



Synthetic gauge fields with ultracold atoms in optical lattices

Topological states of matter exhibit unique conductivity properties, which are extremely robust against perturbations and make them particularly interesting for applications. One of the most prominent examples are the integer and fractional quantum Hall effect, where a two-dimensional electron gas under extreme conditions exhibits a quantized Hall conductivity. Ultracold atoms in optical lattices provide access to these phenomena in a controlled laboratory environment. I will discuss how synthetic gauge fields can be engineered for charge-neutral atoms, explain the current state-of-the-art regarding the realization of topological many-body phases and present ongoing efforts towards engineering complete gauge theories, where the synthetic gauge field is dynamical.

Dr. Monika Aidelsburger,

LMU München

room P 602, Fr. 03.05.2019, 10:00