Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Cavity-Assisted Spin Orbit Coupling CHUANZHOU ZHU, LIN DONG, HAN PU, Rice University — We consider a single ultracold atom trapped inside a single-mode optical cavity, where a two-photon Raman process induces an effective coupling between atom's pseudo-spin and external center-of-mass (COM) motion. Without the COM motion, this system is described by the Jaynes-Cummings (JC) model. We show how the atomic COM motion dramatically modifies the predictions based on the JC model. We also investigated the situation when cavity pumping and decay are taken into account. We take a quantum Master equation approach to study this open system and again show how the cavity-induced spin-orbit coupling affects the properties of the system.

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Date submitted: 29 Oct 2015 Electronic form version 1.4