Precision measurement of the ratio of the electric and magnetic form factors of the neutron with polarized $^3$He using CLAS

V. Boykin, J. Calarco, D. DeAngelis, J. Distelbrink, L. Gelinas, J. Heisenberg, F. W. Hersman, M. Kennedy, V. Pomeroy, Timothy P. Smith, I. The, A. Tutein

University of New Hampshire

M. B. Leuschner
Indiana University

V. Burkert, B. A. Mecking, E. Smith
CEBAF

J.-M. Laget
Saclay

and the CLAS Collaboration

F. W. Hersman, Timothy P. Smith, contact persons

ABSTRACT

We propose to measure the polarization response of $^3\text{He}(e,e'p)$ in the quasielastic region to extract the neutron electric to magnetic form factor ratio ($G_E^n/G_M^n$) with CLAS. We present a plan to adapt existing techniques for polarizing helium by alkali spin exchange for use in the CLAS. The anticipated precision in the ratio corresponds to an uncertainty of 0.002 in $G_E^n$ at low momentum transfer, and approximately 0.010 at 3 GeV/c$^2$ (in four-momentum bins of $\Delta Q = 0.2$ GeV/c).