

$\Sigma_c(2520)$

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

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

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2518.4±0.6 OUR FIT				Error includes scale factor of 1.4.
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
2530 ±5 ±5	6	¹ AMMOSOV	93 HLBC	$\nu p \rightarrow \mu^- \Sigma_c(2530)^{++}$

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

$\Sigma_c(2520)^+$ MASS

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>
2517.5±2.3 OUR FIT	

$\Sigma_c(2520)^0$ MASS

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>
2518.0±0.5 OUR FIT	

$\Sigma_c(2520)$ MASS DIFFERENCES

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

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
231.9±0.6 OUR FIT				Error includes scale factor of 1.5.
231.9±1.0 OUR AVERAGE				Error includes scale factor of 2.1.
231.5±0.4±0.3	1330 ± 110	ATHAR	05 CLEO	$e^+ e^-$, 9.4–11.5 GeV
234.5±1.1±0.8	677	BRANDENB...	97 CLE2	$e^+ e^- \approx \Upsilon(4S)$

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

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

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

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
231.6±0.5 OUR FIT				Error includes scale factor of 1.1.
231.6±0.5 OUR AVERAGE				
231.4±0.5±0.3	1350 ± 120	ATHAR	05 CLEO	$e^+ e^-$, 9.4–11.5 GeV
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
0.3 ± 0.6 OUR FIT	Error includes scale factor of 1.2.		
0.5 ± 0.8 OUR AVERAGE			
$+0.1 \pm 0.8 \pm 0.3$	² ATHAR 05	CLEO	$e^+ e^-$, 9.4–11.5 GeV
$1.9 \pm 1.4 \pm 1.0$	³ BRANDENB... 97	CLE2	$e^+ e^- \approx \Upsilon(4S)$
² This ATHAR 05 result is redundant with measurements in earlier entries.			
³ 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
14.9 ± 1.9 OUR AVERAGE				
$14.4^{+1.6}_{-1.5} \pm 1.4$	1330 ± 110	ATHAR 05	CLEO	$e^+ e^-$, 9.4–11.5 GeV
$17.9^{+3.8}_{-3.2} \pm 4.0$	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
16.1 ± 2.1 OUR AVERAGE				
$16.6^{+1.9}_{-1.7} \pm 1.4$	1350 ± 120	ATHAR 05	CLEO	$e^+ e^-$, 9.4–11.5 GeV
$13.0^{+3.7}_{-3.0} \pm 4.0$	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)
$\Gamma_1 \Lambda_c^+ \pi$	$\approx 100\%$

$\Sigma_c(2520)$ REFERENCES

ATHAR 05	PR D71 051101R	S.B. Athar <i>et al.</i>	(CLEO Collab.)
AMMAR 01	PRL 86 1167	R. Ammar <i>et al.</i>	(CLEO Collab.)
BRANDENB... 97	PRL 78 2304	G. Brandenburg <i>et al.</i>	(CLEO Collab.)
AMMOISOV 93	JETPL 58 247	V.V. Ammosov <i>et al.</i>	(SERP)
	Translated from ZETFP 58 241.		