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Experimental study of the <sup>3</sup>He and neutron spin structure at low  $Q^2$  using a polarized <sup>3</sup>He target NGUYEN TON, University of Virginia, SMALL ANGLE GDH COLLABORATION — The Jefferson Lab (JLab) Hall A E97110 experiment performed a precise measurement of the neutron spin structure functions at low  $Q^2$  by using a polarized <sup>3</sup>He target as an effective polarized neutron target. The goals of the experiment are to make a bench-mark test of Chiral Perturbation Theory calculations and to check the Gerasimov-Drell-Hearn (GDH) sum rule by extrapolating the integral to the real photon point. The data were taken in two experimental run periods. The first period covered the lowest  $Q^2$  points but with a defective equipment which complicates the data analysis. The second period covered higher  $Q^2$  point, with a properly working equipment. The elastic carbon cross section measurement used for spectrometer optics and systematics studies will be discussed for the first run period along with the future plans for the analysis.

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