Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Behavior of a new type quantum accelerator mode in phase-modulated optical potential WAKUN LAM, Oklahoma State University, SANDRO WIMBERGER, Institut für Theoretische Physik, Universität Heidelberg, SIAMAK DADRAS, JIATING NI, Oklahoma State University, GIL SUMMY, gil.summy@okstate.edu — It has been shown that the delta-kicked rotor (DKR) with a Bose-Einstein Condensate is a powerful model for studying the dynamics of many-body systems. Many efforts based on this model have been made in study of dynamical localization, quantum accelerator mode (QAM), to name but a few. QAM is a dynamical phenomenon in which the momentum of atoms exposed to a pulsed accelerating optical standing wave manifest linear growth. In many applications, we expect high transport rate to suppress localization. A recent technique utilizing the phase modulation on the optical potential to produce transport islands [PRE 68, 026209 (2003) and PRA 87, 013631 (2013)] has been discussed. In this presentation we study the stability of such islands in classical phase space of a modified DKR system in which the phase of the optical potential is modulated by a certain phase on each kick. Numerical simulations testify the existence of QAM even in small phase perturbation. We also investigate the momentum distribution numerically and report a new type of QAM which exposed in stationary optical potential instead. The interesting structure of the area of the transport islands against wide range of dynamical parameters is observed to be quite distinct to the regular one.

Wakun Lam
Oklahoma State University

Date submitted: 30 Jan 2015 Electronic form version 1.4