

$\Xi_c(2815)$

$I(J^P) = \frac{1}{2}(\frac{3}{2}^-)$ 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
2816.51±0.25 OUR FIT	Error includes scale factor of 1.2.			
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2817.0 ±1.2 ^{+0.7} _{-0.8}	73 ± 10	LESLIAK	08	BELL e ⁺ e ⁻ ≈ $\Upsilon(4S)$

$\Xi_c(2815)^0$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
2819.79±0.30 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 ^{+0.9} _{-1.0}	48 ± 8	LESLIAK	08	BELL e ⁺ e ⁻ ≈ $\Upsilon(4S)$

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

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

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
348.80±0.10 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
−3.27±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	LESLIAK	08	BELL 73 & 48 events

$\Xi_c(2815)$ WIDTHS

$\Xi_c(2815)^+$ WIDTH

VALUE (MeV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$2.43 \pm 0.20 \pm 0.17$		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
$2.54 \pm 0.18 \pm 0.17$		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
$\Gamma_3 \quad \Xi_c^0 \gamma$	seen
$\Gamma_4 \quad \Xi_c^+ \gamma$	

$\Gamma(\Xi'_c \pi)/\Gamma_{\text{total}}$				Γ_1/Γ
VALUE	DOCUMENT ID	TECN	COMMENT	
seen	YELTON	16	BELL	e^+e^- , γ regions
seen	ALEXANDER	99B	CLE2	$e^+e^- \approx \gamma(4S)$

$\Gamma(\Xi_c(2645)\pi)/\Gamma_{\text{total}}$	Γ_2/Γ			
VALUE	DOCUMENT ID	TECN	COMMENT	
seen	YELTON	16	BELL	e^+e^- , γ regions
seen	LESIAK	08	BELL	$e^+e^- \approx \gamma(4S)$

$\Gamma(\Xi_c^0\gamma)/\Gamma(\Xi_c(2645)\pi)$					Γ_3/Γ_2	
VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT	
$0.41\pm0.05\pm0.03$	222	¹ YELTON	20	BELL	0	e^+e^- at $\gamma(4S)$

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_4/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

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.)