

# $\Xi_c(2790)$

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

Seen in  $\Xi_c' \pi$  decays. The simplest assignment, based on the mass, width, and decay mode, is that this belongs in the same SU(4) multiplet as the  $\Lambda(1405)$  and the  $\Lambda_c(2595)^+$ , but the spin and parity have not been measured.

## $\Xi_c(2790)$ MASSES

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

### $\Xi_c(2790)^+$ MASS

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>
<b>2791.9 ± 0.5 OUR FIT</b>	

### $\Xi_c(2790)^0$ MASS

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>
<b>2793.9 ± 0.5 OUR FIT</b>	

## $\Xi_c(2790) - \Xi_c'$ MASS DIFFERENCES

### $m_{\Xi_c(2790)^+} - m_{\Xi_c^0}$

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>213.20 ± 0.22 OUR FIT</b>				
<b>213.2 ± 0.2 ± 0.1</b>		YELTON	16	BELL 2231 and 11,560 evts
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
211.2 ± 1.3 ± 1.0	18	CSORNA	01	CLEO $e^+e^- \approx \Upsilon(4S)$

### $m_{\Xi_c(2790)^0} - m_{\Xi_c^{'+}}$

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>215.70 ± 0.22 OUR FIT</b>				
<b>215.7 ± 0.2 ± 0.1</b>		YELTON	16	BELL 1241 and 7055 evts
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
216.2 ± 1.3 ± 1.0	14	CSORNA	01	CLEO $e^+e^- \approx \Upsilon(4S)$

## $\Xi_c(2790)^+ - \Xi_c(2790)^0$ MASS DIFFERENCE

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>-2.0 ± 0.7 OUR FIT</b>			
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
-3.3 ± 0.4 ± 0.5	YELTON	16	BELL 2231 and 1241 evts

## $\Xi_c(2790)$ WIDTHS

### $\Xi_c(2790)^+$ WIDTH

VALUE (MeV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>8.9 \pm 0.6 \pm 0.8</math></b>		2231	YELTON	16	BELL $e^+e^-$ , $\Upsilon$ regions
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
<15	90		CSORNA	01	CLEO $e^+e^- \approx \Upsilon(4S)$

### $\Xi_c(2790)^0$ WIDTH

VALUE (MeV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>10.0 \pm 0.7 \pm 0.8</math></b>		1241	YELTON	16	BELL $e^+e^-$ , $\Upsilon$ regions
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
<12	90		CSORNA	01	CLEO $e^+e^- \approx \Upsilon(4S)$

### $\Xi_c(2790)$ DECAY MODES

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1 \quad \Xi_c^{\prime+} \pi$	seen
$\Gamma_2 \quad \Xi_c^0 \gamma$	
$\Gamma_3 \quad \Xi_c^+ \gamma$	
$\Gamma_4 \quad \Lambda_c^+ K^-$	seen

### $\Xi_c(2790)$ BRANCHING RATIOS

$\Gamma(\Xi_c^{\prime+} \pi)/\Gamma_{\text{total}}$					$\Gamma_1/\Gamma$
VALUE	DOCUMENT ID	TECN	COMMENT		
seen	YELTON	16	BELL	$e^+e^-$ , $\Upsilon$ regions	
<b>seen</b>	CSORNA	01	CLEO	$e^+e^- \approx \Upsilon(4S)$	

$\Gamma(\Xi_c^0 \gamma)/\Gamma(\Xi_c^{\prime+} \pi)$					$\Gamma_2/\Gamma_1$
VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
<b><math>0.13 \pm 0.03 \pm 0.02</math></b>	401	<sup>1</sup> YELTON	20	BELL	0 $e^+e^-$ at $\Upsilon(4S)$

<sup>1</sup> Assumes  $B(\Xi_c^{\prime+} \rightarrow \Xi_c^+ \gamma) = 100\%$ , noting no strong decay of the  $\Xi_c^{\prime+}$  is permitted in the available phase space. YELTON 20 measures  $B(\Xi_c(2790)^0 \rightarrow \Xi_c^0 \gamma)/B(\Xi_c(2790)^0 \rightarrow \Xi_c^+ \pi^- \rightarrow \Xi_c^+ \gamma \pi^-)$ .

$\Gamma(\Xi_c^+ \gamma)/\Gamma(\Xi_c^{\prime+} \pi)$					$\Gamma_3/\Gamma_1$
VALUE	CL%	DOCUMENT ID	TECN	CHG	COMMENT
<b>&lt;0.06</b>	90	<sup>1</sup> YELTON	20	BELL	+ $e^+e^-$ at $\Upsilon(4S)$

<sup>1</sup> Assumes  $B(\Xi_c^{\prime0} \rightarrow \Xi_c^0 \gamma) = 100\%$ , noting no strong decay of the  $\Xi_c^{\prime+}$  is permitted in the available phase space. YELTON 20 measures  $B(\Xi_c(2790)^+ \rightarrow \Xi_c^+ \gamma)/B(\Xi_c(2790)^+ \rightarrow \Xi_c^0 \pi^+ \rightarrow \Xi_c^0 \gamma \pi^+)$ .

$\Gamma(\Lambda_c^+ K^-)/\Gamma_{\text{total}}$					$\Gamma_4/\Gamma$
<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<b>seen</b>	1.5k	<sup>1</sup> AAIJ	23X LHCb	$B^- \rightarrow \Lambda_c^+ \bar{\Lambda}_c^- K^-$	
<sup>1</sup> AAIJ 23X observes this decay mode at $3.7\sigma$ significance from a study of the $\Lambda_c^+ K^-$ system within $B^- \rightarrow \Lambda_c^+ \bar{\Lambda}_c^- K^-$ decays.					

### $\Xi_c(2790)$ REFERENCES

AAIJ	23X	PR D108 012020	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.)
CSORNA	01	PRL 86 4243	S.E. Csorna <i>et al.</i>	(CLEO Collab.)