Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

A microfabricated hyperpolarized Xe source RICARDO JIMENEZ-MARTINEZ, Time and Frequency Division, NIST Boulder, DANIEL KENNEDY, Lawrence Berkeley National Laboratory, Berkeley, CA; University of California, Berkeley, CA, MICHAEL ROSENBLUH, Department of Physics, Bar-Ilan University, Ramat-Gan, Israel, ELIZABETH DONLEY, SVENJA KNAPPE, Time and Frequency Division, NIST Boulder, SCOTT SELTZER, HATTIE RING, Lawrence Berkeley National Laboratory, Berkeley, CA; University of California, Berkeley, CA, BRIAN PATTON, University of California, Berkeley, CA, VIKRAM BAJAJ, ALEXANDER PINES, Lawrence Berkeley National Laboratory, Berkeley, CA; University of California, Berkeley, CA, JOHN KITCHING, Time and Frequency Division, NIST Boulder — Spin-exchange collisions offer an efficient way to transfer spin orientation from optically pumped alkali-metal atoms to the nuclei of noble gas atoms. Of particular interest in NMR spectroscopy is the polarization of xenon gas, which due to its physical properties is an amenable sensor in fields ranging from medical imaging to analytical chemistry. There is current interest in developing portable NMR instrumentation combining hyperpolarized Xe. Here we demonstrate a microfabricated platform for the optical production and detection of polarized Xe gas. The device is implemented in a 3 cm X 1cm X 0.1 cm silicon preform with two micromachined chambers connected by a 300 μm X 300 μm X 1000 μm channel. One chamber is used to orient Xe nuclei spin through spin-exchange collisions with optically pumped Rb atoms. Characterization of the polarized Xe is carried out in the second chamber by measuring its magnetic field using a Rb magnetometer.

Ricardo Jimenez-Martinez
Time and Frequency Division, NIST Boulder

Date submitted: 30 Jan 2013 Electronic form version 1.4