CHARMED BARYONS ($C = +1$)

$\Lambda_c^+ = u\,d\,c$, $\Sigma_c^{++} = u\,u\,c$, $\Sigma_c^+ = u\,d\,c$, $\Sigma_c^0 = d\,d\,c$,
$\Xi_c^+ = u\,s\,c$, $\Xi_c^0 = d\,s\,c$, $\Omega_c^0 = s\,s\,c$

Λ_c^+

$I(J^P) = 0(\frac{1}{2}^+)$

Mass $m = 2286.46 \pm 0.14$ MeV
Mean life $\tau = (202.6 \pm 1.0) \times 10^{-15}$ s
$c\tau = 60.75\ \mu$m

Decay asymmetry parameters

$\Lambda\pi^+$ $\alpha = -0.755 \pm 0.006$
α FOR $\Lambda_c^+ \to \Lambda\rho^+ = -0.76 \pm 0.07$
$\Sigma^+\pi^0$ $\alpha = -0.484 \pm 0.027$
α FOR $\Lambda_c^+ \to \Sigma^+\eta = -0.99 \pm 0.06$
α FOR $\Lambda_c^+ \to \Sigma^+\eta' = -0.46 \pm 0.07$
α FOR $\Lambda_c^+ \to \Sigma^0\pi^+ = -0.466 \pm 0.018$
α FOR $\Lambda_c^+ \to \Sigma(1385)^+\pi^0 = -0.92 \pm 0.09$
α FOR $\Lambda_c^+ \to \Sigma(1385)^0\pi^+ = -0.79 \pm 0.11$
$\Lambda\ell^+\nu_\ell$ $\alpha = -0.875 \pm 0.033$
α FOR $\Lambda_c^+ \to pK_S^0 = 0.2 \pm 0.5$
α FOR $\Lambda_c^+ \to \Lambda K^+ = -0.58 \pm 0.05$
α FOR $\Lambda_c^+ \to \Sigma^0 K^+ = -0.54 \pm 0.20$
α FOR $\Lambda_c^+ \to \Lambda(1405)\pi^+ = 0.58 \pm 0.28$
α FOR $\Lambda_c^+ \to \Lambda(1520)\pi^+ = 0.93 \pm 0.09$
α FOR $\Lambda_c^+ \to \Lambda(1600)\pi^+ = 0.2 \pm 0.5$
α FOR $\Lambda_c^+ \to \Lambda(1670)\pi^+ = 0.82 \pm 0.08$
α FOR $\Lambda_c^+ \to \Lambda(1690)\pi^+ = 0.958 \pm 0.034$
α FOR $\Lambda_c^+ \to \Lambda(2000)\pi^+ = -0.57 \pm 0.19$
α FOR $\Lambda_c^+ \to \Delta(1232)^{++}K^- = 0.55 \pm 0.04$
α FOR $\Lambda_c^+ \to \Delta(1600)^{++}K^- = -0.50 \pm 0.18$
α FOR $\Lambda_c^+ \to \Delta(1700)^{++}K^- = 0.22 \pm 0.08$
α FOR $\Lambda_c^+ \to \overline{K}_0^*(700)^0 p = -0.1 \pm 0.7$
α FOR $\Lambda_c^+ \to \overline{K}_0^*(1430)^0 p = 0.34 \pm 0.14$
$(\alpha + \overline{\alpha})/(\alpha - \overline{\alpha})$ in $\Lambda_c^+ \to \Lambda\pi^+$, $\overline{\Lambda}_c^- \to \overline{\Lambda}\pi^- = 0.020 \pm 0.016$

$(\alpha + \overline{\alpha})/(\alpha - \overline{\alpha})$ in $\Lambda_c^+ \to \Sigma^0\pi^+$, $\overline{\Lambda}_c^- \to \overline{\Sigma}^0\pi^-$ = −0.02 ± 0.05
$(\alpha + \overline{\alpha})/(\alpha - \overline{\alpha})$ in $\Lambda_c^+ \to \Lambda e^+\nu_e$, $\overline{\Lambda}_c^- \to \overline{\Lambda} e^-\overline{\nu}_e$ = 0.00 ± 0.04
$(\alpha + \overline{\alpha})/(\alpha - \overline{\alpha})$ in $\Lambda_c^+ \to \Lambda K^+$, $\overline{\Lambda}_c^- \to \overline{\Lambda} K^-$ = −0.23 ± 0.11
$(\alpha + \overline{\alpha})/(\alpha - \overline{\alpha})$ in $\Lambda_c^+ \to \Sigma^0 K^+$, $\overline{\Lambda}_c^- \to \overline{\Sigma}^0 K^-$ = 0.1 ± 0.4
$A_{CP}(\Lambda X)$ in $\Lambda_c \to \Lambda X$, $\overline{\Lambda}_c \to \overline{\Lambda} X$ = (2 ± 7)%
$A_{CP}(\Lambda K^+)$ in $\Lambda_c \to \Lambda K^+$, $\overline{\Lambda}_c \to \overline{\Lambda} K^-$ = 0.021 ± 0.026
$A_{CP}(\Sigma^0 K^+)$ in $\Lambda_c \to \Sigma^0 K^+$, $\overline{\Lambda}_c \to \overline{\Sigma}^0 K^-$ = 0.03 ± 0.05
$\Delta A_{CP} = A_{CP}(\Lambda_c^+ \to pK^+K^-) - A_{CP}(\Lambda_c^+ \to p\pi^+\pi^-)$ = (0.3 ± 1.1)%

Branching fractions marked with a footnote, e.g. [a], have been corrected for decay modes not observed in the experiments. For example, the submode fraction $\Lambda_c^+ \to p\overline{K}^*(892)^0$ seen in $\Lambda_c^+ \to pK^-\pi^+$ has been multiplied up to include $\overline{K}^*(892)^0 \to \overline{K}^0\pi^0$ decays.

