

Abstract Submitted  
for the DAMOP14 Meeting of  
The American Physical Society

**Nondestructive measurement of an ultracold lattice gas** YOGESH PATIL, HARRY CHEUNG, SRIVATSAN CHAKRAM, YARIV YANAY, ERICH MUELLER, MUKUND VENGALATTORE, Cornell University — We realize a continuous measurement of a lattice gas of bosons via two photon fluorescence imaging. We characterize the effect of this measurement on the ultracold gas for various parameters of lattice depth, fluorescence acquisition rate and image resolution. Through sideband spectroscopy, we also quantify the heating induced on the atomic gas due to the imaging sequence. In addition to enabling the local measurements of transport and non-equilibrium dynamics of the lattice gas, our work also paves the way towards the use of continuous quantum measurements for the deterministic control of interacting many-body systems.

This work is supported by the ARO MURI on non-equilibrium dynamics.

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Date submitted: 31 Jan 2014

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