

Baryon-Antibaryon Photoproduction off the Proton Using GlueX at Jefferson Lab

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The GlueX Collaboration at Jefferson Lab has used linearly polarized photons to observe $p\bar{p}$ and, for the first time, $\Lambda\bar{\Lambda}$ and $p\bar{\Lambda}$ photoproduction from thresholds up to $E_\gamma = 11.6$ GeV. The goal is to examine and compare the reaction mechanisms for both strange and non-strange quark-pair production. A phenomenological model that includes t -channel Regge exchange and double Regge exchange was developed to match all kinematic distributions in various angles and correlated longitudinal momenta. A dominant forward peak in the polar angle of the baryon-antibaryon pairs in t -channel production is seen. In addition, wide-angle anti-baryon distributions asymmetric from those of the baryons are found, necessitating a production mechanism that acts differently on baryons and anti-baryons. In the hyperon channels, there is clear kinematic separation between the photoproduction of the $\Lambda\bar{\Lambda}$ and $p\bar{\Lambda}$ systems, showing the presence of different production mechanisms. We report the total cross sections of the reactions, the differential cross sections with respect to various momentum transfers, the beam spin asymmetry of the $p\bar{p}$ system, and the invariant mass spectra of the produced systems.

Parallel Session

Few-Body Systems

Primary author: Prof. SCHUMACHER, Reinhard (Carnegie Mellon University)

Co-author: Mr LI, Hao (Carnegie Mellon University)

Presenter: Prof. SCHUMACHER, Reinhard (Carnegie Mellon University)

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