Hyperon production at HERMES

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Semi-inclusive and inclusive Λ and other hyperon production have been studied in the HERMES experiment using a $E_e = 27.57$ GeV polarized positron beam incident on an unpolarized hydrogen and deuterium gas target.

Multiplicity distributions of Λ hyperons versus their fractional energy z and transverse momentum p_T^2 were studied. The extracted fragmentation function $D_u^\Lambda(z)$ [1] is found to be in a good agreement with results of (μ, N) experiment at higher energies [2] and with theoretical prediction for hadron-hadron collisions [3]. The p_T^2 distribution at relatively low z is shown to be dominated by the quark transverse momentum in the fragmentation process.

The study of the spin transfer to the Λ from the longitudinally polarized beam scattered off unpolarized hydrogen and deuterium target is based on the $\approx 10^4$ Λ events collected in the years 1996-2000. The longitudinal spin transfer is found to be compatible with 0: $S_\Lambda = 0.04 \pm 0.08(stat) \pm 0.03(syst)$ at average $z = 0.45$ [1,4].

Inclusively produced heavy hyperon Σ and Ξ have been detected by the HERMES spectrometer thus allowing investigation of the reaction mechanism of the hyperon photoproduction.

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