

# A Precision Measurement Of $G_E^n$ At High $Q^2$ In Hall A At Jefferson Lab

Aidan M. Kelleher  
*Department of Physics*  
*The College of William & Mary*  
*P.O. Box 8795*  
*Williamsburg, Virginia 23187, USA*

*For the Hall A and E02-013 collaborations*

In the first half of 2006, Jefferson Lab experiment E02-013 successfully collected data to measure the neutron elastic form factor  $G_E^n$  at the four four-momentum transfer values  $Q^2 = 1.2, 1.8, 2.6,$  and  $3.5(\text{GeV}/c)^2$ . This quasi-elastic semi-exclusive  ${}^3\vec{H}e(\vec{e}, e'n)$  reaction used the polarized CEBAF beam ( $P_b > 80\%$ ) and a highly polarized  ${}^3\text{He}$  target ( $P_t > 50\%$ ). Neutrons were detected by an array of scintillators, which has a measured neutron efficiency of 35-40%. The electrons were detected by the newly commissioned BigBite spectrometer with a momentum resolution of 1-1.5%. The transverse asymmetry of the cross section  $A_T$  will be measured from which  $G_E^n$  may be extracted. A statistical accuracy of  $\Delta G_E^n/G_E^n \approx 0.14$  is expected.

An overview of the experiment and the experimental motivation will be discussed. Analysis progress, especially as related to the many new systems, will also be presented.