Ξ BARYONS
($S = -2, I = 1/2$)

$\Xi^0 = uss, \quad \Xi^- = dss$

Ξ^0

$I(J^P) = \frac{1}{2}(\frac{1}{2}^+)$

P is not yet measured; + is the quark model prediction.

Mass $m = 1314.83 \pm 0.20$ MeV
$m_{\Xi^-} - m_{\Xi^0} = 6.48 \pm 0.24$ MeV
Mean life $\tau = (2.90 \pm 0.09) \times 10^{-10}$ s
$c\tau = 8.71$ cm
Magnetic moment $\mu = -1.250 \pm 0.014\ \mu_N$

Decay parameters

$\Lambda\pi^0$	$\alpha = -0.411 \pm 0.022$ (S = 2.1)
"	$\phi = (21 \pm 12)^\circ$
"	$\gamma = 0.85$ [h]
"	$\Delta = (218^{+12}_{-19})^\circ$ [h]
$\Lambda\gamma$	$\alpha = 0.4 \pm 0.4$
$\Sigma^0\gamma$	$\alpha = -0.63 \pm 0.09$
$\Sigma^+ e^- \overline{\nu}_e$	$g_1(0)/f_1(0) = 1.32^{+0.22}_{-0.18}$
$\Sigma^+ e^- \overline{\nu}_e$	$f_2(0)/f_1(0) = 2.0 \pm 1.3$

Ξ^0 DECAY MODES		Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
$\Lambda\pi^0$		(99.522±0.032) %	S=1.7	135
$\Lambda\gamma$		(1.18 ±0.30) $\times 10^{-3}$	S=2.0	184
$\Sigma^0\gamma$		(3.33 ±0.10) $\times 10^{-3}$		117
$\Sigma^+ e^- \overline{\nu}_e$		(2.7 ±0.4) $\times 10^{-4}$		120
$\Sigma^+ \mu^- \overline{\nu}_\mu$		$< 1.1 \times 10^{-3}$	CL=90%	64
$\Delta S = \Delta Q$ (SQ) violating modes or $\Delta S = 2$ forbidden ($S2$) modes				
$\Sigma^- e^+ \nu_e$	SQ	$< 9 \times 10^{-4}$	CL=90%	112
$\Sigma^- \mu^+ \nu_\mu$	SQ	$< 9 \times 10^{-4}$	CL=90%	49
$p\pi^-$	$S2$	$< 4 \times 10^{-5}$	CL=90%	299
$p e^- \overline{\nu}_e$	$S2$	$< 1.3 \times 10^{-3}$		323
$p\mu^- \overline{\nu}_\mu$	$S2$	$< 1.3 \times 10^{-3}$		309

Ξ^-

$I(J^P) = \frac{1}{2}(\frac{1}{2}^+)$

P is not yet measured; + is the quark model prediction.

Mass $m = 1321.31 \pm 0.13$ MeV
Mean life $\tau = (1.639 \pm 0.015) \times 10^{-10}$ s
$c\tau = 4.91$ cm
Magnetic moment $\mu = -0.6507 \pm 0.0025\ \mu_N$

Decay parameters

$\Lambda\pi^-$ $\alpha = -0.458 \pm 0.012$ (S = 1.8)
$[\alpha(\Xi^-)\alpha_-(\Lambda) - \alpha(\overline{\Xi}^+)\alpha_+(\overline{\Lambda})]/[\alpha(\Xi^-)\alpha_-(\Lambda) + \alpha(\overline{\Xi}^+)\alpha_+(\overline{\Lambda})]$
$= 0.012 \pm 0.014$
" $\phi = (4 \pm 4)^\circ$
" $\gamma = 0.89$ [h]
" $\Delta = (188 \pm 8)^\circ$ [h]
$\Lambda e^-\overline{\nu}_e$ $g_A/g_V = -0.25 \pm 0.05$ [f]

