Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

Remote Atmospheric Magnetometry LUKE JOHNSON, PHILLIP SPRANGLE, THOMAS ANTONSEN, University of Maryland — We are investigating an optical technique for remotely measuring nanotesla variations in the Earth's magnetic field (~ 0.5G). This technique uses a frequency-modulated, circularly polarized laser ($\lambda = 760$ nm) to spin polarize the ground state of molecular oxygen at atmospheric conditions. The Earth's magnetic field splits the magnetic sublevels of molecular oxygen's ground state leading to spin depolarization. The molecule's fluorescence depends on the spin depolarization and consequently on the Earth's magnetic field. The time-dependent fluorescence will be extracted by heterodyning with the laser's frequency modulation. We will discuss limiting physical processes such as collisional dephasing, Doppler broadening, and molecular oxygen's magnetic dipole transition strength. This research is being funded by ONR.

Luke Johnson
University of Maryland

Date submitted: 31 Jan 2014 Electronic form version 1.4