Double-Polarization Experiments Using Polarized HD at LEGS.\textsuperscript{1}

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— A novel, solid, frozen-spin HD target has been developed for measurements of double-polarization observables in the \( \Delta \) resonance region. Our focus is the determination of the pion photo-production amplitudes for the neutron and proton. Cross sections, beam asymmetries and the \( E \) and \( G \) double-polarization observables are measured simultaneously. \( E \) provides information on the GDH and Spin-Polarizability spin sum rule integrals. We report here a preliminary analysis of one month of data collected on a \( \vec{H}\vec{D} \) target with polarizations of \(< P_H > = 30.0\% \) and \(< P_D > = 31.5\% \) and in-beam spin relaxation times of about one year. The photon beam energies ranged from 190 - 422 MeV with circular polarizations between 59\% and 100\%. Data collected during this run period focused on \( \pi^0 \) production from the neutron using a detector system optimized to detect the recoil neutron in coincidence with the \( \pi^0 \). This work is supported by the U.S. Department of Energy under contract DE-AC02-98CH10886, by the U.S. National Science Foundation, and by the Instituto Nazionale de Fisica Nucleare, Italy.

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