Λ_c^+ DECAY MODES		Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
Hadronic modes with a p or n: $S = -1$ final states				
pK_S^0		(1.59 ± 0.07) %	S=1.1	873
$pK^-\pi^+$		(6.24 ± 0.28) %	S=1.4	823
$p\overline{K}_0^*(700)^0$		(1.9 ± 0.6) × 10^{-3}		715
$p\overline{K}^*(892)^0$	[a]	(1.39 ± 0.07) %		685
$p\overline{K}_0^*(1430)$		(9.2 ± 1.8) × 10^{-3}		†
$\Delta(1232)^{++}K^-$		(1.76 ± 0.09) %		710
$\Delta(1600)^{++}K^-$		(2.8 ± 1.0) × 10^{-3}		–
$\Delta(1700)^{++}K^-$		(2.4 ± 0.6) × 10^{-3}		–
$\Lambda(1405)^0\pi^+$		(4.8 ± 1.9) × 10^{-3}		–
$\Lambda(1520)\pi^+$	[a]	(1.16 ± 0.16) × 10^{-3}		628
$\Lambda(1600)\pi^+$		(3.2 ± 1.2) × 10^{-3}		571
$\Lambda(1670)\pi^+$		(7.4 ± 2.1) × 10^{-4}		516
$\Lambda(1690)\pi^+$		(7.4 ± 2.2) × 10^{-4}		504
$\Lambda(2000)\pi^+$		(6.0 ± 0.7) × 10^{-3}		234
$pK^-\pi^+$ nonresonant		(3.5 ± 0.4) %		823
$pK_S^0\pi^0$		(1.96 ± 0.12) %		823
$nK_S^0\pi^+$		(1.82 ± 0.25) %		821
$nK^-\pi^+\pi^+$		(1.90 ± 0.12) %		756
$p\overline{K}^0\eta$		(8.8 ± 0.6) × 10^{-3}	S=1.1	568
$pK_S^0\pi^+\pi^-$		(1.59 ± 0.11) %	S=1.1	754
$pK^-\pi^+\pi^0$		(4.43 ± 0.28) %	S=1.5	759
$pK^*(892)^-\pi^+$	[a]	(1.4 ± 0.5) %		580
$p(K^-\pi^+)_{\text{nonresonant}}\pi^0$		(4.6 ± 0.8) %		759
$\Delta(1232)\overline{K}^*(892)$		seen		419
$pK^-2\pi^+\pi^-$		(1.4 ± 0.9) × 10^{-3}		671
$pK^-\pi^+2\pi^0$		(10 ± 5) × 10^{-3}		678

Hadronic modes with a p or n: $S = 0$ final states

$p\pi^0$		$< 8 \times 10^{-5}$	CL=90%	945
$n\pi^+$		$(6.6 \pm 1.3) \times 10^{-4}$		944
$p\eta$		$(1.57 \pm 0.12) \times 10^{-3}$		856
$p\eta'$		$(4.8 \pm 0.9) \times 10^{-4}$		639
$p\omega(782)^0$		$(1.11 \pm 0.21) \times 10^{-3}$		751
$p\pi^+\pi^-$		$(4.59 \pm 0.25) \times 10^{-3}$		927
$\quad pf_0(980)$	[a]	$(3.4 \pm 2.3) \times 10^{-3}$		614
$n\pi^+\pi^0$		$(6.4 \pm 0.9) \times 10^{-3}$		927
$n\pi^+\pi^-\pi^+$		$(4.5 \pm 0.8) \times 10^{-3}$		895
$p2\pi^+2\pi^-$		$(2.2 \pm 1.4) \times 10^{-3}$		852
pK^+K^-		$(1.06 \pm 0.05) \times 10^{-3}$		616
$\quad p\phi$	[a]	$(1.06 \pm 0.14) \times 10^{-3}$		590
$\quad pK^+K^-$ non-ϕ		$(5.2 \pm 1.1) \times 10^{-4}$		616
$pK^0_S K^0_S$		$(2.35 \pm 0.18) \times 10^{-4}$		610
$p\phi\pi^0$		$(10 \pm 4) \times 10^{-5}$		460
$pK^+K^-\pi^0$ nonresonant		$< 6.3 \times 10^{-5}$	CL=90%	494

Hadronic modes with a hyperon: $S = -1$ final states

$\Lambda\pi^+$		(1.29 ± 0.05) %	S=1.1	864
$\Lambda(1670)\pi^+$, $\Lambda(1670) \to \eta\Lambda$		$(3.5 \pm 0.5) \times 10^{-3}$		–
$\Lambda\pi^+\pi^0$		(7.02 ± 0.35) %	S=1.1	844
$\quad \Lambda\rho^+$		(4.0 ± 0.5) %		636
$\quad \Sigma(1385)^+\pi^0$, $\Sigma^+ \to \Lambda\pi^+$		$(5.0 \pm 0.7) \times 10^{-3}$		–
$\quad \Sigma(1385)^0\pi^+$, $\Sigma^0 \to \Lambda\pi^0$		$(5.6 \pm 0.8) \times 10^{-3}$		–
$\Lambda\pi^-2\pi^+$		(3.61 ± 0.26) %	S=1.4	807
$\quad \Sigma(1385)^+\pi^+\pi^-$, $\Sigma^{*+} \to \Lambda\pi^+$		(1.0 ± 0.5) %		688
$\quad \Sigma(1385)^-2\pi^+$, $\Sigma^{*-} \to \Lambda\pi^-$		$(7.6 \pm 1.4) \times 10^{-3}$		688
$\quad \Lambda\pi^+\rho^0$		(1.4 ± 0.6) %		524
$\quad \Sigma(1385)^+\rho^0$, $\Sigma^{*+} \to \Lambda\pi^+$		$(5 \pm 4) \times 10^{-3}$		363
$\quad \Lambda\pi^-2\pi^+$ nonresonant		< 1.1 %	CL=90%	807
$\Lambda\pi^-\pi^0 2\pi^+$ total		(2.2 ± 0.8) %		757
$\quad \Lambda\pi^+\eta$	[a]	(1.84 ± 0.11) %	S=1.1	691
$\quad\quad \Sigma(1385)^+\eta$	[a]	$(9.1 \pm 2.0) \times 10^{-3}$		570
$\quad \Lambda\pi^+\omega$	[a]	(1.5 ± 0.5) %		517
$\quad \Lambda\pi^-\pi^0 2\pi^+$, no η or ω		$< 8 \times 10^{-3}$	CL=90%	757
$\Lambda K^+\overline{K}^0$		$(5.6 \pm 1.1) \times 10^{-3}$	S=1.9	443
$\quad \Xi(1690)^0 K^+$, $\Xi^{*0} \to \Lambda\overline{K}^0$		$(1.6 \pm 0.5) \times 10^{-3}$		286
$\Sigma^0\pi^+$		(1.27 ± 0.06) %	S=1.1	825
$\Sigma^0\pi^+\eta$		$(7.5 \pm 0.8) \times 10^{-3}$		635
$\Sigma^+\pi^0$		(1.24 ± 0.09) %		827
$\Sigma^+\eta$		$(3.2 \pm 0.5) \times 10^{-3}$		713
$\Sigma^+\eta'$		$(4.1 \pm 0.8) \times 10^{-3}$		391

