Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Exploring the Hubbard model: the interplay of geometry and interactions RÉMI DESBUQUOIS, MICHAEL MESSER, THOMAS UEHLINGER, GREGOR JOTZU, FREDERIK GÖRG, DANIEL GREIF, SEBASTIAN HUBER, TILMAN ESSLINGER, ETH Zurich — The nature of the ground state of many-body systems not only depends on the relative strength of kinetic and interaction energies, but also on the geometry imposed by the Hamiltonian. We show here two different experiments performed with ultracold fermions, where the geometry of the optical lattice strongly influences the many-body state. In the Ionic Hubbard model, a new energy scale associated with the breaking of the inversion symmetry of the lattice can be tuned to shift from a Mott insulating to a band insulating state. In the spin sector as well, the geometry of the lattice also plays an important role. Even above the transition temperature, the influence of the lattice geometry is revealed by nearest-neighbour (NN) magnetic correlations, and provides key insights on their formation.

Rémi Desbuquois
ETH Zurich

Date submitted: 29 Jan 2016 Electronic form version 1.4