Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Dynamic Dopant Delocalization in a Hubbard Antiferromagnet GEOFFREY JI, CHRISTIE CHIU, MUQING XU, Harvard University, JUSTUS BRGGENJRGEN, Harvard University and University of Hamburg, ANNABELLE BOHRDT, Harvard University and Technical University of Munich, MICHAEL KNAP, Technical University of Munich, EUGENE DEMLER, FABIAN GRUSDT, DANIEL GREIF, MARKUS GREINER, Harvard University — The interplay between spin and charge underlies much of the phenomena of the doped Hubbard model. Quantum simulation of the Hubbard model using quantum gas microscopy offers site-resolved readout and manipulation, enabling detailed exploration of the relationship between the two. We use this platform to explore spin and charge dynamics upon the delocalization of an initially-pinned hole dopant. We first prepare a two-component quantum gas of Lithium-6 loaded into a square optical lattice at half-filling and strong interactions, where the atoms exhibit antiferromagnetic spin ordering. During the loading process, we use a digital micromirror device to pin a localized hole dopant into the antiferromagnet. We then release the dopant and examine how it interacts with and scrambles the surrounding spin environment. The microscopic dynamics of dopants may provide further insight into the phases that appear in the doped Hubbard model.

Geoffrey Ji
Harvard University

Date submitted: 01 Feb 2019 Electronic form version 1.4