$\Sigma^+\pi^+\pi^-$		(4.47± 0.22) %	S=1.2	804
$\Sigma^+\rho^0$		< 1.7 %	CL=95%	575
$\Sigma^- 2\pi^+$		(1.86± 0.18) %		799
$\Sigma^0\pi^+\pi^0$		(3.5 ± 0.4) %		803
$\Sigma^+\pi^0\pi^0$		(1.54± 0.14) %		806
$\Sigma^0\pi^- 2\pi^+$		(1.10± 0.30) %		763
$\Sigma^+\omega$		(1.69± 0.20) %		569
$\Sigma^-\pi^0 2\pi^+$		(2.1 ± 0.4) %		762
$\Sigma^+ K^+ K^-$		(3.59± 0.35) $\times 10^{-3}$	S=1.1	349
$\Sigma^+\phi$	[a]	(3.9 ± 0.5) $\times 10^{-3}$	S=1.1	295
$\Xi(1690)^0 K^+$, $\Xi^{*0} \to \Sigma^+ K^-$		(1.01± 0.25) $\times 10^{-3}$		286
$\Sigma^+ K^+ K^-$ nonresonant		< 8 $\times 10^{-4}$	CL=90%	349
$\Xi^0 K^+$		(5.5 ± 0.7) $\times 10^{-3}$		653
$\Xi^- K^+\pi^+$		(6.2 ± 0.5) $\times 10^{-3}$	S=1.1	565
$\Xi(1530)^0 K^+$		(4.3 ± 0.9) $\times 10^{-3}$	S=1.1	473

Hadronic modes with a hyperon: $S = 0$ final states

ΛK^+		(6.42± 0.31) $\times 10^{-4}$		781
$\Lambda K^+\pi^+\pi^-$		< 5 $\times 10^{-4}$	CL=90%	637
$\Sigma^0 K^+$		(3.70± 0.31) $\times 10^{-4}$		735
$\Sigma^+ K^0_S$		(4.7 ± 1.4) $\times 10^{-4}$		736
$\Sigma^0 K^+\pi^+\pi^-$		< 2.5 $\times 10^{-4}$	CL=90%	574
$\Sigma^+ K^+\pi^-$		(2.00± 0.26) $\times 10^{-3}$		670
$\Sigma^+ K^*(892)^0$	[a]	(3.5 ± 1.0) $\times 10^{-3}$		470
$\Sigma^+ K^+\pi^-\pi^0$		< 1.1 $\times 10^{-3}$	CL=90%	581
$\Sigma^- K^+\pi^+$		< 1.2 $\times 10^{-3}$	CL=90%	664

Doubly Cabibbo-suppressed modes

$p K^+\pi^-$		(1.11± 0.17) $\times 10^{-4}$		823

Semileptonic modes

$\Lambda e^+\nu_e$		(3.56± 0.13) %		871
$\Lambda\pi^+\pi^- e^+\nu_e$		< 3.9 $\times 10^{-4}$	CL=90%	843
$p K^- e^+\nu_e$		(8.8 ± 1.8) $\times 10^{-4}$		874
$p K^0_S\pi^- e^+\nu_e$		< 3.3 $\times 10^{-4}$	CL=90%	821
$\Lambda(1520) e^+\nu_e$		(1.0 ± 0.5) $\times 10^{-3}$		639
$\Lambda(1405)^0 e^+\nu_e$, $\Lambda^0 \to p K^-$		(4.2 ± 1.9) $\times 10^{-4}$		–
$\Lambda\mu^+\nu_\mu$		(3.48± 0.17) %		867

Inclusive modes

e^+ anything		(4.06± 0.13) %		–
p anything		(50 ±16) %		–
n anything		(32.6 ± 1.6) %		–
Λ anything		(38.2 $^{+2.9}_{-2.4}$) %		–

K^0_S anything		(9.9 $\pm$ 0.7) %			–
3prongs		(24 $\pm$ 8) %			–

$\Delta C = 1$ weak neutral current (*C1*) modes, or Lepton Family number (*LF*), or Lepton number (*L*), or Baryon number (*B*) violating modes

