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Fingerprints of the axion in the phonon properties of topological semimetals

Wednesday 15 June 2016 16:00 (15 minutes)

Weyl semimetals are three dimensional crystals that contain topologically protected Dirac fermions in the electronic band structure.
These materials display an array of unusual transport and optical properties, which can be traced to the emergence of an axion term in Maxwell's equations.
Predicted four decades ago in the context of high energy physics, the axion has remained experimentally elusive until its recent discovery in topological materials.
Following this discovery, the impact of the axion in the electronic properties has been extensively studied.
However, little is known about the interplay between the axion and the lattice vibrations.
In this talk, I will present a theory which describes the coupling between the axion and the polar optical phonons in Weyl semimetals.
I will thereafter show how this coupling modifies the dynamical properties of the lattice and the electron-phonon interactions.

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