

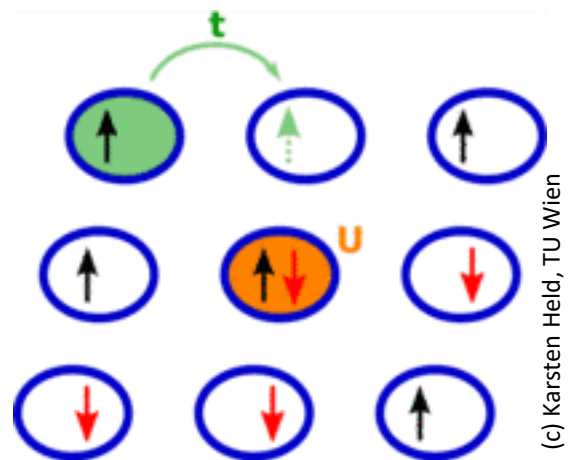
IMPRS UFAST Focus Course Hubbard Model Michael Sentef

Abstract:

The Hubbard model is the drosophila of condensed matter physics. It is perhaps the simplest possible model capturing the *competition* between localization of electrons in solids due to Coulomb repulsion and delocalization in energy bands due to kinetic energy lowering. Invented in the early 1960s to describe magnetism in transition-metal monoxides, it has been generalized and applied to a host of problems in condensed matter including heavy fermions or high-temperature superconductors. Despite its apparent simplicity it shows complicated phase diagrams that depend on dimensionality and lattice coordination as well as electronic filling, with only few exact solutions in limiting cases known to this date. Here I will give a basic introduction with hands-on tutorials.

Topics include:

- basics of second quantization
- Hubbard Hamiltonian
- symmetries and exact results
- mean-field theory of magnetism (hands-on)
- Mott gap and spectral functions
- infinite dimensions: dynamical mean-field theory (hands-on)
- applications in ongoing solid state research



14th – 18th June 2021

9:30h – 12:30 (online)

Register on Geventis I-UF FC7