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UV Laser Development for Dual Species Co-Magnetometer using ^{129}Xe and ^{199}Hg EMILY ALTIERE, TOMOHIRO HAYAMIZU, ERIC MILLER, JOSHUA WIENANDS, KIRK MADISON, TAKAMASA MOMOSE, DAVID JONES, University of British Columbia — The new ultracold neutron (UCN) facility under development at TRIUMF will introduce a dual co-magnetometer with cohabiting ^{129}Xe and ^{199}Hg for measuring the neutrons electric dipole moment (nEDM). By simultaneously incorporating two atomic species we can characterize both the magnitude and gradient of the magnetic field, thereby lowering the systematic uncertainties in the nEDM measurement. Toward this end, the spin precession of polarized ^{129}Xe is detected by measuring the fluorescence decay following the spin-selective two-photon transition at 252-nm $5\mathrm{p}^6(^1\mathrm{S}_0) \rightarrow 5p^5(^2\mathrm{P}_{3/2})6\mathrm{p}$. As there is no suitable commercial high power laser at 252 nm, we have built an optically pumped semiconductor laser with two stages of resonant frequency doubling to produce 320 mW at 252 nm. Further increase in the power, up to 7.5 W, is achieved via a 252 nm enhancement cavity. The precession of the second atomic source, ^{199}Hg, is detected by absorption of 253-nm from the $6\mathrm{s}^2(^1\mathrm{S}_0) \rightarrow 6s6p(^3\mathrm{P}_1)$. We have constructed an analogous laser system as the ^{129}Xe laser but at 253-nm. In this talk I will present the construction and characterization of these two laser systems.

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