

Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Laboratory and Modeling Studies of Velocity-Changing Collisions, Spin-Changing Collisions, and Magnetic Fields on Sodium Guidestars¹ NATALIE KOSTINSKI, IVANA DIMITROVA, WILLIAM HAPPER, Princeton University — Lasers used to produce sodium guidestars can cause optical pumping of Na atoms, but only interact with atoms that possess resonant Doppler shift. The number density of atmospheric constituents (e.g., Na, N₂, O, O₂) is so low, that there is minimal collision broadening of the optical absorption lines and distinct velocity groups can be excited. A goal of our work is modeling and laboratory studies of the correlations between the atomic spin polarization and the atomic velocity along the pumping beam. We believe this will aid in understanding the various mechanisms (collision processes, geomagnetic field) that can influence guidestar signal strength. This work should lead to a better understanding of the relative importance of strong and weak velocity-changing collisions.

¹AFOSR, NSF

Natalie Kostinski
Princeton University

Date submitted: 18 Jan 2010

Electronic form version 1.4