Abstract Submitted
for the DAMOP09 Meeting of
The American Physical Society

Quantum control approach to creating and detecting fractional quantum Hall puddles[1] STEFAN BAUR, KADEN HAZZARD, ERICH MUELLER, Laboratory of Atomic and Solid State Physics, Cornell University — We theoretically explore a novel approach to generating few-body analogs of bosonic fractional quantum Hall states [1]. We consider an array of identical few-atom clusters (n = 2, 3, 4), each cluster trapped at the node of an optical lattice. By temporally varying the amplitude and phase of the trapping lasers, one can introduce a rotating deformation at each site. This allows for coherently transferring atoms into highly correlated states. We study target state fidelities and experimental signatures by exactly solving the many-body time dependent Schrödinger equation within a truncated basis. In addition to bosonic quantum hall states our method provides a path to create fermionic quantum hall states and other exotic states. [1] SKB, KRAH, and EJM, Phys. Rev. A 78, 061608(R) (2008)

[1]This material is based upon work supported by the National Science Foundation through grant No. PHY-0758104

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Date submitted: 20 Jan 2009 Electronic form version 1.4