

Abstract Submitted
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Measurement of the Gerasimov-Drell-Hearn (GDH) Sum Rule in Hall D at Jefferson Lab MARK DALTON, ALEXANDRE DEUR, Jefferson Lab, SIMON SIRCA, University of Ljubljana, JUSTIN STEVENS, College of William & Mary — The Gerasimov-Drell-Hearn (GDH) sum rule links the anomalous magnetic moment of any target particle to the helicity-dependence of its total photo-production cross section. We plan to measure the integrand of the GDH sum rule for protons and neutrons, for the first time using photons of energy between 3 and 12 GeV. Hall D at Jefferson Lab, with its high-luminosity photon tagger and its large solid angle detector is well-suited for a high precision experiment using existing standard equipment and a new polarized target. A failure of the sum rule would reveal new nucleon structural processes. Using 3 weeks of beam time this experiment would be able to check the convergence of the sum rule for both nucleons, significantly improve the statistics and systematics on the intercept of the a_1 Regge trajectory, yield the first non-zero polarized deuteron asymmetry in the diffractive regime, significantly improve the uncertainty in the polarizability contribution to the proton-structure correction in muonic hydrogen hyperfine splitting, provide a real-photon baseline for studies of the transition between polarized DIS and diffractive regimes, and constrain quark compositeness or size. In this talk we will introduce the measurement and discuss some of these implications.

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