



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

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>2471.0 ± 0.4</b>   | <b>OUR FIT</b>     |                       |          |   |
| <b>2471.09<sup>+0.35</sup><sub>-1.00</sub></b>                                | <b>OUR AVERAGE</b> |                       |          |   |
| 2471.0 ± 0.3 <sup>+0.2</sup> <sub>-1.4</sub>                                  | 8620 ± 355         | <sup>1</sup> LESIAK   | 05 BELL  | $e^+e^-$ , $\Upsilon(4S)$               |
| 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>2</sup> FRABETTI | 93C E687 | See FRABETTI 98B                        |
| 2471 ± 3 ± 4  | 14                 | AVERY                 | 89 CLEO  | See ALAM 89                             |

<sup>1</sup> The systematic error was (wrongly) given the other way round in LESIAK 05.

<sup>2</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>3.1 ± 0.5</b> | <b>OUR FIT</b>     |         |   |
| <b>3.1 ± 0.5</b> | <b>OUR AVERAGE</b> |         |   |
| +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 | $\pi^- (K^-)$ 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></b> | <b>OUR AVERAGE</b> |             |          |   |
| 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

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

| Mode  | Fraction ( $\Gamma_i/\Gamma$ ) |
|---|--------------------------------|
| $\Gamma_1$ $pK^-K^-\pi^+$                       | seen                           |
| $\Gamma_2$ $pK^-\bar{K}^*(892)^0$               | seen                           |
| $\Gamma_3$ $pK^-K^-\pi^+$ no $\bar{K}^*(892)^0$ | seen                           |
| $\Gamma_4$ $\Lambda K_S^0$                      | seen                           |
| $\Gamma_5$ $\Lambda K^-\pi^+$                   |                                |
| $\Gamma_6$ $\Lambda\bar{K}^0\pi^+\pi^-$         | seen                           |
| $\Gamma_7$ $\Lambda K^-\pi^+\pi^+\pi^-$         | seen                           |
| $\Gamma_8$ $\Xi^-\pi^+$                         | seen                           |
| $\Gamma_9$ $\Xi^-\pi^+\pi^+\pi^-$               | seen                           |
| $\Gamma_{10}$ $\Omega^-K^+$                     | seen                           |
| $\Gamma_{11}$ $\Xi^-e^+\nu_e$                   | seen                           |
| $\Gamma_{12}$ $\Xi^-\ell^+$ anything            | seen                           |

## $\Xi_c^0$ BRANCHING RATIOS

### $\Gamma(pK^-K^-\pi^+)/\Gamma(\Xi^-\pi^+)$ $\Gamma_1/\Gamma_8$

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

### $\Gamma(pK^-\bar{K}^*(892)^0)/\Gamma(\Xi^-\pi^+)$ $\Gamma_2/\Gamma_8$

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

| VALUE   | DOCUMENT ID | TECN | COMMENT                       |
|---|-------------|------|-------------------------------|
| <b>0.210±0.045±0.015</b>  | DANKO       | 04   | CLEO $e^+e^-$                 |
| ••• We do not use the following data for averages, fits, limits, etc. ••• |             |      |                               |
| seen  | BARLAG      | 90   | ACCM $\pi^- (K^-)$ Cu 230 GeV |

### $\Gamma(pK^-K^-\pi^+ \text{ no } \bar{K}^*(892)^0)/\Gamma(\Xi^-\pi^+)$ $\Gamma_3/\Gamma_8$

| VALUE                 | DOCUMENT ID | TECN | COMMENT       |
|-----------------------|-------------|------|---------------|
| <b>0.21±0.04±0.02</b> | DANKO       | 04   | CLEO $e^+e^-$ |

### $\Gamma(\Lambda K_S^0)/\Gamma(\Xi^-\pi^+)$ $\Gamma_4/\Gamma_8$

| VALUE   | EVTS     | DOCUMENT ID | TECN | COMMENT                        |
|---|----------|-------------|------|--------------------------------|
| <b>0.21±0.02 ±0.02</b>  | 465 ± 37 | LESIK       | 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  |

