

AVVISO DI SEMINARIO

Il giorno 12 Aprile 2016 alle ore 16.00 presso l'Aula B del Dipartimento, in via Archirafi 36, il Dr. **Hannes Hübener** del Nano-Bio Spectroscopic Group, dell'University of the Basque County di San Sebastian, terrà un seminario intitolato

Floquet-Weyl semimetal in laser-driven 3D Dirac materials

Abstract

Periodic driving of many-body systems offers a platform to design Floquet states of matter with tunable electronic properties on ultrafast time scales. In particular the recent discovery of Floquet-topological insulators opens an exciting avenue to study and manipulate topological non-equilibrium phases. Here, we show how femtosecond laser pulses can be used to switch between Weyl semimetal, Dirac semimetal and topological insulating states in a prototypical 3D Dirac material, Na_3Bi . I will discuss the concept of time-dependent bands and steering of Floquet-Weyl points, and demonstrate how lasers can enhance topological protection against lattice perturbations. This work has potential practical implications for the ultrafast switching of important materials properties, like optical band gaps or anomalous magnetoresistance. Moreover, we introduce Floquet time-dependent density functional theory (Floquet-TDDFT) as a first principles method for predictive Floquet engineering of topological states of matter.

Prof. E. Fiordilino