

Abstract Submitted  
for the HAW14 Meeting of  
The American Physical Society

**Development of an optical co-magnetometer for a neutron EDM experiment at TRIUMF** TAKAMASA MOMOSE, The University of British Columbia — TRIUMF is now constructing a new facility that will produce high density ultracold neutrons (UCN). One of the important experiments for the new facility is the measurement of the neutron electric dipole moment (nEDM), an experiment that exploits the fundamental symmetries of nature to search for new physics beyond the Standard Model. In order to improve the present world's best experimental result for the nEDM by more than an order of magnitude, it is indispensable to develop an extremely sensitive co-magnetometer, which measures the magnetic field inside the nEDM cell while the nEDM measurement is being conducted. For this purpose, our group is proposing to use a dual-species comagnetometer with  $^{199}\text{Hg}$  and  $^{129}\text{Xe}$ . In this method, polarized  $^{199}\text{Hg}$  and  $^{129}\text{Xe}$  atoms will be introduced into the nEDM cell at the same time as the neutrons, and the spin-precession frequencies of both species are measured simultaneously. The Xe and Hg atoms are probed continuously by observing the modulation of transmitted probe light, at 253.7 nm, for Hg, and emission in the near infrared (823 nm and 895 nm) for Xe by exciting a two-photon transition at 252.4 nm. This talk will present our progress on the development of the dual-species comagnetometer.

Takamasa Momose  
Univ of British Columbia

Date submitted: 01 Jul 2014

Electronic form version 1.4