

BEAM ASYMMETRY FOR THE $\gamma p \rightarrow \eta \Delta^+$ REACTION AT GLUEX*

Saturday, 14 February 2026 09:30 (15 minutes)

The principal goal of the GlueX experiment at the Thomas Jefferson National Accelerator Facility is to search for non- $q\bar{q}$ mesons, a construction not allowed by the simple quark model but predicted by Quantum Chromodynamics. Specifically, hybrid mesons, which result from the addition of a gluonic field with exotic states and are pictured as a $q\bar{q}g$ state, will be accessed using a 8.2-8.8 GeV linearly polarized photon beam. Conventional and exotic meson states will be mapped as a function of their quantum numbers using partial wave analysis (PWA). Utilizing linear polarization, we can learn more about the photoproduction process, which is needed as an ingredient for PWA. Specifically, the beam asymmetry will be extracted by exploiting azimuthal-angle distributions, which informs the photo production mechanism. This asymmetry will be extracted as a function of four-momentum transfer ($-t$) for the reaction $\gamma p \rightarrow \eta \Delta^+$. Results from the full GlueX-I data set (2017-2018) over a wide range of $-t$ will be shown and will test whether the production mechanism is dominated by natural (ρ and ω) exchange processes. The results will be compared to complimentary analyses for the reactions $\gamma p \rightarrow \eta p$ and $\gamma p \rightarrow \eta' p$.

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