

CONDENSED MATTER SCIENCES SEMINAR

Professor Efthimios Kaxiras

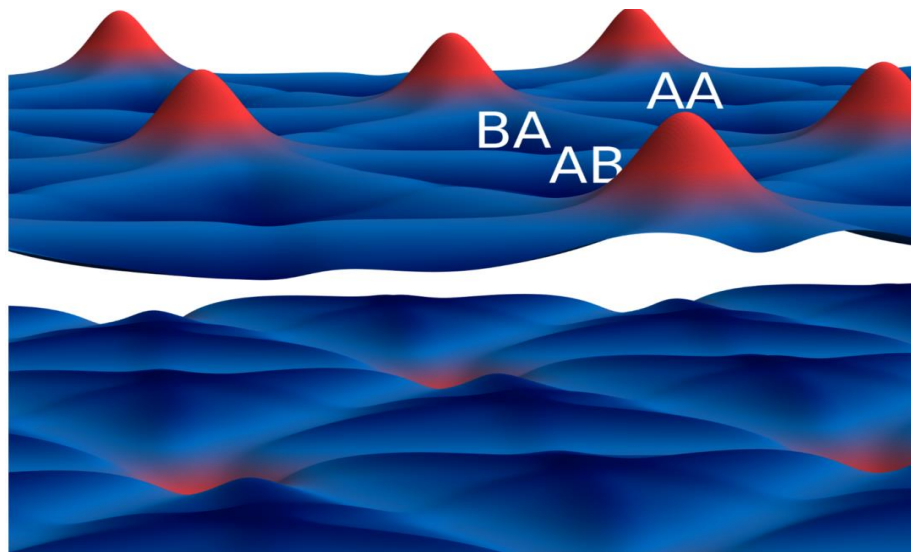
Harvard University

Hosted by: Dr Oskar Vafek

Twistronics: the unconventional behavior of electrons in two-dimensional solids

Friday, October 18th, 2024

1st Floor – B101, 15:00-16:00



In the past few years, the field of twisted multilayer graphene and other two-dimensional layered materials, including families of insulators and semiconductors, has blossomed to the point of being referred to by a new term, "twistronics". New structures, including twisted multi-layers of successively twisted single layers, mixed layers, and multilayers of multilayers, are being studied experimentally and revealing ever richer behavior. We discuss theoretical investigations of some representative systems, starting with the iconic twisted bilayer graphene near the so-called magic angle. Our work is based on first-principles tight-binding hamiltonians and includes full relaxation of atomistic degrees of freedom. We focus on the realistic representation of single-particle states and how those can be employed in studying many-body physics related to Mott insulator behavior, superconductivity and other manifestations of correlated electronic states.