

Frank Schindler

Title: Non-Compact Atomic Insulators

Abstract: In my talk, I will discuss a novel type of band topology that lies between trivial and topological insulators. I will first introduce the conditions for Bloch bands to be spanned by symmetric and strictly compact Wannier states that have zero overlap with all lattice sites beyond a certain range. Similar to the characterization of topological insulators in terms of an algebraic (rather than exponential) localization of Wannier states, we found that there may be impediments to the compact localization even of topologically "trivial" obstructed atomic insulators. These insulators admit exponentially localized Wannier states centered at unoccupied orbitals of the crystalline lattice. I will explain a proof showing that the band complement of inversion-symmetric fragile topological bands cannot be compact, even if it is an atomic insulator. I will end my talk with results for higher symmetry groups, including a commuting projector Hamiltonian for fragile topology.