$\Lambda_c(2625)^+$

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

The spin-parity has not been measured but is expected to be $3/2^-$: this is presumably the charm counterpart of the strange $\Lambda(1520)$.

$\Lambda_c(2625)^+$ MASS

The mass is obtained from the $\Lambda_c(2625)^+ - \Lambda_c^+$ mass-difference measurements below.

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
2628.00±0.15 OUR FIT				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2626.6 ±0.5 ±1.5	42 ± 9	ALBRECHT	93F ARG	See ALBRECHT 97

$\Lambda_c(2625)^+ - \Lambda_c^+$ MASS DIFFERENCE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
341.54 ±0.05 OUR FIT				
341.54 ±0.05 OUR AVERAGE				
341.518±0.006±0.049	30.3k	WANG	23 BELL	e^+e at/near $\Upsilon(4S)$
341.65 ±0.04 ±0.12	6.2k	AALTONEN	11H CDF	$p\overline{p}$ at 1.96 TeV
342.1 ±0.5 ±0.5	51	ALBRECHT	97 ARG	$e^+e^- \approx$ 10 GeV
342.2 ±0.2 ±0.5	245	EDWARDS	95 CLE2	$e^+e^- \approx$ 10.5 GeV
340.4 ±0.6 ±0.3	40	FRABETTI	94 E687	γBe, $\overline{E}_\gamma$ = 220 GeV

$\Lambda_c(2625)^+$ WIDTH

VALUE (MeV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<0.52	90	30.3k	WANG	23 BELL	e^+e at/near $\Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.97	90	6.2k	AALTONEN	11H CDF	$p\overline{p}$ at 1.96 TeV
<1.9	90	245 ± 19	EDWARDS	95 CLE2	$e^+e^- \approx$ 10.5 GeV
<3.2	90		ALBRECHT	93F ARG	$e^+e^- \approx \Upsilon(4S)$

$\Lambda_c(2625)^+$ DECAY MODES

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

	Mode	Fraction (Γ_i/Γ)		Confidence level
Γ_1	$\Lambda_c^+\pi^+\pi^-$	[a] 66.67	%	
Γ_2	$\Sigma_c(2455)^{++}\pi^-$	(3.42±0.27) %		
Γ_3	$\Sigma_c(2455)^0\pi^+$	(3.46±0.31) %		
Γ_4	$\Lambda_c^+\pi^+\pi^-$ 3-body	large		
Γ_5	$\Lambda_c^+\pi^0$	[b] < 60	%	90%
Γ_6	$\Lambda_c^+\gamma$	< 35	%	90%

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

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

$\Lambda_c(2625)^+$ BRANCHING RATIOS

$\Gamma(\Sigma_c(2455)^{++}\pi^-)/\Gamma(\Lambda_c^+\pi^+\pi^-)$ Γ_2/Γ_1

VALUE (units 10^{-2})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
5.13±0.26±0.32		467	[1] WANG	23	BELL	e^+e at/near $\Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<8	90		EDWARDS	95	CLE2	$e^+e^- \approx 10.5$ GeV

[1] From a Dalitz plot fit, recovered simultaneously with $\Lambda_c(2625)^+ \to \Sigma_c(2455)^0 \pi^+$.

$\Gamma(\Sigma_c(2455)^0\pi^+)/\Gamma(\Lambda_c^+\pi^+\pi^-)$ Γ_3/Γ_1

VALUE (units 10^{-2})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
5.19±0.23±0.40		391	[2] WANG	23	BELL	e^+e at/near $\Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<7	90		EDWARDS	95	CLE2	$e^+e^- \approx 10.5$ GeV

[2] From a Dalitz plot fit, recovered simultaneously with $\Lambda_c(2625)^+ \to \Sigma_c(2455)^{++} \pi^-$.

$[\Gamma(\Sigma_c(2455)^{++}\pi^-) + \Gamma(\Sigma_c(2455)^0\pi^+)]/\Gamma(\Lambda_c^+\pi^+\pi^-)$ $(\Gamma_2+\Gamma_3)/\Gamma_1$

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.36	90		FRABETTI	94	E687	γ Be, $\overline{E}_\gamma = 220$ GeV
0.46±0.14		21	ALBRECHT	93F	ARG	$e^+e^- \approx \Upsilon(4S)$

$\Gamma(\Lambda_c^+\pi^+\pi^-$ 3-body$)/\Gamma(\Lambda_c^+\pi^+\pi^-)$ Γ_4/Γ_1

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.54±0.14	16	ALBRECHT	93F	ARG	$e^+e^- \approx \Upsilon(4S)$

$\Gamma(\Lambda_c^+\pi^0)/\Gamma(\Lambda_c^+\pi^+\pi^-)$ Γ_5/Γ_1

$\Lambda_c^+ \pi^0$ decay is forbidden by isospin conservation if this state is in fact a Λ_c.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.91	90	EDWARDS	95	CLE2	$e^+e^- \approx 10.5$ GeV

$\Gamma(\Lambda_c^+\gamma)/\Gamma(\Lambda_c^+\pi^+\pi^-)$ Γ_6/Γ_1

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.52	90	EDWARDS	95	CLE2	$e^+e^- \approx 10.5$ GeV

$\Lambda_c(2625)^+$ REFERENCES

WANG	23	PR D107 032008	D. Wang et al.	(BELLE Collab.)
AALTONEN	11H	PR D84 012003	T. Aaltonen et al.	(CDF Collab.)
ALBRECHT	97	PL B402 207	H. Albrecht et al.	(ARGUS Collab.)
EDWARDS	95	PRL 74 3331	K.W. Edwards et al.	(CLEO Collab.)
FRABETTI	94	PRL 72 961	P.L. Frabetti et al.	(FNAL E687 Collab.)
ALBRECHT	93F	PL B317 227	H. Albrecht et al.	(ARGUS Collab.)