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 has 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*
2471.0 ±0.6 OUR FIT					
$2471.09^{+0.35}_{-1.00}$ OUR AVERAGE					
2471.0 ±0.3 $^{+0.2}_{-1.4}$	8620 ± 355	[1] LESIAK	05	BELL	e^+e^-, $\Upsilon(4S)$
2470.0 ±2.8 ±2.6	85	FRABETTI	98B	E687	γ Be, $\overline{E}_\gamma$ = 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. • • •					
2462.1 ±3.1 ±1.4	42	[2] FRABETTI	93C	E687	See FRABETTI 98B
2471 ±3 ±4	14	AVERY	89	CLEO	See ALAM 89

[1] The systematic error was (wrongly) given the other way round in LESIAK 05.
[2] The FRABETTI 93C mass is well below the other measurements.

$\Xi_c^0 - \Xi_c^+$ MASS DIFFERENCE

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
3.0±0.5 OUR FIT				
3.1±0.5 OUR AVERAGE				
+2.9±0.5	LESIAK	05	BELL	e^+e^-, $\Upsilon(4S)$
+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^{-15} s)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
112^{+13}_{-10} OUR AVERAGE					
$118^{+14}_{-12}\pm5$	110	LINK	02H	FOCS	γ nucleus, ≈ 180 GeV
$101^{+25}_{-17}\pm5$	42	FRABETTI	93C	E687	γBe, $\overline{E}_\gamma$= 220 GeV
82^{+59}_{-30}	4	BARLAG	90	ACCM	π^- (K^-) Cu 230 GeV

Ξ_c^0 DECAY MODES

No absolute branching fractions have been measured. Several measurements of ratios of fractions may be found in the Listings that follow.

	Mode	Fraction (Γ_i/Γ)
Γ_1	$p K^- K^- \pi^+$	seen
Γ_2	$p K^- \overline{K}^*(892)^0$	seen
Γ_3	$p K^- K^- \pi^+$ no $\overline{K}^*(892)^0$	seen
Γ_4	ΛK_S^0	seen
Γ_5	$\Lambda K^- \pi^+$	
Γ_6	$\Lambda \overline{K}^0 \pi^+ \pi^-$	seen
Γ_7	$\Lambda K^- \pi^+ \pi^+ \pi^-$	seen
Γ_8	$\Xi^- \pi^+$	seen
Γ_9	$\Xi^- \pi^+ \pi^+ \pi^-$	seen
Γ_{10}	$\Omega^- K^+$	seen
Γ_{11}	$\Xi^- e^+ \nu_e$	seen
Γ_{12}	$\Xi^- \ell^+$ anything	seen

Ξ_c^0 BRANCHING RATIOS

$\Gamma(p K^- K^- \pi^+)/\Gamma(\Xi^- \pi^+)$ — Γ_1/Γ_8

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.34±0.04 OUR AVERAGE					
0.33±0.03±0.03	1908 ± 62	LESIAK	05	BELL	$e^+ e^-$, $\Upsilon(4S)$
0.35±0.06±0.03	148 ± 18	DANKO	04	CLEO	$e^+ e^-$

$\Gamma(p K^- \overline{K}^*(892)^0)/\Gamma(\Xi^- \pi^+)$ — Γ_2/Γ_8

Unseen decay modes of the $\overline{K}^*(892)^0$ are included.

