The g_2^p Polarized Proton Target

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The recently completed g_2^p experiment used a dynamic nuclear polarized (DNP) NH_3 target to investigate the spin structure of the proton at Jefferson Lab. The goal was to extract the proton's inclusive spin structure function at the lowest practical momentum transfer, $0.02 < Q^2 < 0.2GeV^2$, a Q^2 region largely unexplored prior to this experiment. The incident electron beam energies ranged from 1.1 to 3.3 GeV. Inclusive scattering from a transversely polarized target was detected at 5.6° in a pair of magnetic spectrometers outfitted with a room temperature septum magnet. The deflection of the electron beam was minimized for a portion of the experiment by limiting the target magnetic field to 2.5 Tesla. Most recent DNP studies have been performed at 5 Tesla so polarization studies in this configuration are limited. Also of interest during the experiment was the measurement of the proton form factor ratio G_E/G_M, which required a longitudinal target field, so a rotatable target chamber was needed to transition between settings. I will discuss the basic physical processes which drive DNP, and the unique instrumentation and design challenges that arose from running under the g_2^p configuration. I'll also present preliminary polarimetry results, and other performance indicators such as anneal time and polarization decay rates.