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Study of the Hyperon-Nucleon Interaction using the CLAS detector

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A large amount of data collected over the past several decades allowed a detailed understanding of the nucleon-nucleon (NN) interaction. On the other hand, experimental difficulties prevent us from obtaining a comprehensive understanding of interactions involving other members of the baryon octet – namely the hyperons (Y). Such difficulties are associated with the short lifetime of hyperons, which prevents us from being able to produce precise elastic scattering experiments using conventional experimental approaches. Recent advancements in accelerator and detector technologies allow us, however, to isolate and study in great precision interactions between hyperons and nucleons by studying exclusive reactions in hyperon (Y) photoproduction channels. Specifically, high-statistics data collected using the CLAS detector housed in Hall-B of the Thomas Jefferson laboratory allow us to obtain a large set of observables, including cross section information [1] on the YN interaction and place stringent constraints on the underlying dynamics. This talk will present the recent results from the CLAS collaboration on the determination of the elastic Lambda-proton scattering cross section, as well an overview of ongoing efforts on the determination of both cross section measurements and polarisation observables determination for other YN and YNN reactions.
[1] J. Rowley, et. al. Phys. Rev. Lett. 127, 272303 (2021)

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