Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

A method of identifying higher order quantum accelerator modes in the quantum-delta-kicked rotor VIJAYASHANKAR RAMAREDDY[1], GIL SUMMY, Physics Department, Oklahoma State University — Quantum accelerator modes (QAM) are signatures of resonances in the quantum evolution of the delta-kicked accelerator. Experimentally this system is realized by exposing a Bose-Einstein condensate to short "kicks" from an optical standing wave. This atom optical implementation of the kicked accelerator shows that the QAM consists of momentum states that rephase during the free evolution between the kicks. We show that higher order modes rephase after few kicks. We present a method of identifying the higher order QAMs using the rephasing model and show that the momentum state step structure of these modes directly correlates with that predicted by the rephasing model. We also show that the step structure is replaced by a sinusoidal behavior for the momentum states in quantum kicked rotor due to the presence of anti-resonance which occurs for phase evolution of odd multiple of π. The step size can be used to classify the higher order modes [1].

[1] Vijayashankar Ramareddy and Gil S Summy, "Detailed momentum structure of the higher order quantum accelerator modes" in preparation

[1]Current address: NBS Cambridge MA

Vijayashankar Ramareddy
Physics Department, Oklahoma State University

Date submitted: 30 Sep 2013 Electronic form version 1.4