
<0.06		DIONISI	78	HBC	–	$K^- p$ 4.2 GeV/ $c$

### $\Xi(1690)$ FOOTNOTES

- <sup>1</sup> From a fit to the  $\Sigma^+ K^-$  spectrum.
- <sup>2</sup> From a coupled-channel analysis of the  $\Sigma^+ K^-$  and  $\Lambda \bar{K}^0$  spectra.
- <sup>3</sup> A fit to the inclusive spectrum from  $\Xi^- N \rightarrow \Lambda K^- X$ .
- <sup>4</sup> From a coupled-channel analysis of the  $\Sigma^0 K^-$  and  $\Lambda K^-$  spectra.

### $\Xi(1690)$ REFERENCES

AUBERT	08AK	PR D78 034008	B. Aubert <i>et al.</i>	(BABAR Collab.)
ABE	02C	PL B524 33	K. Abe <i>et al.</i>	(KEK BELLE Collab.)
ADAMOVICH	98	EPJ C5 621	M.I. Adamovich <i>et al.</i>	(CERN WA89 Collab.)
BIAGI	87	ZPHY C34 15	S.F. Biagi <i>et al.</i>	(BRIS, CERN, GEVA+) I
BIAGI	81	ZPHY C9 305	S.F. Biagi <i>et al.</i>	(BRIS, CAVE, GEVA+)
DIONISI	78	PL 80B 145	C. Dionisi <i>et al.</i>	(CERN, AMST, NIJM+) I