$p e^+ e^-$	*C1*	< 5.5	$\times 10^{-6}$	CL=90%	951
$p \mu^+ \mu^-$ non-resonant	*C1*	< 7.7	$\times 10^{-8}$	CL=90%	937
$p e^+ \mu^-$	*LF*	< 9.9	$\times 10^{-6}$	CL=90%	947
$p e^- \mu^+$	*LF*	< 1.9	$\times 10^{-5}$	CL=90%	947
$\overline{p} 2e^+$	*L,B*	< 2.7	$\times 10^{-6}$	CL=90%	951
$\overline{p} 2\mu^+$	*L,B*	< 9.4	$\times 10^{-6}$	CL=90%	937
$\overline{p} e^+ \mu^+$	*L,B*	< 1.6	$\times 10^{-5}$	CL=90%	947
$\Sigma^- \mu^+ \mu^+$	*L*	< 7.0	$\times 10^{-4}$	CL=90%	812

Radiative modes

$\Sigma^+ \gamma$		< 2.5	$\times 10^{-4}$	CL=90%	834

Exotic modes

$p \gamma_D$		[b] < 8.0	$\times 10^{-5}$	CL=90%	–

$\Lambda_c(2595)^+$

$I(J^P) = 0(\frac{1}{2}^-)$

The spin-parity follows from the fact that $\Sigma_c(2455)\pi$ decays, with little available phase space, are dominant. This assumes that $J^P = 1/2^+$ for the $\Sigma_c(2455)$.

Mass $m = 2592.25 \pm 0.28$ MeV
$m - m_{\Lambda_c^+} = 305.79 \pm 0.24$ MeV
Full width $\Gamma = 2.6 \pm 0.6$ MeV

$\Lambda_c^+ \pi\pi$ and its submode $\Sigma_c(2455)\pi$ — the latter just barely — are the only strong decays allowed to an excited Λ_c^+ having this mass; and the submode seems to dominate.

$\Lambda_c(2595)^+$ DECAY MODES		Fraction (Γ_i/Γ)	p (MeV/c)
$\Lambda_c^+ \pi^+ \pi^-$	[c]	—	117
$\Sigma_c(2455)^{++} \pi^-$		24 $\pm$ 7 %	3
$\Sigma_c(2455)^0 \pi^+$		24 $\pm$ 7 %	3
$\Lambda_c^+ \pi^+ \pi^-$ 3-body		18 $\pm$ 10 %	117
$\Lambda_c^+ \pi^0$	[d]	not seen	258
$\Lambda_c^+ \gamma$		not seen	288

$\Lambda_c(2625)^+$

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

J^P has not been measured; $\frac{3}{2}^-$ is the quark-model prediction.

Mass $m = 2628.00 \pm 0.15$ MeV
$m - m_{\Lambda_c^+} = 341.54 \pm 0.05$ MeV
Full width $\Gamma < 0.52$ MeV, CL = 90%

$\Lambda_c^+ \pi\pi$ and its submode $\Sigma(2455)\pi$ are the only strong decays allowed to an excited Λ_c^+ having this mass.

$\Lambda_c(2625)^+$ DECAY MODES		Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$\Lambda_c^+ \pi^+ \pi^-$	[e]	66.67 %		184
$\Sigma_c(2455)^{++} \pi^-$		(3.42±0.27) %		103
$\Sigma_c(2455)^0 \pi^+$		(3.46±0.31) %		103
$\Lambda_c^+ \pi^+ \pi^-$ 3-body		large		184
$\Lambda_c^+ \pi^0$	[d]	< 60 %	90%	293
$\Lambda_c^+ \gamma$		< 35 %	90%	319

$\Lambda_c(2860)^+$

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

Mass $m = 2856.1^{+2.3}_{-6.0}$ MeV
Full width $\Gamma = 68^{+12}_{-22}$ MeV

$\Lambda_c(2860)^+$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$D^0 p$	seen	259

$\Lambda_c(2880)^+$

$I(J^P) = 0(\frac{5}{2}^+)$

Mass $m = 2881.63 \pm 0.24$ MeV
$m - m_{\Lambda_c^+} = 595.17 \pm 0.28$ MeV
Full width $\Gamma = 5.6^{+0.8}_{-0.6}$ MeV

$\Lambda_c(2880)^+$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Lambda_c^+ \pi^+ \pi^-$	seen	471
$\Sigma_c(2455)^{0,++} \pi^\pm$	seen	376
$\Sigma_c(2520)^{0,++} \pi^\pm$	seen	317
$p D^0$	seen	316

$\Lambda_c(2940)^+$

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

$J^P = 3/2^-$ is favored, but is not certain

Mass $m = 2939.6^{+1.3}_{-1.5}$ MeV
Full width $\Gamma = 20^{+6}_{-5}$ MeV

$\Lambda_c(2940)^+$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$p D^0$	seen	420
$\Sigma_c(2455)^{0,++}\pi^\pm$	seen	–

$\Sigma_c(2455)$

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

$\Sigma_c(2455)^{++}$ mass $m = 2453.97 \pm 0.14$ MeV
$\Sigma_c(2455)^{+}$ mass $m = 2452.65^{+0.22}_{-0.16}$ MeV
$\Sigma_c(2455)^{0}$ mass $m = 2453.75 \pm 0.14$ MeV
$m_{\Sigma_c(2455)^{++}} - m_{\Lambda_c^+} = 167.510 \pm 0.017$ MeV
$m_{\Sigma_c(2455)^{+}} - m_{\Lambda_c^+} = 166.19^{+0.16}_{-0.08}$ MeV
$m_{\Sigma^0_{c2455}} - m_{\Lambda_c^+} = 167.290 \pm 0.017$ MeV
$m_{\Sigma_c(2455)^{++}} - m_{\Sigma_c(2455)^0} = 0.220 \pm 0.013$ MeV
$m_{\Sigma_c(2455)^{+}} - m_{\Sigma_c(2455)^0} = -1.10^{+0.16}_{-0.08}$ MeV
$\Sigma_c(2455)^{++}$ full width $\Gamma = 1.89^{+0.09}_{-0.18}$ MeV (S = 1.1)
$\Sigma_c(2455)^{+}$ full width $\Gamma = 2.3 \pm 0.4$ MeV
$\Sigma_c(2455)^{0}$ full width $\Gamma = 1.83^{+0.11}_{-0.19}$ MeV (S = 1.2)

$\Lambda_c^+\pi$ is the only strong decay allowed to a Σ_c having this mass.

