

Measurement of the Double Polarization Observables C_x and C_z for Final-state Interactions in $\vec{\gamma}d \rightarrow K^+ \vec{\Lambda} n$

Tontong Cao, Yordanka Ilieva, Nicholas Zachariou

for the CLAS Collaboration

Department of Physics and Astronomy, University of South Carolina,
South Carolina, SC, USA

The hyperon-nucleon (YN) interaction plays a key role in hypernuclei and strange nuclear matter and is an important part of the baryon-baryon interaction. 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 YN interaction. Some parameters of the YN potential can be obtained from the NN potential by using SU(3) symmetry. However, due to the broken SU(3) there are parameters, which must be obtained from fits to experimental data. High-statistics data on exclusive Λ photoproduction off the deuteron initiated with highly-polarized photons offer unique opportunity to extract a large sample of polarization observables for final-state interaction events, which can be used to constrain hyperon-nucleon potentials. In this talk we present preliminary results for the polarization transfers to the Λ , C_x and C_z , from circularly polarized photons for final-state interactions in the reaction $\vec{\gamma}d \rightarrow K^+ \vec{\Lambda} n$. The data were taken with the CLAS detector at Thomas Jefferson National Accelerator Facility in the E06-103 experiment. Our results cover photon energies from 0.9 GeV to 2.6 GeV and Λ polar angle (relative to the three-momentum transfer to the Λn system) from 0° to 60° . These results are the first ever obtained for C_x and C_z and will provide stringent constraints on the theoretical models of the YN potential. This work is funded in part by the U.S. NSF under grant PHY-125782.