

Measuring the Neutron and ^3He Spin Structure at Low Q^2

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Abstract

The spin structure of the nucleon has been of great interest over the past few decades. Sum rules, including the Gerasimov-Drell-Hearn (GDH), and moments of the spin structure functions are powerful tools for understanding nucleon structure. The GDH sum rule, originally derived for real photon absorption, has been generalized to nonzero Q^2 . The goal of Jefferson Lab experiment E97-110 is to perform a precise measurement of the Q^2 dependence of the generalized GDH integral and of the moments of the neutron and ^3He spin structure functions between 0.02 and 0.3 GeV^2 . This Q^2 range will allow us to test predictions of Chiral Perturbation Theory, and verify the GDH sum rule by extrapolating the integral to the real photon point. The measurement will also contribute to the understanding of nucleon resonances. The data have been taken in Hall A using a high resolution spectrometer with the addition of a septum magnet, which allowed us to access the low Q^2 region. The analysis's status, prospects and impact will be discussed.