

Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Signatures of a first-order phase transition from competing short- and infinite-range interactions LORENZ HRUBY, RENATE LANDIG, NISHANT DOGRA, MANUELE LANDINI, RAFAEL MOTTL, TOBIAS DONNER, TILMAN ESSLINGER, ETH Zurich — We experimentally realize a two dimensional bosonic lattice model with competing short- and infinite-range interactions. We map out the phase diagram consisting of a superfluid, a supersolid, a Mott insulator and a charge density wave phase. When probing the phase transition between the Mott insulator and the charge density wave in real-time, we discover a behavior characteristic of a first order phase transition. Short-range interactions in our system are controlled via an optical square lattice, while the infinite-range interaction potential stems from the coupling of the external degree of freedom of the atoms to the single mode of an optical cavity.

Lorenz Hruby
ETH Zurich

Date submitted: 29 Jan 2016

Electronic form version 1.4