

Transport Properties of Carbon Nanostructures from first-Principles

Nicola Bonini

Department of Materials Science and Engineering, Massachusetts Institute of Technology

Carbon forms a variety of stable structures, from precious diamond to inexpensive graphite. Surprisingly, it is the latter that excites scientists the most. The reason is that graphene, a single layer of graphite, and nanotubes, rolled-up graphene, are unique low-dimensional systems that show exceptional physical properties. For example, they have the highest thermal conductivities ever reported and they exhibit outstanding electron transport properties that make them very promising materials for future technological applications.

In this talk, I will review the main results of our first-principles calculations of the electronic and vibrational properties of these systems. In particular, I will discuss our results on the electron-phonon and phonon-phonon interactions, which are the key ingredients to understand the energy relaxation mechanisms in these systems and control their transport properties.

Host: Marco Fornari

Cookies and coffee @ 3:30pm in Dow 201.