Ξ^- DECAY MODES		Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$\Lambda\pi^-$		(99.887 ± 0.035) %		139
$\Sigma^-\gamma$		(1.27 ± 0.23) × 10^{-4}		118
$\Lambda e^-\overline{\nu}_e$		(5.63 ± 0.31) × 10^{-4}		190
$\Lambda\mu^-\overline{\nu}_\mu$		(3.5 $^{+3.5}_{-2.2}$) × 10^{-4}		163
$\Sigma^0 e^-\overline{\nu}_e$		(8.7 ± 1.7) × 10^{-5}		122
$\Sigma^0\mu^-\overline{\nu}_\mu$		< 8 × 10^{-4}	90%	70
$\Xi^0 e^-\overline{\nu}_e$		< 2.3 × 10^{-3}	90%	6
$\Delta S = 2$ forbidden ($S2$) modes				
$n\pi^-$	$S2$	< 1.9 × 10^{-5}	90%	303
$ne^-\overline{\nu}_e$	$S2$	< 3.2 × 10^{-3}	90%	327
$n\mu^-\overline{\nu}_\mu$	$S2$	< 1.5 %	90%	314
$p\pi^-\pi^-$	$S2$	< 4 × 10^{-4}	90%	223
$p\pi^- e^-\overline{\nu}_e$	$S2$	< 4 × 10^{-4}	90%	304
$p\pi^-\mu^-\overline{\nu}_\mu$	$S2$	< 4 × 10^{-4}	90%	250
$p\mu^-\mu^-$	L	< 4 × 10^{-4}	90%	272

$\Xi(1530)\ P_{13}$

$I(J^P) = \frac{1}{2}(\frac{3}{2}^+)$

$\Xi(1530)^0$ mass $m = 1531.80 \pm 0.32$ MeV (S = 1.3)
$\Xi(1530)^-$ mass $m = 1535.0 \pm 0.6$ MeV
$\Xi(1530)^0$ full width $\Gamma = 9.1 \pm 0.5$ MeV
$\Xi(1530)^-$ full width $\Gamma = 9.9^{+1.7}_{-1.9}$ MeV

Ξ(1530) DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$\Xi\pi$	100 %		152
$\Xi\gamma$	<4 %	90%	200

$\Xi(1690)$

$I(J^P) = \frac{1}{2}(?^?)$

Mass $m = 1690 \pm 10$ MeV [j]
Full width $\Gamma < 30$ MeV

Ξ(1690) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Lambda\overline{K}$	seen	240
$\Sigma\overline{K}$	seen	51
$\Xi\pi$	seen	–
$\Xi^-\pi^+\pi^-$	possibly seen	214

$\Xi(1820)\ D_{13}$

$I(J^P) = \frac{1}{2}(\frac{3}{2}^-)$

Mass $m = 1823 \pm 5$ MeV [j]
Full width $\Gamma = 24^{+15}_{-10}$ MeV [j]

Ξ(1820) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Lambda\overline{K}$	large	400
$\Sigma\overline{K}$	small	320
$\Xi\pi$	small	413
$\Xi(1530)\pi$	small	234

$\Xi(1950)$

$I(J^P) = \frac{1}{2}(?^?)$

Mass $m = 1950 \pm 15$ MeV [j]
Full width $\Gamma = 60 \pm 20$ MeV [j]

$\Xi(1950)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Lambda\overline{K}$	seen	522
$\Sigma\overline{K}$	possibly seen	460
$\Xi\pi$	seen	518

$\Xi(2030)$

$I(J^P) = \frac{1}{2}(\geq \frac{5}{2}^?)$

Mass $m = 2025 \pm 5$ MeV [j]
Full width $\Gamma = 20^{+15}_{-5}$ MeV [j]

$\Xi(2030)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Lambda\overline{K}$	~ 20 %	589
$\Sigma\overline{K}$	~ 80 %	533
$\Xi\pi$	small	573
$\Xi(1530)\pi$	small	421
$\Lambda\overline{K}\pi$	small	501
$\Sigma\overline{K}\pi$	small	430