

The Proton Spin-Dependent Structure Function, g_2 , at Low Q^2

Ryan Zielinski

Department of Physics, University of New Hampshire, Durham, NH 03824-3568

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Abstract

The Jefferson Laboratory accelerator has been used to great effect in the study of the polarized structure of nucleons. Measurements of the spin-dependent structure functions have proven to be powerful tools in testing the validity of a number of effective theories of Quantum Chromodynamics. While the neutron spin structure functions, $g_{1,2}^n$, and longitudinal proton spin structure function, g_1^p , have been measured over a wide kinematic range, the second proton spin structure function, g_2^p , has not. In this talk I will present the E08-027 (g2p) experiment, which was an inclusive measurement of the proton's spin structure function, g_2^p , in the resonance region at Jefferson Lab's Hall A. This is the first measurement of g_2^p covering $0.02 \text{ GeV}^2 < Q^2 < 0.2 \text{ GeV}^2$. The experiment will allow us to test the Burkhardt-Cottingham Sum Rule at low Q^2 as well as extract the longitudinal-transverse generalized spin polarizability and compare it to predictions made by Chiral Perturbation Theory. In addition, the data will reduce the systematic uncertainty of calculations of the hyperfine splitting of hydrogen and extractions of the proton charge radius. An update on the status of the analysis, along with preliminary results, will be presented.