Mathematical Physics Seminar, Taylor Hughes, UIUC, BRNG 1222

Wednesday, Feb 28th 11:00 pm
Title: Defeating the Chiral Doubling Theorem: Three paths to new phenomena

Abstract: Over forty years ago, Nielsen and Ninomiya proved that chiral modes cannot exist in discrete systems without a matching anti-chiral partner. While this theorem was proved in the context of simulating the weak interactions of the standard model on a lattice, it is far more general and has implications across a broad spectrum of physics sub-fields. In this talk I will discuss three ways to violate the theorem by avoiding the assumptions. I will illustrate that each type of violation is responsible for a new class of topological phenomena. If time permits I will also discuss a new type of chirality that can appear in only non-relativistic systems in two spatial dimensions and its realization in topo-electric circuits.