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Measurements of the Neutron Longitudinal Spin Asymmetry A_1 and Structure Function g_1 in the Valence Quark Region DAVID FLAY, Temple University, JEFFERSON LAB E06-014 COLLABORATION — The current data for the nucleon-virtual photon longitudinal spin asymmetry A_1 on the proton and neutron have shown that the ratio of the polarized-to-unpolarized down-quark parton distribution functions, $\Delta d/d$, tends towards -1/2 at large x, in disagreement with the perturbative QCD prediction that $\Delta d/d$ approaches 1. As a part of experiment E06-014 in Hall A of Jefferson Lab, double-spin asymmetries were measured in the scattering of a longitudinally polarized electron beam of energies 4.73 and 5.89 GeV from a longitudinally and transversely polarized ^{3}He target in the deep inelastic scattering region, allowing for the extraction of the neutron asymmetry A_1^n and the longitudinal spin structure function g_1^n. We will discuss our analysis of the data and present results for A_1 and g_1 on both ^{3}He and the neutron in the kinematic range of $0.2 < x < 0.65$ and $2 < Q^2 < 5$ GeV^2 for the scattered electrons. Our measurements of A_1 and g_1 are compared to the world data and a new value of the second moment of g_1, namely a_2, is evaluated and compared to a lattice QCD calculation. The quantity a_2 is needed to extract the twist-4 matrix element known as f_2.

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