

Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

High Data Rate, Six Axis Atom Interferometer for Dynamic Environments¹ AKASH RAKHOLIA, University of New Mexico, GRANT BIEDERMANN, HAYDEN MCGUINNESS, Sandia National Laboratories — Atom interferometers have the potential to be exceptional broadband inertial sensors. However, typically such systems are designed for laboratory environments in pursuit of maximum sensitivity, and thus are bulky, fragile, and are only able to operate at the few Hertz rate. Recently we demonstrated an atom interferometer accelerometer operating between 50 Hz and 300 Hz which had a compact and robust form-factor and exhibited sensitivities suitable for inertial navigation in dynamic environments. We have expanded on this high data-rate model and produced a six-axis design based on the concept of an exchange MOT system. This device is capable of simultaneous acceleration and rotation measurements at rates of up to 80 Hz, with sensitivities at the level of $\mu\text{g}/\sqrt{\text{Hz}}$ and $\mu\text{rad}/\text{s}/\sqrt{\text{Hz}}$, with further gains in operation rate and sensitivity expected. This approach suggests an attractive alternative to currently available commercial technologies for inertial navigation.

¹Laboratory Directed Research and Development, Sandia National Laboratories

Akash Rakholia
University of New Mexico

Date submitted: 25 Jan 2013

Electronic form version 1.4