$\Sigma_c(2455)$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Lambda_c^+\pi$	≈ 100 %	94

$\Sigma_c(2520)$

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

J^P has not been measured; $\frac{3}{2}^+$ is the quark-model prediction.

$\Sigma_c(2520)^{++}$ mass $m = 2518.41 \pm 0.22$ MeV (S = 1.3)
$\Sigma_c(2520)^{+}$ mass $m = 2517.4^{+0.7}_{-0.5}$ MeV
$\Sigma_c(2520)^{0}$ mass $m = 2518.48 \pm 0.21$ MeV (S = 1.2)
$m_{\Sigma_c(2520)^{++}} - m_{\Lambda_c^+} = 231.95 \pm 0.18$ MeV (S = 1.8)

$m_{\Sigma_c(2520)^+} - m_{\Lambda_c^+} = 230.9^{+0.7}_{-0.5}$ MeV
$m_{\Sigma_c(2520)^0} - m_{\Lambda_c^+} = 232.02 \pm 0.15$ MeV (S = 1.4)
$m_{\Sigma_c(2520)^{++}} - m_{\Sigma_c(2520)^0} = 0.01 \pm 0.15$ MeV
$\Sigma_c(2520)^{++}$ full width $\Gamma = 14.78^{+0.30}_{-0.40}$ MeV
$\Sigma_c(2520)^{+}$ full width $\Gamma = 17.2^{+4.0}_{-2.2}$ MeV
$\Sigma_c(2520)^{0}$ full width $\Gamma = 15.3^{+0.4}_{-0.5}$ MeV

$\Lambda_c^+ \pi$ is the only strong decay allowed to a Σ_c having this mass.

Σ_c(2520) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Lambda_c^+ \pi$	≈ 100 %	179

$\Sigma_c(2800)$

$I(J^P) = 1(?^?)$

$\Sigma_c(2800)^{++}$ mass $m = 2801^{+4}_{-6}$ MeV
$\Sigma_c(2800)^{+}$ mass $m = 2792^{+14}_{-\ 5}$ MeV
$\Sigma_c(2800)^{0}$ mass $m = 2806^{+5}_{-7}$ MeV (S = 1.3)
$m_{\Sigma_c(2800)^{++}} - m_{\Lambda_c^+} = 514^{+4}_{-6}$ MeV
$m_{\Sigma_c(2800)^{+}} - m_{\Lambda_c^+} = 505^{+14}_{-\ 5}$ MeV
$m_{\Sigma_c(2800)^{0}} - m_{\Lambda_c^+} = 519^{+5}_{-7}$ MeV (S = 1.3)
$\Sigma_c(2800)^{++}$ full width $\Gamma = 75^{+22}_{-17}$ MeV
$\Sigma_c(2800)^{+}$ full width $\Gamma = 60^{+60}_{-40}$ MeV
$\Sigma_c(2800)^{0}$ full width $\Gamma = 72^{+22}_{-15}$ MeV

Σ_c(2800) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Lambda_c^+ \pi$	seen	443

Ξ_c^+

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

J^P has not been measured; $\frac{1}{2}^+$ is the quark-model prediction.

Mass $m = 2467.71 \pm 0.23$ MeV (S = 1.3)
Mean life $\tau = (453 \pm 5) \times 10^{-15}$ s
$c\tau = 135.8$ μm

Branching fractions marked with a footnote, e.g. [a], have been corrected for decay modes not observed in the experiments. For example, the submode fraction $\Xi_c^+ \to \Sigma^+ \overline{K}^*(892)^0$ seen in $\Xi_c^+ \to \Sigma^+ K^- \pi^+$ has been multiplied up to include $\overline{K}^*(892)^0 \to \overline{K}^0 \pi^0$ decays.

Ξ_c^+ DECAY MODES		Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
Cabibbo-favored ($S = -2$) decays				
$p 2K_S^0$		$(2.5\pm1.3) \times 10^{-3}$		766
$\Lambda \overline{K}^0 \pi^+$		—		852
$\Sigma(1385)^+ \overline{K}^0$	[a]	(2.9 ± 2.0) %		746
$\Lambda K^- 2\pi^+$		$(9 \pm4) \times 10^{-3}$		787
$\Lambda \overline{K}^*(892)^0 \pi^+$	[a]	$< 5 \times 10^{-3}$	CL=90%	608
$\Sigma(1385)^+ K^- \pi^+$	[a]	$< 6 \times 10^{-3}$	CL=90%	678
$\Sigma^+ K^- \pi^+$		(2.7 ± 1.2) %		810
$\Sigma^+ \overline{K}^*(892)^0$	[a]	(2.3 ± 1.1) %		658
$\Sigma^0 K^- 2\pi^+$		$(8 \pm5) \times 10^{-3}$		735
$\Xi^0 \pi^+$		(1.6 ± 0.8) %		876
$\Xi^- 2\pi^+$		(2.9 ± 1.3) %		851
$\Xi(1530)^0 \pi^+$	[a]	$< 2.9 \times 10^{-3}$	CL=90%	749
$\Xi(1620)^0 \pi^+$		seen		–
$\Xi(1690)^0 \pi^+$		seen		644
$\Xi^0 \pi^+ \pi^0$		(6.7 ± 3.5) %		856
$\Xi^0 \pi^- 2\pi^+$		(5.0 ± 2.6) %		818
$\Xi^0 e^+ \nu_e$		(7 ± 4) %		884
$\Omega^- K^+ \pi^+$		$(2.0\pm1.5) \times 10^{-3}$		399
Cabibbo-suppressed decays				
$p K^- \pi^+$		$(6.2\pm3.0) \times 10^{-3}$	S=1.5	944
$p \overline{K}^*(892)^0$	[a]	$(3.3\pm1.7) \times 10^{-3}$		828
$\Sigma^+ \pi^+ \pi^-$		(1.4 ± 0.8) %		922
$\Sigma^- 2\pi^+$		$(5.1\pm3.4) \times 10^{-3}$		918
$\Sigma^+ K^+ K^-$		$(4.3\pm2.5) \times 10^{-3}$		579
$\Sigma^+ \phi$	[a]	$< 3.2 \times 10^{-3}$	CL=90%	549
$\Xi(1690)^0 K^+$, $\Xi^0 \to \Sigma^+ K^-$		$< 1.3 \times 10^{-3}$	CL=90%	501
$p \phi(1020)$		$(1.2\pm0.6) \times 10^{-4}$		751

