Measurement of deuteron spin structure functions at low to moderate $Q^2$
using CLAS

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Spin structure functions of the nucleon in the region of large $x$ and small to moderate $Q^2$ continue to be of high current interest. The first moment of the spin structure function $g_1$, $\Gamma_1$, goes through a rapid transition from the photon point ($Q^2 = 0$), where it is constrained by the Gerasimov-Drell-Hearn sum rule, to the deep inelastic limit where it is sensitive to the nucleon spin fraction carried by quarks. The interesting behavior in the transition region is dominated by baryon resonance excitations. Among the topics one can study in this kinematic regime are spin-dependent resonance transition amplitudes and their interference with each other and the non-resonant background and the presence or absence of local duality in spin structure functions. Recently, we concluded an experiment to measure these observables for deuterium as part of the "EG1" run group in Jefferson Lab's Hall B. We used a highly polarized electron beam with energies from 1.6 GeV to 5.7 GeV and a cryogenic polarized ND$_3$ target together with the CEBAF Large Acceptance Spectrometer (CLAS) to accumulate over 11 billion events. In this talk, we will present preliminary results for the double spin asymmetry in the resonance region over a $Q^2$ range from 0.05 to 5 GeV$^2$, based on the data taken with 1.6 GeV and 5.7 GeV beam. We also extract the behavior of $A_1^d(x)$ at large $x$ and the $Q^2$ dependence of the spin structure function $g_1^d(x, Q^2)$, as well as its first moment, $\Gamma_1^d(Q^2)$. 