

1 Title

Determination of Polarization Observables for Final-State Interactions in the Reaction $\vec{\gamma}d \rightarrow K^+ \vec{\Lambda}n$

2 Abstract

Building a comprehensive picture of the strong interaction is the goal of modern nuclear physics. While considerable progress has been made in the understanding of the nucleon-nucleon (NN) interaction, we are still far from a complete understanding of the hyperon-nucleon (YN) interaction, which plays a key role in hypernuclear matter and neutron stars. For the YN potential, some parameters can be obtained from the NN potential by using SU(3) symmetry. However, other parameters cannot be obtained from the NN potential due to broken SU(3) and must be obtained from fits to experimental data. One can access the dynamics of the YN interaction by studying nuclear reactions in which hyperons are produced. In this work, we determine the beam spin asymmetry, Σ , the hyperon recoil polarization, P_y , the polarization transfers to the Λ , O_x and O_z , from linearly polarized photons, and the polarization transfers to the Λ , C_x and C_z , from circularly polarized photons, for final-state interactions (FSI) in the reaction $\vec{\gamma}d \rightarrow K^+ \vec{\Lambda}n$ using data taken with the CLAS detector at the Jefferson laboratory. The FSI results are the first ever obtained for these observables and will be used to constrain the theoretical free parameters of the models of the YN potential. This work has been funded in part by the U.S. NSF under grant PHY- 1505615.