Abstract Submitted
for the NWS16 Meeting of
The American Physical Society

Dual Species Co-Magnetometer using 129Xe and 199Hg for Measurement of the Neutron's Electron Dipole Moment EMILY ALTIERE, JOSHUA WIENANDS, ERIC MILLER, TOMOHIRO HAYAMIZU, KIRK MADISON, TAKAMASA MOMOSE, DAVID JONES, University of British Columbia — A new ultra cold neutron (UCN) facility is under development with a flagship experiment of measuring the neutrons electric dipole moment (EDM) with a precision of 10^{-27} e-cm. Construction of the main apparatus is taking place at TRIUMF, with collaborators from Japan and Canada. To measure the nEDM, a magnetic resonance experiment on polarized neutrons is performed, where the uncertainty is limited by how well the magnetic field and its gradient are known. Previous nEDM experiments relied on in-situ measurements of the magnetic field using a Ramsey fringe measurement of the spin precession of 199Hg (cohabiting with the neutrons). In our work we introduce 129Xe as a second species (forming a dual co-magnetometer with 199Hg). Both species are utilized simultaneously to measure the magnetic field, thereby lowering the systematic uncertainties in the nEDM measurement. 129Xe was chosen for several reasons including its negligible interaction with the neutrons and 199Hg. The spin precession of polarized 129Xe is detected by measuring the fluorescence decay following a spin-selective 126-nm optical transition of $5p^6(^1S_0) \rightarrow 5p^5(^2P_{3/2})6p$. In this talk I will present our current progress in preliminary spectroscopy on 129Xe.

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Date submitted: 09 May 2016 Electronic form version 1.4