



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

According to the quark model, the  $\Xi_c^0$  (quark content  $dsc$ ) and  $\Xi_c^+$  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.

### $\Xi_c^0$ MASS

The fit uses the  $\Xi_c^0$  and  $\Xi_c^+$  mass and mass-difference measurements.

| VALUE (MeV)   | EVTS | DOCUMENT ID           | TECN     | COMMENT                                 |
|---|------|-----------------------|----------|---|
| <b>2471.8±1.4 OUR FIT</b>   |      |                       |          |   |
| <b>2471.8±1.4 OUR AVERAGE</b>   |      |                       |          |   |
| 2470.0±2.8±2.6  | 85   | FRABETTI              | 98B E687 | $\gamma$ Be, $\bar{E}_\gamma = 220$ 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  | $\pi^- (K^-)$ 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   | <sup>1</sup> FRABETTI | 93C E687 | See FRABETTI 98B                        |
| 2471 ±3 ±4  | 14   | AVERY                 | 89 CLEO  | See ALAM 89                             |

<sup>1</sup>The FRABETTI 93C mass is well below the other measurements.

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

| VALUE (MeV)                | DOCUMENT ID | TECN    | COMMENT  |
|----------------------------|-------------|---------|--|
| <b>5.5±1.8 OUR FIT</b>     |             |         |  |
| <b>6.3±2.3 OUR AVERAGE</b> |             |         |  |
| +7.0±4.5±2.2               | ALBRECHT    | 90F ARG | $e^+ e^-$ at $\Upsilon(4S)$  |
| +6.8±3.3±0.5               | BARLAG      | 90 ACCM | $\pi^- (K^-)$ Cu 230 GeV   |
| +5 ±4 ±1                   | ALAM        | 89 CLEO | $\Xi_c^0 \rightarrow \Xi^- \pi^+, \Xi_c^+ \rightarrow \Xi^- \pi^+ \pi^+$ |

### $\Xi_c^0$ MEAN LIFE

| VALUE ( $10^{-15}$ s)                                  | EVTS | DOCUMENT ID | TECN     | COMMENT   |
|--|------|-------------|----------|---|
| <b>112<sup>+13</sup><sub>-10</sub> OUR NEW AVERAGE</b> |      |             |          | $[(98+23-15) \times 10^{-15}$ s OUR 2002 AVERAGE] |
| 118 <sup>+14</sup> <sub>-12</sub> ±5                   | 110  | LINK        | 02H FOCS | $\gamma$ nucleus, $\approx 180$ GeV               |
| 101 <sup>+25</sup> <sub>-17</sub> ±5                   | 42   | FRABETTI    | 93C E687 | $\gamma$ Be, $\bar{E}_\gamma = 220$ GeV           |
| 82 <sup>+59</sup> <sub>-30</sub>                       | 4    | BARLAG      | 90 ACCM  | $\pi^- (K^-)$ Cu 230 GeV                          |

## $\Xi_c^0$ DECAY MODES

| Mode                                       | Fraction ( $\Gamma_i/\Gamma$ ) |
|--|--------------------------------|
| $\Gamma_1$ $\Lambda \bar{K}^0$             | seen                           |
| $\Gamma_2$ $\Lambda \bar{K}^0 \pi^+ \pi^-$ | seen                           |
| $\Gamma_3$ $\Lambda K^- \pi^+ \pi^+ \pi^-$ | seen                           |
| $\Gamma_4$ $\Xi^- \pi^+$                   | seen                           |
| $\Gamma_5$ $\Xi^- \pi^+ \pi^+ \pi^-$       | seen                           |
| $\Gamma_6$ $p K^- \bar{K}^*(892)^0$        | seen                           |
| $\Gamma_7$ $\Omega^- K^+$                  | seen                           |
| $\Gamma_8$ $\Xi^- e^+ \nu_e$               | seen                           |
| $\Gamma_9$ $\Xi^- \ell^+$ anything         | seen                           |

