Ξ_c^0

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

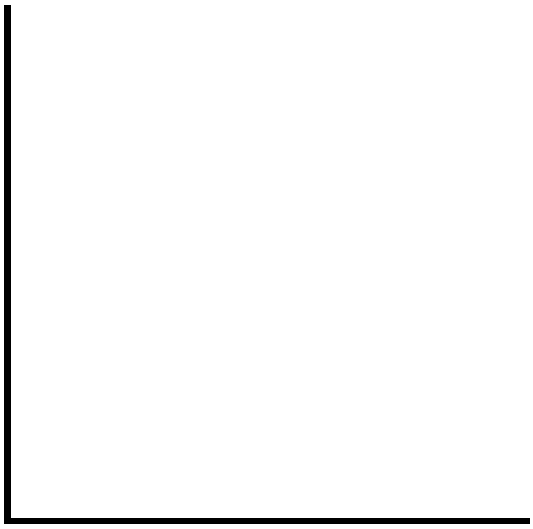
According to the quark model, the Ξ_c^0 (quark content dsc) and Ξ_c^+ form an isospin doublet, and the spin-parity ought to be $J^P = 1/2^+$. None of I, J, or P have actually been measured.

Ξ_c^0 MASS

The fit uses the Ξ_c^0 and Ξ_c^+ mass and mass difference measurements.

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
2470.3±1.8 OUR FIT	Error includes scale factor of 1.3.				
2470.4±2.0 OUR AVERAGE	Error includes scale factor of 1.4. See the ideogram below.				
2462.1±3.1±1.4	42	[1] FRABETTI	93C	E687	γBe $\overline{E}_\gamma = 220$ GeV
2469 ±2 ±3	9	HENDERSON	92B	CLEO	$\Omega^- K^+$
2472.1±2.7±1.6	54	ALBRECHT	90F	ARG	e^+e^- at $\Upsilon(4S)$
2473.3±1.9±1.2	4	BARLAG	90	ACCM	π^- (K^-) Cu 230 GeV
2472 ±3 ±4	19	ALAM	89	CLEO	e^+e^- 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2471 ±3 ±4	14	AVERY	89	CLEO	See ALAM 89

[1] The FRABETTI 93C mass is well below the other measurements.



Ξ_c^0 mass (MeV)

$m_{\Xi_c^0} - m_{\Xi_c^+}$

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
5.2±2.2 OUR FIT Error includes scale factor of 1.1.				
6.3±2.3 OUR AVERAGE				
+7.0±4.5±2.2	ALBRECHT	90F	ARG	e^+e^- at $\Upsilon(4S)$
+6.8±3.3±0.5	BARLAG	90	ACCM	π^- (K^-) Cu 230 GeV
+5 ±4 ±1	ALAM	89	CLEO	$\Xi_c^0 \to \Xi^-\pi^+$, $\Xi_c^+ \to \Xi^-\pi^+\pi^+$

Ξ_c^0 MEAN LIFE

VALUE (10^{-12} s)	EVTS	DOCUMENT ID		TECN	COMMENT
$0.098^{+0.023}_{-0.015}$ OUR AVERAGE					
$0.101^{+0.025}_{-0.017}\pm0.005$	42	FRABETTI	93C	E687	γBe $\overline{E}_\gamma$ = 220 GeV
$0.082^{+0.059}_{-0.030}$	4	BARLAG	90	ACCM	π^- (K^-) Cu 230 GeV

Ξ_c^0 DECAY MODES

A few branching *ratios* but no absolute branching *fractions* have been measured.

	Mode	Fraction (Γ_i/Γ)
Γ_1	$\Lambda\overline{K}^0$	seen
Γ_2	$\Xi^-\pi^+$	seen
Γ_3	$\Xi^-\pi^+\pi^+\pi^-$	seen
Γ_4	$pK^-\overline{K}^*(892)^0$	seen
Γ_5	Ω^-K^+	seen
Γ_6	$\Xi^-\ell^+$ anything	[a] seen

[a] ℓ indicates e or μ mode, not sum over modes.

Ξ_c^0 BRANCHING RATIOS

$\Gamma(\Lambda\overline{K}^0)/\Gamma_{total}$ Γ_1/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
seen	7	ALBRECHT	95B	ARG	$e^+e^-\approx$ 10.4 GeV

$\Gamma(\Xi^-\pi^+)/\Gamma(\Xi^-\pi^+\pi^+\pi^-)$ Γ_2/Γ_3

VALUE	DOCUMENT ID		TECN	COMMENT
0.30±0.12±0.05	ALBRECHT	90F	ARG	e^+e^- at $\Upsilon(4S)$

$\Gamma(pK^-\overline{K}^*(892)^0)/\Gamma_{total}$ Γ_4/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	BARLAG	90	ACCM	π^- (K^-) Cu 230 GeV

$\Gamma(\Omega^-K^+)/\Gamma(\Xi^-\pi^+)$ Γ_5/Γ_2

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.50±0.21±0.05	9	HENDERSON	92B	CLEO	$e^+e^-\approx$ 10.6 GeV

$\Gamma(\Xi^-\ell^+\text{anything})/\Gamma(\Xi^-\pi^+)$ Γ_6/Γ_2

The ratio is for the *average* (not the sum) of the Ξ^-e^+ anything and $\Xi^-\mu^+$ anything modes.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.96±0.43±0.18	18	ALBRECHT	93B	ARG	$e^+e^-\approx$ 10.4 GeV

$\Gamma(\Xi^-\ell^+\text{anything})/\Gamma(\Xi^-\pi^+\pi^+\pi^-)$ Γ_6/Γ_3

The ratio is for the *average* (not the sum) of the Ξ^-e^+ anything and $\Xi^-\mu^+$ anything modes.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.29±0.12±0.04	18	ALBRECHT	93B	ARG	$e^+e^-\approx$ 10.4 GeV

Ξ_c^0 REFERENCES

ALBRECHT	95B	PL B342 397	+Hamacher, Hofmann+	(ARGUS Collab.)
ALBRECHT	93B	PL B303 368	+Cronstroem, Ehrlichmann+	(ARGUS Collab.)
FRABETTI	93C	PRL 70 2058	+Cheung, Cumalat+	(FNAL E687 Collab.)
HENDERSON	92B	PL B283 161	+Kinoshita, Pipkin, Saulnier+	(CLEO Collab.)
ALBRECHT	90F	PL B247 121	+Ehrlichmann, Harder, Kruger, Nau+	(ARGUS Collab.)
BARLAG	90	PL B236 495	+Becker, Boehringer, Bosman+	(ACCMOR Collab.)
ALAM	89	PL B226 401	+Katayama, Kim, Li, Lou, Sun+	(CLEO Collab.)
AVERY	89	PRL 62 863	+Besson, Garren, Yelton, Bowcock+	(CLEO Collab.)