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Spin Exchange Optical Pumping of ^{129}Xe for the Neutron Electron Dipole Moment Experiment at TRIUMF ERIC MILLER, TOMOHIRO HAYAMIZU, JOSHUA WIENANDS, EMILY ALTIERE, DAVID JONES, KIRK MADISON, TAKAMASA MOMOSE, University of British Columbia, MICHAEL LANG, CHRIS BIDINOSTI, JEFFERY MARTIN, University of Winnipeg — Spin polarized noble gases have been a field of study for several decades and are of particular interest with respect to magnetic sensing. Using the Spin Exchange Optical Pumping technique, one can use the angular momentum of circularly polarized NIR photons to spin polarize Rb atoms, which then collide with Xe to polarize the ground state Zeeman sublevels of Xe many orders of magnitude above typical thermal Boltzmann distributions. The resulting polarized gas, with its magnetic dipole moment, is a useful probe of magnetic fields. We plan to use two spin polarized species, ^{129}Xe and ^{199}Hg, as dual co-magnetometers for the neutron EDM experiment at TRIUMF. They will be used to correct the neutron precession frequency for drifts due to magnetic field instability and geometric phase effects. For ^{129}Xe, we aim to probe the populations of the ground state Zeeman sublevels using UV two-photon transitions. The respective populations depend on how much polarization we can produce using the SEOP technique. We will present technical details of our apparatus including results from a parameter space search, investigating how mode of preparation (batch or continuous flow), temperature, flow rate, and laser power affect ^{129}Xe polarization as measured by low field NMR.

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