$\Lambda_c(2625)^+$

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

Seen in $\Lambda_c^+ \pi^+ \pi^-$ but not in $\Lambda_c^+ \pi^0$ so this is indeed an excited Λ_c^+ rather than a Σ_c^+. 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 $\Lambda_c(2625)^+$–Λ_c^+ mass-difference measurements below.

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2626.6±0.8 OUR FIT Error includes scale factor of 1.2.					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2626.6±0.5±1.5	42	[1] ALBRECHT	93F	ARG	See ALBRECHT 97

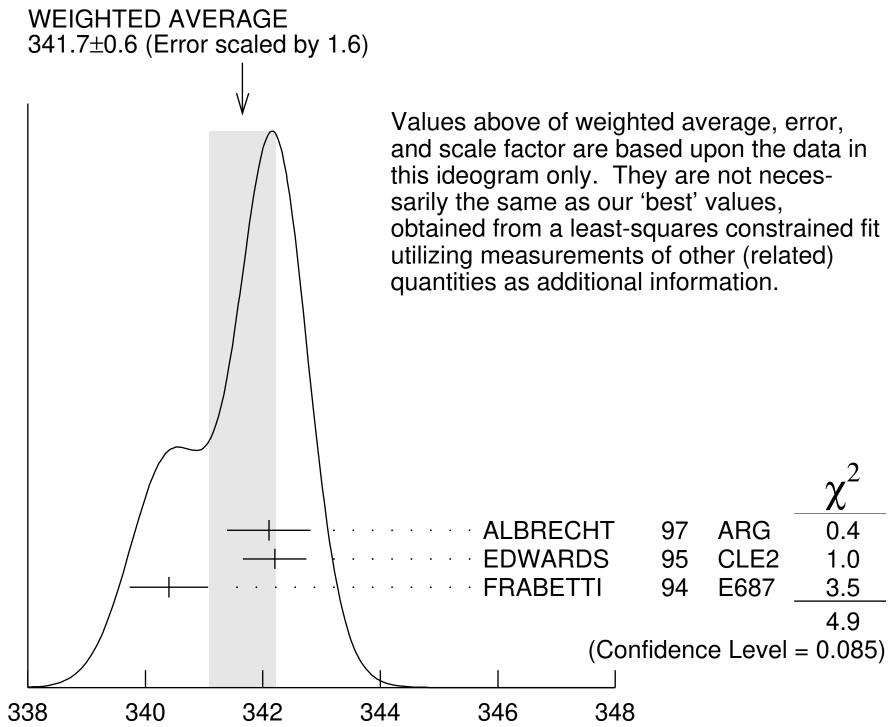
[1] ALBRECHT 93F claims a signal of 42.4 ± 8.8 events.

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

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
341.7±0.6 OUR FIT Error includes scale factor of 1.6.					
341.7±0.6 OUR AVERAGE Error includes scale factor of 1.6. See the ideogram below.					
342.1±0.5±0.5	51	ALBRECHT	97	ARG	$e^+ e^- \approx$ 10 GeV
342.2±0.2±0.5	245	[2] EDWARDS	95	CLE2	$e^+ e^- \approx$ 10.5 GeV
340.4±0.6±0.3	40	[3] FRABETTI	94	E687	γBe, $\overline{E}_\gamma$ = 220 GeV

[2] EDWARDS 95 claims a signal of 244.6 ± 19.0 events in $\Lambda_c^+ \pi^+ \pi^-$.

[3] FRABETTI 94 claims a signal of 39.7 ± 8.7 events.



$m_{\Lambda_c(2625)^+} - m_{\Lambda_c^+}$

$\Lambda_c(2625)^+$ WIDTH

VALUE (MeV)	*CL%*	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
<1.9	90	245	EDWARDS	95	CLE2	$e^+e^- \approx$ 10.5 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<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]	$\approx 67\%$	
Γ_2	$\Sigma_c(2455)^{++}\pi^-$		<5	90%
Γ_3	$\Sigma_c(2455)^0\pi^+$		<5	90%
Γ_4	$\Lambda_c^+\pi^+\pi^-$ 3-body		large	
Γ_5	$\Lambda_c^+\pi^0$	[b]	not seen	
Γ_6	$\Lambda_c^+\gamma$		not seen	

[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	CL%	DOCUMENT ID		TECN	COMMENT
<0.08	90	EDWARDS	95	CLE2	$e^+e^- \approx 10.5$ GeV

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.07	90	EDWARDS	95	CLE2	$e^+e^- \approx 10.5$ GeV

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

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	γBe, $\overline{E}_\gamma = 220$ 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

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.)