Ξ_c^0

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

J^P has not been measured; $\frac{1}{2}^+$ is the quark-model prediction.

Mass $m = 2470.44 \pm 0.28$ MeV (S = 1.2)

$m_{\Xi_c^0} - m_{\Xi_c^+} = 2.72 \pm 0.23$ MeV (S = 1.1)

Mean life $\tau = (150.4 \pm 2.8) \times 10^{-15}$ s (S = 1.4)

$c\tau = 45.1\ \mu$m

Decay asymmetry parameters

$\Xi^- \pi^+$ $\alpha = -0.64 \pm 0.05$

α FOR $\overline{\Xi}_c^0 \to \overline{\Xi}^+ \pi^- = 0.61 \pm 0.05$

α FOR $\Xi_c^0 \to \Lambda \overline{K}^*(892)^0 = 0.15 \pm 0.22$

α FOR $\Xi_c^0 \to \Sigma^+ K^*(892)^- = -0.52 \pm 0.30$

Ξ_c^0 DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
Cabibbo-favored decays			
$pK^-K^-\pi^+$	$(4.9 \pm 1.0) \times 10^{-3}$		676
$pK^-\overline{K}^*(892)^0$, $\overline{K}^{*0} \to K^-\pi^+$	$(2.0 \pm 0.6) \times 10^{-3}$		413
$pK^-K^-\pi^+$ (no $\overline{K}^{*0}$)	$(3.0 \pm 0.8) \times 10^{-3}$		676
ΛK_S^0	$(3.2 \pm 0.6) \times 10^{-3}$		906
$\Lambda K^-\pi^+$	(1.45 ± 0.28) %		856
$\Lambda \overline{K}^*(892)^0$	$(2.6 \pm 0.6) \times 10^{-3}$		717
$\Lambda \overline{K}^0 \pi^+\pi^-$	seen		786
$\Lambda K^-\pi^+\pi^+\pi^-$	seen		703
$\Sigma^0 K_S^0$	$(5.4 \pm 1.4) \times 10^{-4}$		864
$\Sigma^+ K^-$	$(1.8 \pm 0.4) \times 10^{-3}$		868
$\Sigma^0 \overline{K}^*(892)^0$	$(9.9 \pm 1.9) \times 10^{-3}$		658
$\Sigma^+ K^*(892)^-$	$(4.9 \pm 1.3) \times 10^{-3}$		661
$\Xi^-\pi^+$	(1.43 ± 0.27) %		875
$\Xi^-\pi^+\pi^+\pi^-$	(4.8 ± 2.3) %		816
$\Xi^0\phi$, $\phi \to K^+K^-$	$(5.2 \pm 1.2) \times 10^{-4}$		–
$\Xi^0 K^+K^-$ nonresonant	$(5.6 \pm 1.2) \times 10^{-4}$		444
$\Omega^- K^+$	$(4.2 \pm 0.9) \times 10^{-3}$		522
$\Xi^- e^+ \nu_e$	(1.05 ± 0.20) %		882
$\Xi^- \mu^+ \nu_\mu$	(1.01 ± 0.21) %		878
$\Xi^0 \gamma$	$< 1.7 \times 10^{-4}$	90%	885
Cabibbo-suppressed decays			
$\Lambda_c^+ \pi^-$	$(5.5 \pm 1.1) \times 10^{-3}$		115
$\Xi^- K^+$	$(3.9 \pm 1.1) \times 10^{-4}$		789
ΛK^+K^- (no ϕ)	$(4.1 \pm 1.3) \times 10^{-4}$		648
$\Lambda\phi$	$(4.9 \pm 1.3) \times 10^{-4}$		621

$\Xi_c^{\prime +}$

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

J^P has not been measured; $\frac{1}{2}^+$ is the quark-model prediction.

Mass $m = 2578.2 \pm 0.5$ MeV (S = 1.1)
$m_{\Xi_c^{\prime +}} - m_{\Xi_c^+} = 110.5 \pm 0.4$ MeV
$m_{\Xi_c^{\prime +}} - m_{\Xi_c^{\prime 0}} = -0.5 \pm 0.6$ MeV

The $\Xi_c^{\prime +}$–Ξ_c^+ mass difference is too small for any strong decay to occur.

$\Xi_c^{\prime +}$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Xi_c^+ \gamma$	seen	108

$\Xi_c^{\prime 0}$

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

J^P has not been measured; $\frac{1}{2}^+$ is the quark-model prediction.

Mass $m = 2578.7 \pm 0.5$ MeV
$m_{\Xi_c^{\prime 0}} - m_{\Xi_c^0} = 108.3 \pm 0.4$ MeV

The $\Xi_c^{\prime 0} - \Xi_c^0$ mass difference is too small for any strong decay to occur.

$\Xi_c^{\prime 0}$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Xi_c^0 \gamma$	seen	106

$\Xi_c(2645)$

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

J^P has not been measured; $\frac{3}{2}^+$ is the quark-model prediction.

