

Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Experimental apparatus to study cold collisions in sodium spinor Bose-Einstein condensates DELARAM NEMATOLLAHI, AARON FOSTER, KYLE YATES, JOSEPH ALTERMATT, HYOYEON LEE, QIMIN ZHANG, ARNE SCHWETTMANN, University of Oklahoma — We present our progress on building an apparatus to study matter-wave quantum optics in spin space, including our design of the sodium oven, Zeeman slower, vacuum and laser systems. The nonlinear interaction needed to implement quantum optical devices with matter waves will be provided by spin-exchange collisions in a sodium spinor Bose-Einstein condensate. Microwave dressing will allow us to exert precise control over the collisional dynamics and tune the system to behave as an interferometer in spin space with reduced noise, or as a phase-sensitive amplifier for sensitive atom number measurements. Apart from microwave dressing, we are also planning to study the effect of Rydberg excitations on the collisional spin dynamics of the gas.

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Date submitted: 29 Jan 2015

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