Abstract Submitted for the DAMOP16 Meeting of The American Physical Society

**Optical pumping of rubidium atoms in a parahydrogen matrix**<sup>1</sup> JONATHAN WEINSTEIN, W. PATRICK ARNOTT, TIM CHRISTY, CHASE HARTZELL, ANDREW KANAGIN, University of Nevada, TAKAMASA MO-MOSE, University of British Columbia, DAVID PATTERSON, Harvard University, SUNIL UPADHYAY, University of Nevada — Building on prior work with rubidium atoms in a cryogenic argon matrix [*Phys. Rev. A* **88**, 063404 (2013)], we have grown solid parahydrogen crystals doped with rubidium atoms. Typical rubidium densities are on the order of  $10^{17}$  cm<sup>-3</sup>. We have demonstrated optical pumping of the atomic spin of the implanted rubidium atoms; the measured spin polarization signals are roughly one order of magnitude larger than what was achieved in argon matrices. The combination of high atomic densities and optical addressability make this a promising experimental platform for applications such as magnetometry and fundamental physics measurements. Spin lifetimes ( $T_1$ ) on the order of 1 second have been observed. Progress towards measuring coherence times ( $T_2$ ) will be discussed.

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