## $\Xi_c^0$ BRANCHING RATIOS

|   |             |   |                     |
|---|-------------|---|---------------------|
| $\Gamma(\Lambda \bar{K}^0)/\Gamma_{\text{total}}$             |             |   | $\Gamma_1/\Gamma$   |
| <u>VALUE</u>  | <u>EVTS</u> | <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>             |                     |
| seen  | 7           | ALBRECHT 95B ARG $e^+ e^- \approx 10.4$ GeV               |                     |
| $\Gamma(\Lambda \bar{K}^0 \pi^+ \pi^-)/\Gamma_{\text{total}}$ |             |   | $\Gamma_2/\Gamma$   |
| <u>VALUE</u>  |             | <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>             |                     |
| seen  |             | FRABETTI 98B E687 $\gamma$ Be, $\bar{E}_\gamma = 220$ GeV |                     |
| $\Gamma(\Lambda K^- \pi^+ \pi^+ \pi^-)/\Gamma_{\text{total}}$ |             |   | $\Gamma_3/\Gamma$   |
| <u>VALUE</u>  |             | <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>             |                     |
| seen  |             | FRABETTI 98B E687 $\gamma$ Be, $\bar{E}_\gamma = 220$ GeV |                     |
| $\Gamma(\Xi^- \pi^+)/\Gamma(\Xi^- \pi^+ \pi^+ \pi^-)$         |             |   | $\Gamma_4/\Gamma_5$ |
| <u>VALUE</u>  |             | <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>             |                     |
| $0.30 \pm 0.12 \pm 0.05$                                      |             | ALBRECHT 90F ARG $e^+ e^-$ at $\Upsilon(4S)$              |                     |
| $\Gamma(p K^- \bar{K}^*(892)^0)/\Gamma_{\text{total}}$        |             |   | $\Gamma_6/\Gamma$   |
| <u>VALUE</u>  |             | <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>             |                     |
| seen  |             | BARLAG 90 ACCM $\pi^- (K^-)$ Cu 230 GeV                   |                     |
| $\Gamma(\Omega^- K^+)/\Gamma(\Xi^- \pi^+)$                    |             |   | $\Gamma_7/\Gamma_4$ |
| <u>VALUE</u>  | <u>EVTS</u> | <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>             |                     |
| $0.50 \pm 0.21 \pm 0.05$                                      | 9           | HENDERSON 92B CLEO $e^+ e^- \approx 10.6$ GeV             |                     |
| $\Gamma(\Xi^- e^+ \nu_e)/\Gamma(\Xi^- \pi^+)$                 |             |   | $\Gamma_8/\Gamma_4$ |
| <u>VALUE</u>  | <u>EVTS</u> | <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>             |                     |
| $3.1 \pm 1.0^{+0.3}_{-0.5}$                                   | 54          | ALEXANDER 95B CLE2 $e^+ e^- \approx \Upsilon(4S)$         |                     |

$\Gamma(\Xi^- \ell^+ \text{ anything})/\Gamma(\Xi^- \pi^+)$   $\Gamma_9/\Gamma_4$

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                    |
|-----------------------|------|-------------|---------|----------------------------|
| <b>0.96±0.43±0.18</b> | 18   | ALBRECHT    | 93B ARG | $e^+ e^- \approx 10.4$ GeV |

$\Gamma(\Xi^- \ell^+ \text{ anything})/\Gamma(\Xi^- \pi^+ \pi^+ \pi^-)$   $\Gamma_9/\Gamma_5$

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                    |
|-----------------------|------|-------------|---------|----------------------------|
| <b>0.29±0.12±0.04</b> | 18   | ALBRECHT    | 93B ARG | $e^+ e^- \approx 10.4$ GeV |

$\Xi_c^0$  DECAY PARAMETERS

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

$\alpha$  FOR  $\Xi_c^0 \rightarrow \Xi^- \pi^+$

| VALUE   | EVTS | DOCUMENT ID | TECN    | COMMENT                        |
|---|------|-------------|---------|--------------------------------|
| <b>-0.56±0.39<sup>+0.10</sup><sub>-0.09</sub></b> | 138  | CHAN        | 01 CLE2 | $e^+ e^- \approx \Upsilon(4S)$ |

$\Xi_c^0$  REFERENCES

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