

Title:

Detecting topological features in real space and real time

Abstract:

The observation of quantized topological features generally relies on the detection of edge states, and requires transport measurements. Topological phases have by now been engineered in platforms, such as quantum walks and ultracold atoms, which often don't have sharp edges, nor allow for straightforward transport measurements. Here we discuss how a simple physical observable, the Mean Chiral Displacement, permits to read out the topological invariant of chiral Hamiltonians through the direct observation of real space dynamics happening in the bulk of the material. As we will demonstrate, this method is very general, and works also for periodically-driven models like quantum walks and disordered systems