Abstract Submitted
for the DAMOP17 Meeting of
The American Physical Society

Mach-Zehnder atom interferometer inside an optical fiber. MINGJIE XIN, WUISENG LEONG, ZILONG CHEN, SHAU-YU LAN, Nanyang Tech Univ — Precision measurement with light-pulse grating atom interferometry in free space have been used in the study of fundamental physics and applications in inertial sensing. Recent development of photonic band-gap fibers allows light for traveling in hollow region while preserving its fundamental Gaussian mode. The fibers could provide a very promising platform to transfer cold atoms. Optically guided matter waves inside a hollow-core photonic band-gap fiber can mitigate diffraction limit problem and has the potential to bring research in the field of atomic sensing and precision measurement to the next level of compactness and accuracy. Here, we will show our experimental progress towards an atom interferometer in optical fibers. We designed an atom trapping scheme inside a hollow-core photonic band-gap fiber to create an optical guided matter waves system, and studied the coherence properties of Rubidium atoms in this optical guided system. We also demonstrate a Mach-Zehnder atom interferometer in the optical waveguide. This interferometer is promising for precision measurements and designs of mobile atomic sensors.

Mingjie Xin
Nanyang Tech Univ

Date submitted: 03 Feb 2017 Electronic form version 1.4