Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

Spinor dynamics in a ^{23}Na spin-1 thermal Bose gas H.K. PECHKIS, J. WRUBEL, A. SCHWETTMANN, P.F. GRIFFIN, R. BARNETT, E. TIESINGA, P.D. LETT, JQI, NIST, Univ. of Maryland — We present experimental observations of coherent spin-changing collisions in a cold thermal spin-1 Bose gas of ^{23}Na atoms. We observe clear oscillations in the m_F=0 spin population for the thermal gas for various magnetic field and different initial phases. Experimental results show that the population oscillations in a multi-spatial-mode thermal gas have the same behavior as those observed in a single-spatial-mode antiferromagnetic spinor Bose Einstein condensate. We demonstrate this by showing that the two situations are described by the same dynamical equations, with a factor of two change in the spin dependent interaction coefficient, which results from the change to particles with distinguishable momentum states in the thermal gas. We find quantitative agreement with the measured amplitude and period of the oscillations as a function of magnetic field for different initial spinor phases. We also extract a value of the spin dependent interaction coefficient that is in a good agreement with the theory.

H. K. Pechkis
JQI, NIST, Univ. of Maryland

Date submitted: 28 Jan 2013 Electronic form version 1.4