

Abstract

DROUOT, Alexis (Columbia University)

“Topological edge states in continuous honeycomb lattices”

Asymptotically periodic 2D lattices sometimes exhibit robust dispersion-free waves, called edge states. Their origin is deeper than algebraic coincidences. It lies in the non-trivial topological properties of the asymptotic periodic structure. This is formalized in terms of an index-like principle: the bulk-edge correspondence.

We review recent results on continuous asymptotically periodic lattices with near-conical degeneracies (Dirac points) in their band spectrum. We will show that in the adiabatic limit, these models are effectively described by a Dirac equation. As an application, we compute (regardless of adiabatic assumptions) the signed number of edge states; and the Chern invariants of low-lying Bloch bundles. Partly joint with Charles Fefferman and Michael Weinstein.