Horia Cornean (Aalborg)

Tuesday May 30, 2023, 14:30

Bulk-edge correspondence for unbounded Dirac-Landau operators

University of Tübingen, Mathematics Department, C3N16 and via Zoom:
https://zoom.us/j/94274376976?pwd=YVBvU2tNMTBXSGxGYVg4eUoyV1ZiQT09
Meeting-ID: 942 7437 6976
Passcode: 929851

Abstract: We consider two-dimensional unbounded magnetic Dirac operators, either defined on the whole plane, or with infinite mass boundary conditions on a half-plane. Our main results use techniques from elliptic PDEs and integral operators, while their topological consequences are presented as corollaries of some more general identities involving magnetic derivatives of local traces of fast decaying functions of the bulk and edge operators. One of these corollaries leads to the so-called Streda formula: if the bulk operator has an isolated compact spectral island, then the integrated density of states of the corresponding bulk spectral projection varies linearly with the magnetic field as long as the gaps between the spectral island and the rest of the spectrum are not closed, and the slope of this variation is given by the Chern character of the projection. The same bulk Chern character is related to the number of edge states which appear in the gaps of the bulk operator. This is joint work with M. Moscolari and K. Sørensen.