

Spin observable measurements in pseudo scalar-meson polarized photo-production using polarized neutrons in solid HD

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Abstract

Recent LQCD calculations have confirmed the long standing quark model expectation of many more excited states of the nucleon than have as yet been identified. These missing states are expected to be broad and overlapping and require detailed partial wave analyses (PWA) to disentangle. This has been the focus of the N^* photo-production program at Jefferson Lab. Constraining PWA requires measurements of many polarization observables. Furthermore, while $I = 3/2$ Δ amplitudes can be determined from proton targets alone, descriptions of $I = 1/2$ N^* production necessarily require neutron reaction data as well, about which comparatively little is known. To address the latter, the g14/E06-101 experiment has recently completed data taking using the CLAS with circularly and linearly polarized photons incident on polarized neutrons in solid deuterium-hydride (HD) frozen-spin targets. The combination of small dilution and low Z with this target has enabled running at an order of magnitude higher fluxes than previous experiments. CLAS calibrations are ongoing. Preliminary analyses for double-spin asymmetries on the neutron, such as $\gamma + n(p) \rightarrow \pi^- + p(p)$ will be discussed.