



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

### OMITTED FROM SUMMARY TABLE

Nominally the isospin partner of the  $\Xi_{cc}^{++}$  ( $ccu$ ). While the SELEX experiment (MATTSON 02, OCHERASHVILI 05) claimed an observation of this state, subsequent searches by BABAR (AUBERT, B 06D), Belle (CHISTOV 06, KATO 14), and LHCb (AAIJ 13CD, AAIJ 20AX) did not find any significant signal or evidence for the  $\Xi_{cc}^+$ . However, AAIJ 21AE reports that its search for  $\Xi_{cc}^+ \rightarrow \Xi_c^+ \pi^+ \pi^-$ , when combined with a prior search for  $\Xi_{cc}^+ \rightarrow \Lambda_c^+ K^- \pi^+$  decays in AAIJ 20AX, yields a signal at  $2.9 \sigma$  global significance ( $4.0 \sigma$  local).

### $\Xi_{cc}^+$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>3518.9 ± 0.9 OUR AVERAGE</b>				
3518 ± 3	6	<sup>1</sup> OCHERASHVI.05	SELX	$\Sigma^-$ nucleus $\approx 600$ GeV
3519 ± 1	16	<sup>2</sup> MATTSON 02	SELX	$\Sigma^-$ nucleus $\approx 600$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3623.0 ± 1.4	368 ± 193	<sup>3</sup> AAIJ	21AE LHCb	$pp$ at 7, 8, 13 TeV

<sup>1</sup> OCHERASHVILI 05 claims “an excess of 5.62 events over ...  $1.38 \pm 0.13$  events” for a significance of  $4.8 \sigma$  in  $pD^+K^-$  events.

<sup>2</sup> MATTSON 02 claims “an excess of 15.9 events over an expected background of  $6.1 \pm 0.5$  events, a statistical significance of  $6.3 \sigma$ ” in the  $\Lambda_c^+ K^- \pi^+$  invariant-mass spectrum.

The probability that the peak is a fluctuation increases from  $1.0 \times 10^{-6}$  to  $1.1 \times 10^{-4}$  when the number of bins searched is considered.

<sup>3</sup> Uncertainties are statistical only. Because of undetermined systematic uncertainties in the extraction of this result it cannot be considered a mass measurement. AAIJ 21AE performs a combined fit to its  $\Xi_{cc}^+ \rightarrow \Xi_c^+ \pi^+ \pi^-$  data and the  $\Xi_{cc}^+ \rightarrow \Lambda_c^+ K^- \pi^+$  data from AAIJ 20AX, finding a global significance of  $2.9 \sigma$  ( $4.0 \sigma$  local).

### $\Xi_{cc}^+$ MEAN LIFE

VALUE ( $10^{-15}$ s)	CL%	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<33	90	MATTSON 02	SELX	$\Sigma^-$ nucleus, $\approx 600$ GeV

## $\Xi_{cc}^+$ DECAY MODES

Mode	Fraction ( $\Gamma_j/\Gamma$ )
$\Gamma_1 \quad \Lambda_c^+ K^- \pi^+$	not seen
$\Gamma_2 \quad \Xi_c^+ \pi^+ \pi^-$	not seen
$\Gamma_3 \quad p D^+ K^-$	

### $\Gamma(p D^+ K^-)/\Gamma(\Lambda_c^+ K^- \pi^+)$ $\Gamma_3/\Gamma_1$

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.36 ± 0.21	6	OCHERASHVI..05	SELX	$\Sigma^- \approx 600$ GeV
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### $\Gamma(\Lambda_c^+ K^- \pi^+)/\Gamma_{\text{total}}$ $\Gamma_1/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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<b>not seen</b>	<sup>1</sup> AAIJ	20AX LHCB	pp at 7, 8, 13 TeV
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<sup>1</sup> No significant signal is observed in the mass range 3.4–3.8 GeV

### $\Gamma(\Xi_c^+ \pi^+ \pi^-)/\Gamma_{\text{total}}$ $\Gamma_2/\Gamma$

<u>VALUE</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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<b>not seen</b>	95	145 ± 139	<sup>1</sup> AAIJ	21AE LHCB	pp at 7, 8, 13 TeV
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<sup>1</sup> No significant signal is seen in the mass range 3.4–3.8 GeV. AAIJ 21AE performs a combined fit to its  $\Xi_{cc}^+ \rightarrow \Xi_c^+ \pi^+ \pi^-$  data and the  $\Xi_{cc}^+ \rightarrow \Lambda_c^+ K^- \pi^+$  data from AAIJ 20AX, finding a global significance of 2.9  $\sigma$  (4.0  $\sigma$  local).

## $\Xi_{cc}^+$ REFERENCES

AAIJ	21AE JHEP 2112 107	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	20AX SCPMA 63 221062	R. Aaij <i>et al.</i>	(LHCb Collab.)
KATO	14 PR D89 052003	Y. Kato <i>et al.</i>	(BELLE Collab.)
AAIJ	13CD JHEP 1312 090	R. Aaij <i>et al.</i>	(LHCb Collab.)
AUBERT,B	06D PR D74 011103	B. Aubert <i>et al.</i>	(BABAR Collab.)
CHISTOV	06 PRL 97 162001	R. Chistov <i>et al.</i>	(BELLE Collab.)
OCHERASHVI..05	PL B628 18	A. Ocherashvili <i>et al.</i>	(FNAL SELEX Collab.)
MATTSON	02 PRL 89 112001	M. Mattson <i>et al.</i>	(FNAL SELEX Collab.)