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
$2470.88^{+0.34}_{-0.80}$ OUR FIT				Error includes scale factor of 1.1.
$2471.09^{+0.35}_{-1.00}$ OUR AVERAGE				
$2471.0 \pm 0.3 \; ^{+0.2}_{-1.4}$	8620 ± 355	[1] LESIAK	05 BELL	$e^+ e^-$, $\Upsilon(4S)$
$2470.0 \pm 2.8 \pm 2.6$	85	FRABETTI	98B E687	γ Be, $\overline{E}_\gamma = 220$ GeV
$2469 \pm 2 \pm 3$	9	HENDERSON	92B CLEO	$\Omega^- K^+$
$2472.1 \pm 2.7 \pm 1.6$	54	ALBRECHT	90F ARG	$e^+ e^-$ at $\Upsilon(4S)$
$2473.3 \pm 1.9 \pm 1.2$	4	BARLAG	90 ACCM	$\pi^- (K^-)$ Cu 230 GeV
$2472 \pm 3 \pm 4$	19	ALAM	89 CLEO	$e^+ e^-$ 10.6 GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
$2462.1 \pm 3.1 \pm 1.4$	42	[2] FRABETTI	93C E687	See FRABETTI 98B
$2471 \pm 3 \pm 4$	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
$3.1^{+0.4}_{-0.5}$ OUR FIT			
3.1 ± 0.5 OUR AVERAGE			
$+2.9 \pm 0.5$	LESIAK	05 BELL	$e^+ e^-$, $\Upsilon(4S)$
$+7.0 \pm 4.5 \pm 2.2$	ALBRECHT	90F ARG	$e^+ e^-$ at $\Upsilon(4S)$
$+6.8 \pm 3.3 \pm 0.5$	BARLAG	90 ACCM	$\pi^- (K^-)$ Cu 230 GeV
$+5 \pm 4 \pm 1$	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, $\approx$ 180 GeV
$101^{+25}_{-17}\pm5$	42	FRABETTI	93C	E687	γ Be, $\overline{E}_\gamma$ = 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
0.210±0.045±0.015	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

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

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

$\Gamma(\Lambda K^0_S)/\Gamma(\Xi^- \pi^+)$ $\qquad$ 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

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

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

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

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

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

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

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

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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.297±0.024 OUR AVERAGE					
0.294±0.018±0.016	650	AUBERT,B	05M	BABR	$e^+ e^- \approx \Upsilon(4S)$
0.50 ±0.21 ±0.05	9	HENDERSON	92B	CLEO	$e^+ e^- \approx 10.6$ GeV

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

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

$\Gamma(\Xi^- \ell^+ \text{anything})/\Gamma(\Xi^- \pi^+)$ $\qquad$ 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±0.43±0.18	18	ALBRECHT	93B	ARG	$e^+ e^- \approx 10.4$ GeV

$\Gamma(\Xi^- \ell^+ \text{anything})/\Gamma(\Xi^- \pi^+ \pi^+ \pi^-)$ $\qquad$ 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±0.12±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
$-0.56\pm0.39^{+0.10}_{-0.09}$	138	CHAN	01	CLE2	$e^+e^- \approx \Upsilon(4S)$

Ξ_c^0 REFERENCES

AUBERT,B	05M	PRL 95 142003	B. Aubert *et al.*	(BABAR Collab.)
LESIAK	05	PL B605 237	T. Lesiak *et al.*	(BELLE Collab.)
Also		PL B617 198 (erratum)	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		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.)