

Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Quantum emulation of quasiperiodic systems¹ RUWAN SENARATNE, ZACHARY GEIGER, KURT FUJIWARA, KEVIN SINGH, SHANKARI RAJAGOPAL, DAVID WELD, Physics Department, University of California, Santa Barbara and California Institute for Quantum Emulation — Tunable quasiperiodic optical traps can enable quantum emulation of electronic phenomena in quasicrystals. A 1D bichromatic lattice or a Gaussian beam intersecting a 2D square lattice in a direct analogy of the "cut-and-project" construction can be used to create tunable 1D quasiperiodic potentials for cold neutral atoms. We report on progress towards the observation of singular continuous diffraction patterns, fractal energy spectra, and Bloch oscillations in these synthetic quasicrystals. We will also discuss the existence of edge states which can be topologically pumped across the lattice by varying a phasonic parameter.

¹We acknowledge support from the ONR, the ARO and the PECASE and DURIP programs, the AFOSR, the Alfred P. Sloan foundation and the President's Research Catalyst Award from the University of California Office of the President.

Ruwan Senaratne
Univ of California - Santa Barbara

Date submitted: 29 Jan 2016

Electronic form version 1.4