$\Sigma_c(2520)$

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

Seen in the $\Lambda_c^+ \pi^\pm$ mass spectrum. The natural assignment is that this is the $J^P = 3/2^+$ excitation of the $\Sigma_c(2455)$, the charm counterpart of the $\Sigma(1385)$, but neither J nor P has been measured.

$\Sigma_c(2520)$ MASSES

The masses are obtained from the mass-difference measurements that follow.

$\Sigma_c(2520)^{++}$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
2519.4±1.5 OUR FIT					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2530 ±5 ±5	6	[1] AMMOSOV	93	HLBC	$\nu p \to \mu^- \Sigma_c(2530)^{++}$

[1] AMMOSOV 93 sees a cluster of 6 events and estimates the background to be 1 event.

$\Sigma_c(2520)^+$ MASS

VALUE (MeV)	DOCUMENT ID
2515.9±2.4 OUR FIT	

$\Sigma_c(2520)^0$ MASS

VALUE (MeV)	DOCUMENT ID
2517.5±1.4 OUR FIT	

$\Sigma_c(2520)$ MASS DIFFERENCES

$m_{\Sigma_c(2520)^{++}} - m_{\Lambda_c^+}$

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
234.5±1.4 OUR FIT					
234.5±1.1±0.8	677	BRANDENB...	97	CLE2	$e^+e^- \approx \Upsilon(4S)$

$m_{\Sigma_c(2520)^+} - m_{\Lambda_c^+}$

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
231.0±2.3 OUR FIT					
231.0±1.1±2.0	327	AMMAR	01	CLE2	$e^+e^- \approx \Upsilon(4S)$

$m_{\Sigma_c(2520)^0} - m_{\Lambda_c^+}$

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
232.6±1.3 OUR FIT					
232.6±1.0±0.8	504	BRANDENB...	97	CLE2	$e^+e^- \approx \Upsilon(4S)$

$m_{\Sigma_c(2520)^{++}} - m_{\Sigma_c(2520)^0}$

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1.9±1.7 OUR FIT				
1.9±1.4±1.0	[2] BRANDENB...	97	CLE2	$e^+e^- \approx \Upsilon(4S)$

[2] This BRANDENBURG 97 result is redundant with measurements in earlier entries.

$\Sigma_c(2520)$ WIDTHS

$\Sigma_c(2520)^{++}$ WIDTH

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
$17.9^{+3.8}_{-3.2} \pm 4.0$	677	BRANDENB...	97	CLE2	$e^+ e^- \approx \Upsilon(4S)$

$\Sigma_c(2520)^{+}$ WIDTH

VALUE (MeV)	*CL%*	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
<17	90	327	AMMAR	01	CLE2	$e^+ e^- \approx \Upsilon(4S)$

$\Sigma_c(2520)^{0}$ WIDTH

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
$13.0^{+3.7}_{-3.0} \pm 4.0$	504	BRANDENB...	97	CLE2	$e^+ e^- \approx \Upsilon(4S)$

$\Sigma_c(2520)$ DECAY MODES

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

	Mode	Fraction (Γ_i/Γ)
Γ_1	$\Lambda_c^+ \pi$	$\approx$ 100 %

$\Sigma_c(2520)$ REFERENCES

AMMAR	01	PRL 86 1167	R. Ammar *et al.*	(CLEO Collab.)
BRANDENB...	97	PRL 78 2304	G. Brandenburg *et al.*	(CLEO Collab.)
AMMOSOV	93	JETPL 58 247 Translated from ZETFP 58 241.	V.V. Ammosov *et al.*	(SERP)