Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Nanofiber testbed for guided atom interferometry (AI) in high dynamic environments[1] ADRIAN OROZCO, WILLIAM KINDEL, WENG CHOW, JONATHAN STERK, YUAN-YU JAU, Sandia National Laboratories, GRANT BIEDERMANN, The University of Oklahoma, JONGMIN LEE, Sandia National Laboratories — Laboratory based atomic inertial navigation sensors such as accelerometers and gyroscopes have demonstrated excellent performance and sensitivity that is comparable to conventional inertial measurement units. However, atom interferometry (AI) outside the laboratory necessitates operation in high dynamic environments. A promising avenue is guided AI which can increase the dynamic range of free space AI, fundamentally overcoming the potential problems of wavepacket mismatch, lateral atomic motion, and time-varying acceleration. In addition, the nanofiber testbed achieves strong atom-light interactions with low size, weight and power (SWaP) conditions due to its intrinsic small mode area. In this talk, we will present in-house capability of nanofiber fabrication, demonstration of one-dimensional optical dipole trap with two-color evanescent fields, atomic coherence verification of trapped atoms, and our progress toward guided atom interferometry.

[1]Sandia National Laboratories is a multimission laboratory managed and operated by National Technology Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energys National Nuclear Security Administration under contract DE-NA0003525.

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Date submitted: 31 Jan 2020 Electronic form version 1.4