

$\Xi_c(2815)$

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

Seen in both $\Xi_c' \pi$ and $\Xi_c \pi \pi$ decays. The simplest assignment is that this belongs to the same SU(4) multiplet as the $\Lambda(1520)$ and the $\Lambda_c(2625)$, but the spin and parity have not been measured.

$\Xi_c(2815)$ MASSES

The masses are obtained from the mass-difference measurements that follow.

$\Xi_c(2815)^+$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
2816.60 ± 0.16 OUR FIT				
2816.65 ± 0.03 ± 0.03 ± 0.23	4.1k	¹ AAIJ	25A1	LHCB pp at 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2817.0 ± 1.2 $\begin{smallmatrix} +0.7 \\ -0.8 \end{smallmatrix}$	73	LESLIAK	08	BELL $e^+e^- \approx \Upsilon(4S)$

¹ The third uncertainty is due to the Ξ_c^+ mass.

$\Xi_c(2815)^0$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
2819.85 ± 0.27 OUR FIT				Error includes scale factor of 1.1.
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2820.4 ± 1.4 $\begin{smallmatrix} +0.9 \\ -1.0 \end{smallmatrix}$	48 ± 8	LESLIAK	08	BELL $e^+e^- \approx \Upsilon(4S)$

$\Xi_c(2815) - \Xi_c$ MASS DIFFERENCES

$m_{\Xi_c(2815)^+} - m_{\Xi_c^+}$

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
348.81 ± 0.09 OUR FIT				
348.80 ± 0.08 ± 0.06	941	YELTON	16	BELL e^+e^- , Υ regions
• • • We do not use the following data for averages, fits, limits, etc. • • •				
348.6 ± 0.6 ± 1.0	20	ALEXANDER	99B	CLE2 $e^+e^- \approx \Upsilon(4S)$

$m_{\Xi_c(2815)^0} - m_{\Xi_c^0}$

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
349.35 ± 0.11 OUR FIT				
349.35 ± 0.08 ± 0.07	1258	YELTON	16	BELL e^+e^- , Υ regions
• • • We do not use the following data for averages, fits, limits, etc. • • •				
347.2 ± 0.7 ± 2.0	9	ALEXANDER	99B	CLE2 $e^+e^- \approx \Upsilon(4S)$

$\Xi_c(2815)^+ - \Xi_c(2815)^0$ MASS DIFFERENCE

$$m_{\Xi_c(2815)^+} - m_{\Xi_c(2815)^0}$$

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
-3.26±0.27 OUR FIT			
• • • We do not use the following data for averages, fits, limits, etc. • • •			
-3.47±0.12±0.48	YELTON	16	BELL 941 and 1258 evts
-3.4 ±1.9 ±0.9	LESIAK	08	BELL 73 & 48 events

$\Xi_c(2815)$ WIDTHS

$\Xi_c(2815)^+$ WIDTH

VALUE (MeV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
2.15±0.15 OUR AVERAGE					Error includes scale factor of 1.2.
2.07±0.08±0.12		4.1k	AAIJ	25A1	LHCB pp at 13 TeV
2.43±0.20±0.17		941	YELTON	16	BELL e^+e^- , Υ regions
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<3.5		90	ALEXANDER	99B	CLE2 $e^+e^- \approx \Upsilon(4S)$

$\Xi_c(2815)^0$ WIDTH

VALUE (MeV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
2.54±0.18±0.17		1258	YELTON	16	BELL e^+e^- , Υ regions
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<6.5		90	ALEXANDER	99B	CLE2 $e^+e^- \approx \Upsilon(4S)$

$\Xi_c(2815)$ DECAY MODES

The $\Xi_c \pi \pi$ modes are consistent with being entirely via $\Xi_c(2645)\pi$.

Mode	Fraction (Γ_i/Γ)
$\Gamma_1 \quad \Xi_c' \pi$	seen
$\Gamma_2 \quad \Xi_c(2645)\pi$	seen
$\Gamma_3 \quad \Xi_c^+ \pi^+ \pi^-$	seen
$\Gamma_4 \quad \Xi_c^0 \gamma$	seen
$\Gamma_5 \quad \Xi_c^+ \gamma$	

$\Gamma(\Xi_c' \pi)/\Gamma_{\text{total}}$

Γ_1/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
seen	YELTON	16	BELL e^+e^- , Υ regions
seen	ALEXANDER	99B	CLE2 $e^+e^- \approx \Upsilon(4S)$

$\Gamma(\Xi_c(2645)\pi)/\Gamma_{\text{total}}$

Γ_2/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
seen	YELTON	16	BELL e^+e^- , Υ regions
seen	LESIAK	08	BELL $e^+e^- \approx \Upsilon(4S)$

$\Gamma(\Xi_c^+ \pi^+ \pi^-)/\Gamma_{\text{total}}$ Γ_3/Γ

VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
seen	4.1k	AAIJ	25AI	LHCB	pp at 13 TeV

$\Gamma(\Xi_c^0 \gamma)/\Gamma(\Xi_c(2645)\pi)$ Γ_4/Γ_2

VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
0.41 ± 0.05 ± 0.03	222	¹ YELTON	20	BELL	0 $e^+ e^-$ at $\Upsilon(4S)$

¹ Assumes $B(\Xi_c(2645)^+ \rightarrow \Xi_c^0 \pi^+) = 100\%$, which is the only strong decay of the $\Xi_c(2645)$ permitted in the available phase space. YELTON 20 measures $B(\Xi_c(2815)^0 \rightarrow \Xi_c^0 \gamma)/B(\Xi_c(2815)^0 \rightarrow \Xi_c(2645)^+ \pi^- \rightarrow \Xi_c^0 \pi^+ \pi^-)$.

$\Gamma(\Xi_c^+ \gamma)/\Gamma(\Xi_c(2645)\pi)$ Γ_5/Γ_2

VALUE	CL%	DOCUMENT ID	TECN	CHG	COMMENT
<0.09	90	¹ YELTON	20	BELL	+ $e^+ e^-$ at $\Upsilon(4S)$

¹ Assumes $B(\Xi_c(2645)^0 \rightarrow \Xi_c^+ \pi^-) = 100\%$, which is the only strong decay of the $\Xi_c(2645)$ permitted in the available phase space. YELTON 20 measures $B(\Xi_c(2815)^+ \rightarrow \Xi_c^+ \gamma)/B(\Xi_c(2815)^+ \rightarrow \Xi_c(2645)^0 \pi^+ \rightarrow \Xi_c^+ \pi^- \pi^+)$.

$\Xi_c(2815)$ REFERENCES

AAIJ	25AI	PRL 135 161901	R. Aaij <i>et al.</i>	(LHCb Collab.)
YELTON	20	PR D102 071103	J. Yelton <i>et al.</i>	(BELLE Collab.)
YELTON	16	PR D94 052011	J. Yelton <i>et al.</i>	(BELLE Collab.)
LESIK	08	PL B665 9	T. Lesiak <i>et al.</i>	(BELLE Collab.)
ALEXANDER	99B	PRL 83 3390	J.P. Alexander <i>et al.</i>	(CLEO Collab.)