$\Xi_c(2645)^+$ mass $m = 2645.10 \pm 0.30$ MeV (S = 1.2)
$\Xi_c(2645)^0$ mass $m = 2646.16 \pm 0.25$ MeV (S = 1.3)
$m_{\Xi_c(2645)^+} - m_{\Xi_c^0} = 174.67 \pm 0.09$ MeV
$m_{\Xi_c(2645)^0} - m_{\Xi_c^+} = 178.45 \pm 0.10$ MeV
$m_{\Xi_c(2645)^+} - m_{\Xi_c(2645)^0} = -1.06 \pm 0.27$ MeV (S = 1.1)
$\Xi_c(2645)^+$ full width $\Gamma = 2.14 \pm 0.19$ MeV (S = 1.1)
$\Xi_c(2645)^0$ full width $\Gamma = 2.35 \pm 0.22$ MeV

$\Xi_c \pi$ is the only strong decay allowed to a Ξ_c resonance having this mass.

Ξ_c(2645) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Xi_c^0 \pi^+$	seen	102
$\Xi_c^+ \pi^-$	seen	106

$\Xi_c(2790)$

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

J^P has not been measured; $\frac{1}{2}^-$ is the quark-model prediction.

$\Xi_c(2790)^+$ mass $= 2791.9 \pm 0.5$ MeV
$\Xi_c(2790)^0$ mass $= 2793.9 \pm 0.5$ MeV
$m_{\Xi_c(2790)^+} - m_{\Xi_c'^0} = 213.20 \pm 0.22$ MeV
$m_{\Xi_c(2790)^0} - m_{\Xi_c'^+} = 215.70 \pm 0.22$ MeV
$m_{\Xi_c(2790)^+} - m_{\Xi_c(2790)^0} = -2.0 \pm 0.7$ MeV
$\Xi_c(2790)^+$ width $= 8.9 \pm 1.0$ MeV
$\Xi_c(2790)^0$ width $= 10.0 \pm 1.1$ MeV

Ξ_c(2790) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Xi_c' \pi$	seen	159
$\Lambda_c^+ K^-$	seen	98

$\Xi_c(2815)$

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

J^P has not been measured; $\frac{3}{2}^-$ is the quark-model prediction.

$\Xi_c(2815)^+$ mass $m = 2816.51 \pm 0.25$ MeV (S = 1.2)
$\Xi_c(2815)^0$ mass $m = 2819.79 \pm 0.30$ MeV (S = 1.1)
$m_{\Xi_c(2815)^+} - m_{\Xi_c^+} = 348.80 \pm 0.10$ MeV
$m_{\Xi_c(2815)^0} - m_{\Xi_c^0} = 349.35 \pm 0.11$ MeV
$m_{\Xi_c(2815)^+} - m_{\Xi_c(2815)^0} = -3.27 \pm 0.27$ MeV
$\Xi_c(2815)^+$ full width $\Gamma = 2.43 \pm 0.26$ MeV
$\Xi_c(2815)^0$ full width $\Gamma = 2.54 \pm 0.25$ MeV

The $\Xi_c \pi\pi$ modes are consistent with being entirely via $\Xi_c(2645)\pi$.

Ξ_c(2815) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Xi_c' \pi$	seen	188
$\Xi_c(2645)\pi$	seen	102
$\Xi_c^0 \gamma$	seen	325

$\Xi_c(2970)$

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

was $\Xi_c(2980)$

$\Xi_c(2970)^+$ $m = 2964.3 \pm 1.5$ MeV (S = 3.9)
$\Xi_c(2970)^0$ $m = 2967.1 \pm 1.7$ MeV (S = 6.7)
$m_{\Xi_c(2970)^+} - m_{\Xi_c^+} = 496.6 \pm 1.5$ MeV (S = 3.7)
$m_{\Xi_c(2970)^0} - m_{\Xi_c^0} = 496.7 \pm 1.8$ MeV (S = 5.3)
$m_{\Xi_c(2970)^+} - m_{\Xi_c(2970)^0} = -2.8 \pm 1.9$ MeV (S = 4.8)
$\Xi_c(2970)^+$ width $\Gamma = 20.9^{+2.4}_{-3.5}$ MeV (S = 1.2)

Ξ_c(2970) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Lambda_c^+ \overline{K} \pi$	seen	223
$\Sigma_c(2455) \overline{K}$	seen	122
$\Lambda_c^+ \overline{K}$	not seen	410
$\Lambda_c^+ K^-$	seen	410
$\Xi_c 2\pi$	seen	381
$\Xi_c' \pi$	seen	–
$\Xi_c(2645) \pi$	seen	274

$\Xi_c(3055)$

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

Mass $m = 3055.9 \pm 0.4$ MeV
Full width $\Gamma = 7.8 \pm 1.9$ MeV

Ξ_c(3055) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Sigma^{++} K^-$	seen	–
ΛD^+	seen	316

$\Xi_c(3080)$

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

$\Xi_c(3080)^+$ $m = 3077.2 \pm 0.4$ MeV
$\Xi_c(3080)^0$ $m = 3079.9 \pm 1.4$ MeV (S = 1.3)
$\Xi_c(3080)^+$ width $\Gamma = 3.6 \pm 1.1$ MeV (S = 1.5)
$\Xi_c(3080)^0$ width $\Gamma = 5.6 \pm 2.2$ MeV

Ξ_c(3080) DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Lambda_c^+ \overline{K} \pi$	seen	415
$\Sigma_c(2455) \overline{K}$	seen	342
$\Sigma_c(2455)^{++} K^-$	seen	342

$\Sigma_c(2520)^{++} K^-$	seen	239
$\Sigma_c(2455)\overline{K} + \Sigma_c(2520)\overline{K}$	seen	–
$\Lambda_c^+ \overline{K}$	not seen	536
$\Lambda_c^+ \overline{K} \pi^+ \pi^-$	not seen	144
ΛD^+	seen	362

Ω_c^0

$I(J^P) = 0(\frac{1}{2}^+)$

J^P has not been measured; $\frac{1}{2}^+$ is the quark-model prediction.

