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Precision Measurement of d_2^n: Probing the Lorentz Color Force
DAVID FLAY, Temple University, JEFFERSON LAB E06-014 COLLABORATION
— In order to gain a better understanding of the spin structure of the neutron, the experiment to measure the quantity d_2^n was carried out from February to March of 2009 at Jefferson Lab. The experiment consisted of measuring the asymmetries $A_{||}$ and $A_{\perp}$, and the total cross section σ_0 by scattering a longitudinally polarized electron beam off of a longitudinally and transversely polarized ^{3}He target. The experiment covered excitation energies in the deep inelastic valence quark and resonance regions. From the asymmetries and total cross section, the spin dependent structure functions g_1 and g_2 will be extracted. Using these, the quantity d_2^n is determined as the second moment of a linear combination of g_1 and g_2. d_2^n is a measure of the Lorentz color force between quarks averaged over the volume of the neutron. The measurement will provide a benchmark test of Lattice QCD calculations of d_2^n by lowering the uncertainty in the present value by a factor of approximately four. This measurement will also provide for further understanding of quark-gluon correlations in connection to the nucleon spin structure.

David Flay
Temple University

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