



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

### 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 ( $\Gamma_i/\Gamma$ )
$\Gamma_1$ $\Lambda_c^+ K^- \pi^+$	not seen
$\Gamma_2$ $\Xi_c^+ \pi^+ \pi^-$	not seen
$\Gamma_3$ $pD^+ K^-$	

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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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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$\Gamma(\Lambda_c^+ K^- \pi^+)/\Gamma_{\text{total}}$   $\Gamma_1/\Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
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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

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

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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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.)