Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

Experimental Progress Toward a Quantum Hall Array of Bosonic Atoms NATE GEMELKE, YANNICK BIDEL, SEOKCHAN HONG, EDINA SARAJLIC, Stanford University, STEVEN CHU, Lawrence Berkeley National Lab
— We describe progress toward the production of an array of small, isolated clusters of bosonic atoms, each held in an optical dipole potential which locally approximates a harmonic oscillator with a rotating anisotropy and/or minimum position. We show how this is accomplished by interfering ordinary gaussian beams, using only modulation of the beam phases, and present results demonstrating the ability to controllably impart angular momentum to atoms held in this potential. This demonstrates a promising method for producing strongly correlated few-body atomic states analogous to electrons in the fractional quantum hall effect[1]. We outline the experimental challenges in producing and observing such states.

[1]see e.g. Popp, M; Paredes, B; Cirac, JI; PHYSICAL REVIEW A; NOV 2004; v.70, no.5, p.053612

Nate Gemelke
Stanford University

Date submitted: 01 Apr 2005 Electronic form version 1.4