SFB/TRR 21 - Seminar

5. Februar 2015, Ulm

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(MPQ Garching)

## Topological Phases of Ultracold Fermionic Gases in Optical Lattices

The recent successes in coupling ultracold gases to synthetic gauge potentials show the exceptional possibilities of such setups in studying and probing many-body quantum physics. In this talk I will review some aspects of the theory of topological phases of matter and I will describe how synthetic magnetic fields and spin-orbit couplings allow us to simulate topological insulators and superconductors in optical lattices. I will focus in particular on a fermionic ladder model which mimics a one-dimensional topological superconductor and presents fractionalized edge modes. The physical observables suitable for the detection of topological phases in this system will be examined and I will discuss the effects of Hubbard interactions.

**5. Februar 2015, 11:00 Uhr**

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