VALUE	DOCUMENT ID		TECN	COMMENT
0.21±0.05±0.01	DANKO	04	CLEO	$e^+ e^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
seen	BARLAG	90	ACCM	π^- (K^-) Cu 230 GeV

$\Gamma(p K^- K^- \pi^+$ no $\overline{K}^*(892)^0)/\Gamma(\Xi^- \pi^+)$ — Γ_3/Γ_8

VALUE	DOCUMENT ID		TECN	COMMENT
0.21±0.04±0.02	DANKO	04	CLEO	$e^+ e^-$

$\Gamma(\Lambda K_S^0)/\Gamma(\Xi^- \pi^+)$ — Γ_4/Γ_8

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.21 ±0.02 ±0.02	465 ± 37	LESIAK	05	BELL	$e^+ e^-$, $\Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen	7	ALBRECHT	95B	ARG	$e^+ e^- \approx 10.4$ GeV

$\Gamma(\Lambda K^- \pi^+)/\Gamma(\Xi^- \pi^+)$ — Γ_5/Γ_8

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.07±0.12±0.07	2979 ± 211	LESIAK	05	BELL	$e^+ e^-$, $\Upsilon(4S)$

$\Gamma(\Lambda \overline{K}^0 \pi^+ \pi^-)/\Gamma_{total}$ — Γ_6/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	FRABETTI	98B	E687	γ Be, $\overline{E}_\gamma = 220$ GeV

$\Gamma(\Lambda K^- \pi^+ \pi^+ \pi^-)/\Gamma_{total}$ — Γ_7/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	FRABETTI	98B	E687	γ Be, $\overline{E}_\gamma = 220$ GeV

$\Gamma(\Xi^- \pi^+)/\Gamma(\Xi^- \pi^+ \pi^+ \pi^-)$ — Γ_8/Γ_9

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

$\Gamma(\Omega^- K^+)/\Gamma(\Xi^- \pi^+)$ — Γ_{10}/Γ_8

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

$\Gamma(\Xi^- e^+ \nu_e)/\Gamma(\Xi^- \pi^+)$ — Γ_{11}/Γ_8

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$3.1 \pm 1.0^{+0.3}_{-0.5}$	54	ALEXANDER	95B	CLE2	$e^+ e^- \approx \Upsilon(4S)$

$\Gamma(\Xi^- \ell^+ \text{anything})/\Gamma(\Xi^- \pi^+)$ — Γ_{12}/Γ_8

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

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

$\Gamma(\Xi^- \ell^+ \text{anything})/\Gamma(\Xi^- \pi^+ \pi^+ \pi^-)$ — Γ_{12}/Γ_9

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

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

Ξ_c^0 DECAY PARAMETERS

See the note on "Baryon Decay Parameters" in the neutron Listings.

α FOR $\Xi_c^0 \to \Xi^- \pi^+$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$-0.56 \pm 0.39^{+0.10}_{-0.09}$	138	CHAN	01	CLE2	$e^+ e^- \approx \Upsilon(4S)$

Ξ_c^0 REFERENCES

LESIAK	05	PL B605 237	T. Lesiak *et al.*	(BELLE Collab.)
DANKO	04	PR D69 052004	I. Danko *et al.*	(CLEO Collab.)
LINK	02H	PL B541 211	J.M. Link *et al.*	(FNAL FOCUS Collab.)
CHAN	01	PR D63 111102R	S. Chan *et al.*	(CLEO Collab.)
FRABETTI	98B	PL B426 403	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
ALBRECHT	95B	PL B342 397	H. Albrecht *et al.*	(ARGUS Collab.)
ALEXANDER	95B	PRL 74 3113	J. Alexander *et al.*	(CLEO Collab.)
Also	95E	PRL 75 4155 (erratum)	J. Alexander *et al.*	(CLEO Collab.)
ALBRECHT	93B	PL B303 368	H. Albrecht *et al.*	(ARGUS Collab.)
FRABETTI	93C	PRL 70 2058	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
HENDERSON	92B	PL B283 161	S. Henderson *et al.*	(CLEO Collab.)
ALBRECHT	90F	PL B247 121	H. Albrecht *et al.*	(ARGUS Collab.)
BARLAG	90	PL B236 495	S. Barlag *et al.*	(ACCMOR Collab.)
ALAM	89	PL B226 401	M.S. Alam *et al.*	(CLEO Collab.)
AVERY	89	PRL 62 863	P. Avery *et al.*	(CLEO Collab.)