Mass $m = 2695.2 \pm 1.7$ MeV (S = 1.3)
Mean life $\tau = (273 \pm 12) \times 10^{-15}$ s
$c\tau = 82\ \mu$m

No absolute branching fractions have been measured. The following are branching *ratios* relative to $\Omega^- \pi^+$.

Ω_c^0 DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
Cabibbo-favored ($S = -3$) decays — relative to $\Omega^- \pi^+$			
$\Omega^- \pi^+$	**DEFINED AS 1**		821
$\Omega^- \pi^+ \pi^0$	1.80 ± 0.33		797
$\Omega^- \rho^+$	>1.3	90%	532
$\Omega^- \pi^- 2\pi^+$	0.31 ± 0.05		753
$\Omega^- e^+ \nu_e$	1.98 ± 0.15		829
$\Omega^- \mu^+ \nu_\mu$	1.94 ± 0.21		824
$\Xi^0 \overline{K}^0$	1.64 ± 0.29		950
$\Xi^0 K^- \pi^+$	1.20 ± 0.18		901
$\Xi^0 \overline{K}^{*0}$, $\overline{K}^{*0} \to K^- \pi^+$	0.68 ± 0.16		764
$\Omega(2012)^- \pi^+$, $\Omega(2012)^- \to \Xi^0 K^-$	0.12 ± 0.05		–
$\Xi^- \overline{K}^0 \pi^+$	2.12 ± 0.28		895
$\Omega(2012)^- \pi^+$, $\Omega(2012)^- \to \Xi^- \overline{K}^0$	0.12 ± 0.06		–
$\Xi^- K^- 2\pi^+$	0.63 ± 0.09		830
$\Xi(1530)^0 K^- \pi^+$, $\Xi^{*0} \to \Xi^- \pi^+$	0.21 ± 0.06		757
$\Xi^- \overline{K}^{*0} \pi^+$	0.34 ± 0.11		653
$p K^- K^- \pi^+$	seen		864
$\Sigma^+ K^- K^- \pi^+$	<0.32	90%	689
$\Lambda \overline{K}^0 \overline{K}^0$	1.72 ± 0.35		837
Singly Cabibbo-suppressed modes — relative to $\Omega^- \pi^+$			
$\Xi^- \pi^+$	0.25 ± 0.06		–
$\Omega^- K^+$	<0.29	90%	–

Doubly Cabibbo-suppressed modes — relative to $\Omega^- \pi^+$

$\Xi^- K^+$	<0.07	90%	–

$\Omega_c(2770)^0$

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

J^P has not been measured; $\frac{3}{2}^+$ is the quark-model prediction.

Mass $m = 2765.9 \pm 2.0$ MeV (S = 1.2)
$m_{\Omega_c(2770)^0} - m_{\Omega_c^0} = 70.7^{+0.8}_{-0.9}$ MeV

The $\Omega_c(2770)^0$–Ω_c^0 mass difference is too small for any strong decay to occur.

$\Omega_c(2770)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Omega_c^0 \gamma$	presumably 100%	70

$\Omega_c(3000)^0$

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

Mass $m = 3000.46 \pm 0.25$ MeV
Full width $\Gamma = 3.8^{+1.6}_{-0.4}$ MeV

$\Omega_c(3000)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Xi_c^+ K^-$	seen	182

$\Omega_c(3050)^0$

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

Mass $m = 3050.17 \pm 0.19$ MeV
Full width $\Gamma < 1.8$ MeV, CL = 95%

$\Omega_c(3050)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Xi_c^+ K^-$	seen	278

$\Omega_c(3065)^0$

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

Mass $m = 3065.58 \pm 0.21$ MeV
Full width $\Gamma = 3.4^{+0.7}_{-0.8}$ MeV (S = 1.7)

$\Omega_c(3065)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Xi_c^+ K^-$	seen	303

$\Omega_c(3090)^0$

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

Mass $m = 3090.15 \pm 0.26$ MeV
Full width $\Gamma = 8.5^{+0.8}_{-1.7}$ MeV

$\Omega_c(3090)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Xi_c^+ K^-$	seen	340

$\Omega_c(3120)^0$

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

Mass $m = 3118.98^{+0.27}_{-0.35}$ MeV
Full width $\Gamma < 2.5$ MeV, CL = 95%

$\Omega_c(3120)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Xi_c^+ K^-$	seen	379

$\Omega_c(3185)^0$

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

Mass $m = 3185^{+7.6}_{-1.9}$ MeV
Full width $\Gamma = 50^{+12}_{-21}$ MeV

$\Omega_c(3185)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Xi_c^+ K^-$	seen	460

$\Omega_c(3327)^0$

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

Mass $m = 3327.1^{+1.2}_{-1.8}$ MeV
Full width $\Gamma = 20^{+14}_{-5}$ MeV

$\Omega_c(3327)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Xi_c^+ K^-$	seen	610

NOTES

[*a*] This branching fraction includes all the decay modes of the final-state resonance.

[*b*] Here γ_D stands for a dark photon.

[*c*] See AALTONEN 11H, Fig. 8, for the calculated ratio of $\Lambda_c^+ \pi^0 \pi^0$ and $\Lambda_c^+ \pi^+ \pi^-$ partial widths as a function of the $\Lambda_c(2595)^+ - \Lambda_c^+$ mass difference. At our value of the mass difference, the ratio is about 4.

[*d*] A test that the isospin is indeed 0, so that the particle is indeed a Λ_c^+.

[*e*] Assuming isospin conservation, so that the other third is $\Lambda_c^+ \pi^0 \pi^0$.