

# $\Xi(1690)$

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

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.

ADAMOVIICH 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	ADAMOVIICH 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

VALUE (MeV) DOCUMENT ID

**<30 OUR ESTIMATE**

### $\Xi(1690)^0$ 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 ( $\Gamma_i/\Gamma$ )
$\Gamma_1$ $\Lambda \bar{K}$	seen
$\Gamma_2$ $\Sigma \bar{K}$	seen
$\Gamma_3$ $\Xi \pi$	seen
$\Gamma_4$ $\Xi^- \pi^+ \pi^0$	
$\Gamma_5$ $\Xi^- \pi^+ \pi^-$	possibly seen
$\Gamma_6$ $\Xi(1530) \pi$	

### $\Xi(1690)$ BRANCHING RATIOS

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

$\Gamma(\Sigma \bar{K})/\Gamma(\Lambda \bar{K})$						$\Gamma_2/\Gamma_1$
<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>	
0.75 ± 0.39	75	ABE 02c	BELL		$e^+ e^- \approx \gamma(4S)$	
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	

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

$\Gamma(\Xi \pi)/\Gamma_{\text{total}}$						$\Gamma_3/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>			
seen	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>
possibly seen	4	BIAGI	87	SPEC	– $\Xi^-$ 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

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