Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Spin-Exchange Optical Pumping of Solid Alkali Compounds[1] BRIAN PATTON, Princeton University Physics Department, KIYOSHI ISHIKAWA, Graduate School of Material Science, University of Hyogo, Japan, YUAN-YU JAU, WILLIAM HAPPER, Princeton University Physics Department — Spin-exchange optical pumping of noble gases has been used for many years to create highly non-equilibrium spin populations, with applications ranging from fundamental physics[1] to medical imaging[2]. In this procedure, angular momentum is transferred from circularly-polarized laser light to the electron spins of an alkali vapor and ultimately to the nuclei of a gas such as ^{3}He or ^{129}Xe. Here we show experimentally that a similar process can be used to polarize the nuclei of a solid film of cesium hydride which coats the walls of an optical pumping cell. We present nuclear magnetic resonance (NMR) data which demonstrate that the nuclear polarization of ^{133}Cs in CsH can be enhanced above the Boltzmann limit in a 9.4-Tesla magnetic field. Possible spin-exchange mechanisms will be discussed, as well as the extension of this technique to other compounds.
[1] T. W. Kornack, R. K. Ghosh, and M. V. Romalis, Phys. Rev. Lett. *95*, 23080 (2005).
[2] M. S. Conradi, D. A. Yablonskiy, et al., Acad. Radiol. *12*, 1406 (2005).

[1]This work was supported by AFOSR.

Brian Patton
Princeton University

Date submitted: 20 Nov 2006 Electronic form version 1.4