

Measurement of Hyperon Polarization at GlueX

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We have investigated the spin structure of photoproduced hyperon pairs for the first time. At Jefferson Lab, we have collected data on the reactions $\gamma p \rightarrow \bar{\Lambda}\Lambda p$ (with $\Lambda \rightarrow \pi^- p$, $\bar{\Lambda} \rightarrow \pi^+ \bar{p}$) from the threshold up to a beam photon energy of 11.4 GeV. Phenomenological models have been developed to identify the reaction mechanisms behind the production of $\Lambda\bar{\Lambda}$ and $p\bar{\Lambda}$ systems, based on their momentum and angular correlations. We will present differential cross-sections as well as preliminary measurements of hyperon polarization, along with a study on the spin correlation of the hyperon pairs from the GlueX Phase-I period. These findings are expected to enhance our understanding of the role of strangeness in the dynamics of photoproduced baryonic systems, especially for the $p\bar{\Lambda}$ interaction that lacks guidelines from experimental data in the past. Furthermore, we will also discuss preliminary strangeonia investigations into the $K\pi$ mesonic system recoiling against Λ or Σ hyperons, which allows for the extraction of recoil polarization information to be incorporated into the amplitude analysis of kaon exchange in the GlueX polarized photon beam data.

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