

SPEAKER:

Christoph Marx, Oberlin College

TITLE:

Proving delocalization for quasi-periodic Schrödinger operators with trigonometric potentials

ABSTRACT:

In physics quasi-periodic Schrödinger operators capture how electrons in a crystal respond to external magnetic fields. An interesting phenomenon encountered for such operators are metal insulator transitions: depending on the material properties, presence of the external magnetic field may enhance (“localization”) or deplete the conductivity (“delocalization”) in the crystal.

In 2010-2012, A. Avila published a series of papers, now known as “Avila’s global theory,” which allows for a robust, dynamical framework to capture and analyze these metal-insulator transitions. In this talk, I will describe methods of how to apply Avila’s global theory to explore the spectral properties of various explicit models from physics. We will give a criterion implying subcritical behavior for quasi-periodic Schrödinger operators where the potential sampling function is given by a trigonometric polynomial. Subcritical behavior, in the sense of Avila’s global theory, is known to imply purely absolutely continuous spectrum for all irrational frequencies and all phases.