

Abstract Submitted
for the DAMOP17 Meeting of
The American Physical Society

Detection and control of motion of single atoms or ions in an optical cavity MOJTABA MOAZZEZI, YURI V. ROSTOVTSEV, Center for Nonlinear Sciences and Department of Physics, University of North Texas — Using quantum coherence effects, we have developed a new technique of detection of motion of single atoms or ions in an optical cavity. We have theoretically demonstrated that a three-level atom inside a cavity can act as an ultra-dispersive medium and the group velocity of light becomes ultraslow. If the atom is in motion, it causes a phase shift because of Fizeau effect due to dragging of light, which can be observed. It has been shown that the change of phase is extremely sensitive to probe detuning in vicinity of resonance frequency and is in the order of 10^{-9} even for speed of a few meter per seconds.

Mojtaba Moazzezi
University of North Texas

Date submitted: 06 Feb 2017

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