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Study of the Hyperon-nucleon interaction using the CLAS detector

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Obtaining a detailed understanding of the physics of hyperons allow us to improve our basic understanding of the strong force, which is currently based on nucleons, and allow a deeper understanding of matter in neutron stars. The difficulty in obtaining a high-quality data set of hyperon-nucleon scattering lies with experimental difficulties in obtaining hyperon beams or targets. Here I will present our novel approach that allows us to access the Hyperon- Nucleon interaction by producing a hyperon beam electromagnetically within a few-body nuclear system, and studying final-state interactions. The CLAS detectors housed in Hall-B of the Thomas Jefferson laboratory provides a large kinematic coverage, and in combination with the exceptionally high quality of the experimental data from experiment E06-103, we are able identify and select final-state interactions events in the reaction $\gamma d \rightarrow K^+\Lambda n$ and to establish their kinematical dependencies. A polarised photon beam allows the determination of a large set of observables that provides stringent constraints on modern Hyperon-Nucleon potentials.

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