### $\Gamma(\Lambda K^-\pi^+)/\Gamma(\Xi^-\pi^+)$ $\Gamma_5/\Gamma_8$

| VALUE                 | EVTS       | DOCUMENT ID | TECN | COMMENT                        |
|-----------------------|------------|-------------|------|--------------------------------|
| <b>1.07±0.12±0.07</b> | 2979 ± 211 | LESIK       | 05   | BELL $e^+e^-$ , $\Upsilon(4S)$ |

| $\Gamma(\Lambda\bar{K}^0\pi^+\pi^-)/\Gamma_{\text{total}}$ |                    |             |   | $\Gamma_6/\Gamma$ |
|--|--------------------|-------------|---|-------------------|
| <u>VALUE</u>   | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                          |                   |
| <b>seen</b>  | FRABETTI           | 98B E687    | $\gamma$ Be, $\bar{E}_\gamma = 220$ GeV |                   |

| $\Gamma(\Lambda K^-\pi^+\pi^-)/\Gamma_{\text{total}}$ |                    |             |   | $\Gamma_7/\Gamma$ |
|---|--------------------|-------------|---|-------------------|
| <u>VALUE</u>  | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                          |                   |
| <b>seen</b>   | FRABETTI           | 98B E687    | $\gamma$ Be, $\bar{E}_\gamma = 220$ GeV |                   |

| $\Gamma(\Xi^-\pi^+)/\Gamma(\Xi^-\pi^+\pi^-\pi^-)$ |                    |             |                            | $\Gamma_8/\Gamma_9$ |
|---|--------------------|-------------|----------------------------|---------------------|
| <u>VALUE</u>                                      | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>             |                     |
| <b>0.30±0.12±0.05</b>                             | ALBRECHT           | 90F ARG     | $e^+e^-$ at $\Upsilon(4S)$ |                     |

| $\Gamma(\Omega^-K^+)/\Gamma(\Xi^-\pi^+)$ |             |                    |             | $\Gamma_{10}/\Gamma_8$        |
|--|-------------|--------------------|-------------|-------------------------------|
| <u>VALUE</u>                             | <u>EVTS</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                |
| <b>0.297±0.024 OUR AVERAGE</b>           |             |                    |             |                               |
| 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     |

| $\Gamma(\Xi^-e^+\nu_e)/\Gamma(\Xi^-\pi^+)$   |             |                    |             | $\Gamma_{11}/\Gamma_8$        |
|--|-------------|--------------------|-------------|-------------------------------|
| <u>VALUE</u>                                 | <u>EVTS</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                |
| <b>3.1±1.0<sup>+0.3</sup><sub>-0.5</sub></b> | 54          | ALEXANDER          | 95B CLE2    | $e^+e^- \approx \Upsilon(4S)$ |

| $\Gamma(\Xi^-\ell^+\text{anything})/\Gamma(\Xi^-\pi^+)$   |             |                    |             | $\Gamma_{12}/\Gamma_8$    |
|---|-------------|--------------------|-------------|---------------------------|
| The ratio is for the <i>average</i> (not the sum) of the $\Xi^-e^+$ anything and $\Xi^-\mu^+$ anything modes. |             |                    |             |                           |
| <u>VALUE</u>  | <u>EVTS</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>            |
| <b>0.96±0.43±0.18</b>   | 18          | ALBRECHT           | 93B ARG     | $e^+e^- \approx 10.4$ GeV |

| $\Gamma(\Xi^-\ell^+\text{anything})/\Gamma(\Xi^-\pi^+\pi^-\pi^-)$   |             |                    |             | $\Gamma_{12}/\Gamma_9$    |
|---|-------------|--------------------|-------------|---------------------------|
| The ratio is for the <i>average</i> (not the sum) of the $\Xi^-e^+$ anything and $\Xi^-\mu^+$ anything modes. |             |                    |             |                           |
| <u>VALUE</u>  | <u>EVTS</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>            |
| <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 $\Xi_c^0 \rightarrow \Xi^-\pi^+$     |             |                    |             |                               |
|---|-------------|--------------------|-------------|-------------------------------|
| <u>VALUE</u>                                      | <u>EVTS</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                |
| <b>-0.56±0.39<sup>+0.10</sup><sub>-0.09</sub></b> | 138         | CHAN               | 01 CLE2     | $e^+e^- \approx \Upsilon(4S)$ |

## ☰<sub>c</sub> REFERENCES

|           |     |                       |                             |                      |
|-----------|-----|-----------------------|-----------------------------|----------------------|
| AUBERT,B  | 05M | PRL 95 142003         | B. Aubert <i>et al.</i>     | (BABAR Collab.)      |
| LESIAK    | 05  | PL B605 237           | T. Lesiak <i>et al.</i>     | (BELLE Collab.)      |
| Also      |     | PL B617 198 (erratum) | T. Lesiak <i>et al.</i>     | (BELLE Collab.)      |
| DANKO     | 04  | PR D69 052004         | I. Danko <i>et al.</i>      | (CLEO Collab.)       |
| 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      |     | 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.)       |

---