

Measurement of transverse Λ and $\bar{\Lambda}$ polarization at COMPASS

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Abstract

New data on hyperon polarization in semi-inclusive deep inelastic scattering have been collected by the COMPASS collaboration at CERN during the years 2002-2004, using a beam of longitudinally polarized muons of 160 GeV/c and a ${}^6\text{LiD}$ target than can be polarized both longitudinally and transversely. The various combinations of beam and target polarizations allow for the study of a wide variety of hyperon polarization effects. Here we present preliminary results on transverse polarization of hyperons produced both with unpolarized and transversely polarized deuteron targets.

Hyperons produced in unpolarized high energy hadro-production experiments are found to be polarized along the normal to the production plane, with a clear dependence on the hyperon transverse momentum. The mechanism of this spontaneous polarization is not yet understood, and very little is known about this effect in photo-production experiments. Preliminary results will be presented on spontaneous transverse Λ and $\bar{\Lambda}$ polarization, measured both in the quasi-real photo-production regime and in the deep inelastic scattering region.

When the Λ and $\bar{\Lambda}$ hyperons are produced in deep inelastic scattering from a transversely polarized target, the measurement of the spin correlation between the target and the final state hyperon can provide information on the transversity distributions $\Delta_T q(x)$. The Bjorken x dependence of the Λ and $\bar{\Lambda}$ polarization measured along a special axis correlated with the target transverse polarization direction has been studied and preliminary results will be presented.

¹ On behalf of the COMPASS collaboration