Studies of Lambda-Neutron Interaction Through Polarization Observables for Final-State Interactions in $\vec{\gamma}d \to K^+\vec{\Lambda}n$

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Theoretical studies suggest that experimental observables for hyperon production reactions can place stringent constraints on the free parameters of hyperon-nucleon potentials, which are critical for the understanding of hypernuclear matter and neutron stars. We will present preliminary experimental results for the polarization observables Σ, P_y, O_x, O_z, C_x, and C_z for final-state interactions (FSI) in exclusive Λ photoproduction off the deuteron. The observables were obtained from data collected during the E06-103 (g13) experiment with the CEBAF Large Acceptance Spectrometer (CLAS) in Hall B at Jefferson Lab. The g13 experiment ran with unpolarized deuteron target and circularly- and linearly-polarized photon beams with energies between 0.5 GeV and 2.5 GeV and collected about 5×10^{10} events with multiple charged particles in the final state. To select the reaction of interest, the kaon and the Λ decay products, a proton and a negative pion, were detected in CLAS. Missing-mass technique was used to further reduce the event sample. Final-state interaction events were selected by requesting that the reconstructed neutron has a momentum larger than 200 MeV/c. The large statistics of E06-103 provided statistically meaningful FSI event samples, which allow for the extraction of one- and two-fold differential single- and double-polarization observables. In this talk we will show preliminary results for a set of six observables for photon energies between 0.9 GeV and 2.3 GeV and for several kinematic variables in the $\Lambda - n$ center-of-mass frame. Comparison with theoretical calculations will also be discussed. Our results are the very first estimates of polarization observables for FSI in hyperon photoproduction and will be used to constrain the free parameters of hyperon-nucleon potentials. This work is supported in part by the U.S. National Science Foundation under grant PHY-125782.