Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

Rotating sensing with an atom analog of the SQUID[1]
CHANGHYUN RYU, MALCOLM BOSHIER, Los Alamos National Laboratory —
After the SQUID was created to study and utilize quantum interference of currents flowing through Josephson Junctions connected in loop, it was developed into the most sensitive magnetometer known. An atom analog of the SQUID (an "Atom SQUID") would be sensitive, instead, to rotation. The study of the Atom SQUID is important given the need to develop compact and sensitive rotation sensors and the possibility of using it to study macroscopic quantum phenomena with a BEC. In previous experiments, we demonstrated Josephson Junctions (JJs) for an Atom SQUID with a "Painted Potential" method for manipulating a BEC. The critical current was measured by moving the JJs through a BEC to create a bias current. Compression of atoms was observed when the bias current exceeded the critical current, showing Josephson effects directly. In a rotating Atom SQUID the critical current is a periodic function of external rotation rate, with period $\Omega_0 = \hbar/mR^2$ for atoms of mass m in a torus of radius R. In this poster we will describe progress toward measuring this modulation of the critical current, which will show the interference of currents flowing through Josephson Junctions and also serve as a proof of principle demonstration of rotation sensing with an Atom SQUID.

[1]This work was funded by the Los Alamos National Laboratory LDRD program

Malcolm Boshier
Los Alamos National Laboratory

Date submitted: 30 Jan 2013 Electronic form version 1.4