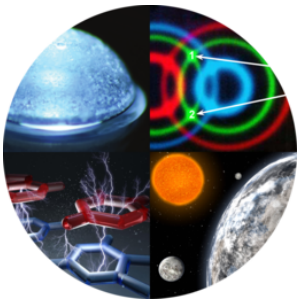

Münchner Physik-Kolloquium

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Floquet topological phases with ultracold atoms in periodically-driven lattices

Prof. Dr. Monika Aidelsburger, *Ludwig-Maximilians-Universität München, and Munich Center for Quantum Science and Technology (MCQST)*

Monday, 22 June 2020, 17:15 h
https://tum-conf.zoom.us/j/93234766313 Meeting-ID: 932 3476 6313 Passwort: Kolloquium
Software bitte möglichst vorab installieren.

Topological phases of matter exhibit remarkable electronic properties that offer unique possibilities for applications. A prominent example is the robust quantization of the Hall conductivity in quantum Hall insulators. A widespread technique for generating topological band structures in synthetic systems, such as ultracold atoms in optical lattices, is Floquet engineering [1]. This method relies on the periodic modulation of the system's parameters to emulate the properties of a non-trivial static system and facilitated the realization of two paradigmatic topological lattice models: the Hofstadter and the Haldane model. Moreover, it inspired ideas for implementing complete lattice gauge theories [2].

The rich properties of Floquet systems, however, transcend those of their static counterparts [3]. The associated quasienergy spectrum can exhibit a non-trivial winding number, which leads to the appearance of anomalous chiral edge modes even in situations where the bulk bands have zero Chern numbers, hence, altering the well-known bulk-edge correspondence. A full classification of Floquet phases requires a new set of topological invariants. We have studied the rich Floquet phase diagram of a periodically-modulated honeycomb lattice using bosonic atoms. The novel properties of anomalous Floquet phases mentioned above open the door to exciting new non-equilibrium phases without any static analogue [4].

[1] A. Eckardt, Phys. Mod. Phys. 89, 311 (2017)
[2] C. Schweizer *et al.*, Nat. Phys. (2019); L. Barbiero *et al.*, Science Advances 5, eaav744 (2019)
[3] T. Kitagawa *et al.*, Phys. Rev. B 82, 235114 (2010)
[4] K. Wintersperger *et al.*, accepted in Nature Physics, arXiv:2002.09840

Student event: Meet the speaker

*We invite you to a **student-only** discussion-round with Prof. Dr. Monika Aidelsburger before her Munich Physics Colloquium talk.*
Be curious and feel free to ask any question.
Monday, 22 June 2020, 16:00 h,
more information: https://www.moodle.tum.de/course/view.php?id=57309