

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

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Measurements of the nucleon spin-dependent structure functions have been proven to be powerful tools to test the validity of effective theories of Quantum Chromodynamics (QCD). The neutron spin structure functions, g_1^n and g_2^n , and the proton spin structure function, g_1^p , have been measured over a wide kinematic range. However, the proton spin structure function, g_2^p , has not. Recently an experiment (E08-027, also named G2P) is carried out at Jefferson Lab Hall A to measure the proton g_2 structure function in the low momentum transfer region covering $0.02 < Q^2 < 0.20(\text{GeV}^2)$. This experiment allows us not only to extract the generalized longitudinal-transverse spin polarizability (δ^{LT}) then give a benchmark test to the Chiral Perturbation Theory (χ^{PT}) in this kinematic region, but also test the Burkhardt-Cottingham sum rule at low Q^2 . The details of the experiment and the preliminary results will be present.