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Spin-Density Matrix Elements in the reaction $\gamma p \to \rho^- \Delta^{++}$ at GlueX

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The GlueX experiment, located in Hall D at Jefferson Lab, aims to map the full spectrum of light-quark mesons with an emphasis on hybrid mesons, states in which the gluonic field is excited and contributes to the quantum numbers of the meson. The experiment employs a linearly polarized photon beam produced via coherent bremsstrahlung with an energy around 8.2-8.8 GeV on a liquid hydrogen target. The GlueX spectrometer provides large acceptance for both charged and neutral particles in the final state.
The search for exotic hybrid mesons requires a detailed understanding of the underlying production mechanisms. Polarization observables, such as the spin-density matrix elements (SDMEs), provide an important experimental tool to investigate these mechanisms.
In this talk, I present the measurement of the unpolarized and polarized SDMEs in the photoproduction of $\rho^- \Delta^{++}$ using GlueX data collected in 2017-2018.
Compared to a previous measurement from SLAC, the new dataset provides significantly improved statistical precision and allows a high-resolution determination of the t-dependence of the SDMEs in the range $0.025 \leq -t \leq 1.4$ GeV^2.

Collaboration

GlueX

Primary author: HERRMANN, Niklas (Ruhr University Bochum)

Presenter: HERRMANN, Niklas (Ruhr University Bochum)

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