

# $\Omega$ BARYONS

## $(S = -3, I = 0)$

$$\Omega^- = sss$$

$\Omega^-$

$$I(J^P) = 0(\frac{3}{2}^+)$$

$J^P = \frac{3}{2}^+$  is the quark-model prediction; and  $J = 3/2$  is fairly well established.

$$\text{Mass } m = 1672.45 \pm 0.29 \text{ MeV}$$

$$(m_{\Omega^-} - m_{\bar{\Omega}^+}) / m_{\Omega^-} = (-1 \pm 8) \times 10^{-5}$$

$$\text{Mean life } \tau = (0.821 \pm 0.011) \times 10^{-10} \text{ s}$$

$$c\tau = 2.461 \text{ cm}$$

$$(\tau_{\Omega^-} - \tau_{\bar{\Omega}^+}) / \tau_{\Omega^-} = 0.00 \pm 0.05$$

$$\text{Magnetic moment } \mu = -2.02 \pm 0.05 \mu_N$$

### Decay parameters

$$\alpha(\Omega^-) \alpha_-(\Lambda) \text{ FOR } \Omega^- \rightarrow \Lambda K^- = 0.0115 \pm 0.0015$$

$$\Lambda K^- \quad \alpha = 0.0154 \pm 0.0020$$

$$\Lambda K^-, \bar{\Lambda} K^+ \quad (\alpha + \bar{\alpha}) / (\alpha - \bar{\alpha}) = -0.02 \pm 0.13$$

$$\Xi^0 \pi^- \quad \alpha = 0.09 \pm 0.14$$

$$\Xi^- \pi^0 \quad \alpha = 0.05 \pm 0.21$$

| $\Omega^-$ DECAY MODES                                              | Fraction ( $\Gamma_i/\Gamma$ )       | Scale factor/<br>Confidence level | $p$<br>(MeV/c) |
|---------------------------------------------------------------------|--------------------------------------|-----------------------------------|----------------|
| $\Lambda K^-$                                                       | $(67.7 \pm 0.7) \%$                  |                                   | 211            |
| $\Xi^0 \pi^-$                                                       | $(24.3 \pm 0.7) \%$                  | S=1.5                             | 294            |
| $\Xi^- \pi^0$                                                       | $(8.55 \pm 0.33) \%$                 |                                   | 289            |
| $\Xi^- \pi^+ \pi^-$                                                 | $(3.7^{+0.7}_{-0.6}) \times 10^{-4}$ |                                   | 189            |
| $\Xi(1530)^0 \pi^-$                                                 | $< 7 \times 10^{-5}$                 | CL=90%                            | 17             |
| $\Xi^0 e^- \bar{\nu}_e$                                             | $(5.6 \pm 2.8) \times 10^{-3}$       |                                   | 319            |
| $\Xi^- \gamma$                                                      | $< 4.6 \times 10^{-4}$               | CL=90%                            | 314            |
| <b><math>\Delta S = 2</math> forbidden (<math>S_2</math>) modes</b> |                                      |                                   |                |
| $\Lambda \pi^-$                                                     | $S_2 \quad < 2.9 \times 10^{-6}$     | CL=90%                            | 449            |
| $\Sigma^0 \pi^-$                                                    | $< 5.4 \times 10^{-4}$               | CL=90%                            | 393            |
| $n K^-$                                                             | $< 2.4 \times 10^{-4}$               | CL=90%                            | 415            |

$\Omega(2012)^-$

$$I(J^P) = 0(?^-)$$

Mass  $m = 2012.5 \pm 0.6$  MeV  
Full width  $\Gamma = 6.4^{+3.0}_{-2.6}$  MeV

| $\Omega(2012)^-$ DECAY MODES | Fraction ( $\Gamma_i/\Gamma$ ) | $p$ (MeV/c) |
|------------------------------|--------------------------------|-------------|
| $\Xi^0 K^-$                  | seen                           | 403         |
| $\Xi^- \overline{K}^0$       | seen                           | 392         |
| $\Xi^- \pi^+ K^-$            | seen                           | 224         |

$\Omega(2250)^-$

$$I(J^P) = 0(?^?)$$

Mass  $m = 2252 \pm 9$  MeV  
Full width  $\Gamma = 55 \pm 18$  MeV

| $\Omega(2250)^-$ DECAY MODES | Fraction ( $\Gamma_i/\Gamma$ ) | $p$ (MeV/c) |
|------------------------------|--------------------------------|-------------|
| $\Xi^- \pi^+ K^-$            | seen                           | 532         |
| $\Xi(1530)^0 K^-$            | seen                           | 437         |