ID de Contribution: **50** Type: **Non spécifié**

Quantum gas microscopy of Hubbard models in and out of equilibrium

lundi 26 juin 2023 12:00 (40 minutes)

Neutral atoms trapped in optical lattices are a versatile platform to study many-body physics in and out of equilibrium. Quantum gas microscopes provide an excellent toolbox to prepare, control and detect such systems at the level of individual atoms.
In the first part of my talk, I will present our recent work on implementing passively phase-stable square and triangular lattices for bosonic rubidium atoms. Combining these base lattices with fine-tuned local on-site blocking potentials, we realize several derived lattice configurations, among them Lieb and kagome lattices. As a first application of our system, we characterize the superfluid-to-Mott-insulator transition through a measurement of brane parity, a non-local observable derived from string correlators. Our measurements demonstrate that brane parity can act as an order parameter for the Mott-insulating state in two dimensions.
In the second part of the talk, I will focus on recent experiments on characterizing spin transport in Heisenberg chains. Using a direct mapping between the two-component Bose-Hubbard model and the Heisenberg model, we study the relaxation of spin domain walls. We track the evolution of the magnetization transported across the initial location of the domain wall, from which we find that transport is superdiffusive. Furthermore, our microscopic detection sheds light on the fluctuations in the transported spin, which indicate that transport falls in the celebrated Kardar-Parisi-Zhang universality class.

Orateur: ZEIHER, Johannes