

Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Spin coherence of rubidium atoms in solid parahydrogen using dynamical decoupling¹ UGNE DARGYTE, SUNIL UPADHYAY, JONATHAN WEINSTEIN, University of Nevada, Reno — We implant rubidium atoms inside cryogenic solid parahydrogen and study their electron spin coherence. We have measured the ensemble spin dephasing time T_2^* to be on the order of microseconds, six orders of magnitude below the longitudinal relaxation time T_1 . We observe that with dynamical decoupling pulse sequences, we can achieve much longer spin coherence times. A modified Hahn echo extends T_2 to times on the order of milliseconds, and the alternating-phase Carr-Purcell sequence gives a T_2 approaching 0.1 s. The physics limiting the spin coherence will be discussed. Long spin coherence times make atoms in parahydrogen promising for applications in AC magnetometry, quantum sensing, and nano-MRI.

¹This material is based upon work supported by The National Science Foundation under Grants PHY 1607072 and 1912425.

Jonathan Weinstein
University of Nevada, Reno

Date submitted: 30 Jan 2020

Electronic form version 1.4