

Probing the meson photoproduction mechanism through spin-density matrix elements at GlueX

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Abstract

The light meson spectrum is explored with the GlueX experiment at Jefferson Lab using a real photon beam with energies of up to 12 GeV. At these high energies, the dominant meson photoproduction mechanism in forward direction is the exchange of Reggeons. Understanding the production mechanism is essential for ongoing searches of exotic hybrid mesons in the meson spectrum. An important experimental tool in studying the production mechanism is the measurement of polarization observables including beam asymmetries and Spin-Density Matrix Elements (SDMEs) with a linearly polarized photon beam that is incident on a liquid hydrogen target. The GlueX detector setup is well equipped to detect neutral as well as charged particles over a large angular range. This talk presents an overview of the SDMEs measured at GlueX with an emphasis on high precision measurements of the photoproduction reaction $\gamma p \rightarrow \pi^- \Delta^{++}$.