PHYSIK

THEORETISCH PHYSIKALISCHES KOLLOQUIUM

Donnerstag, den 24.05.2017 um 15:30 Uhr in Raum 46-576

Exploring Synthetic Quantum Matter with Tensor Networks

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The interplay of geometrical constraints, tunable interactions of various range and (artificial) gauge fields made available, e.g., by cold atomic platforms, can be presently used to access i) interacting topological states of matter and ii) many-body effects in the transport properties of low-dimensional systems. In order to gain insights about the entanglement structure of the many-body correlated states, quantum-information-inspired numerical techniques, namely Tensor Networks algorithms, are exploited here.
In this talk, I will provide an overview of some of my recent results: in particular, I will focus on the Creutz-Hubbard ladder, a neat playground to generate flat bands as well as of non-doubled Dirac dispersion relations. In [1], I will present a theoretical analysis of the competition between correlated topological phases and orbital quantum magnetism. In [2], I will examine a repulsively interacting system of Dirac-Weyl fermions confined in a one-dimensional (1D) ring: a unique many-body system that displays an enhancement of the Drude weight with respect to the non-interacting value. Moreover, I will review our proposal to experimentally realize this model in a synthetic ladder, made of two internal states of ultracold fermionic atoms in a 1D optical lattice.

References:
[1] J. Jünemann, et al., PRX 7, 031057 (2017)
[2] M. Bischoff, et al., PRB 96, 241112(R) (2017)

Gäste sind herzlich willkommen.

Die Dozenten der Theoretischen Physik

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