

Transverse Polarization of $\Sigma^+(1189)$ in Photoproduction on a Hydrogen Target in CLAS

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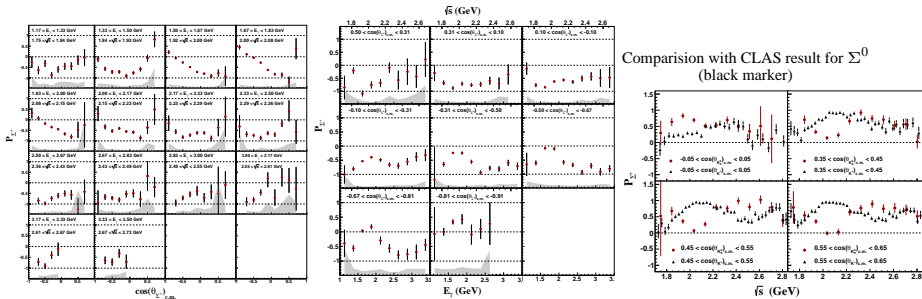
Event selection: $\gamma + p \rightarrow \Sigma^+ + K_S^0 \rightarrow p + \pi^0 + \pi^+ + \pi^-$ (unpolarized beam and target)

Particle reconstruction: $MM(p\pi^+\pi^-) \Rightarrow \pi^0$; $M(\pi^+\pi^-) \Rightarrow K_S^0$; $MM(\pi^+\pi^-) \Rightarrow \Sigma^+$

Production plane: $\hat{p}_\gamma \times \hat{p}_{\Sigma^+}$, Quantization axis: $\hat{n}_z = \hat{p}_\gamma \times \hat{p}_{\Sigma^+} / |\hat{p}_\gamma \times \hat{p}_{\Sigma^+}|$

Polarization: $P_{\Sigma^+} = \frac{2}{\alpha_{\Sigma^+}} \left[\frac{N^U}{N^D} - \frac{N^D}{N^U} \right] \Rightarrow \frac{2}{\alpha_{\Sigma^+}} \times$ asymmetry of the proton (in Σ^+ rest frame) with respect to the production plane.

α_{Σ^+} (asymmetry parameter) = 0.979 for $\Sigma^+ \rightarrow p + \pi^0$ decay mode.



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