Quantum Gas Microscopy of Three-Flavor Hubbard Systems

P Schauss[1,2]

[1] *Physics Department, University of Virginia, Charlottesville VA, USA*
[2] *Department of Physics, University of Hamburg, Luruper Ch 149, Hamburg, Germany.*
Contact Phone: +4940428383589
Contact Email: peter.schauss@uni-hamburg.de

Hubbard systems are paradigmatic realizations of strongly correlated many-body systems. Introducing additional species breaks the SU(2) symmetry of the Hubbard model and leads to a wide variety of novel exotic quantum phases. Three-component fermionic systems are at the heart of model systems for quantum chromodynamics where the three components reflect the three flavors.

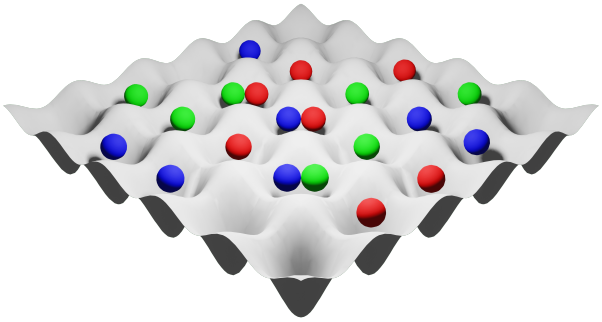

Figure 1: Three-component Fermi gas in an optical lattice

In this talk, I discuss how we extend the technique of quantum gas microscopy to three-flavor Fermi lattice gases in the Hubbard regime. Relying on site- and flavor-resolved detection, we studied the phase diagram of the three-flavor Hubbard model and found signatures of flavor-selective localization and selective pairing at temperatures down to the tunneling energy scale. I will compare our measurements with numerical linked-cluster expansion calculations. Further improvements may enable the observation of a novel pair Mott phase at half filling, and clear a path toward the study of color superfluidity and other aspects of quantum chromodynamics.