Topology and disorder in Floquet photonic lattices

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Abstract

Particles moving in a lattice subject to temporal modulations display dynamics that depart significantly from static lattices. One of the most spectacular effects is the existence of anomalous topological phases in two dimensions with topological edge states even when the Chern numbers of the bands are zero. In this talk, we will introduce anomalous topological phases in two dimensions and how they can be enriched when the time-evolution of the lattice is subject to a discrete step time evolution. In this case the number of edge states is not only given by the bulk invariants but also by invariants associated to the edges. The effect of noise in the Floquet period will also be discussed. Particularly, discrete-step Floquet lattices display subspaces immune to certain types of noise. These concepts will be illustrated with experimental results obtained in a two-fibre ring setup in which pulses of light follow the dynamics of particles in a two-dimensional lattice subject to discrete-step evolution.

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