

Thursday, 4th February 2016

15:00

AER 19 Seminar Room 3.11

Theory of light-induced Floquet topological states

by

Michael Sentef

MPSD Hamburg

In this talk, I will discuss the theory of effective Floquet Hamiltonians and band structures in the context of periodically laser-driven solids. I will give a brief introduction to Floquet states and their connection to time-resolved photoemission spectroscopy measured during an optical laser pump in a pump-probe setup. I will also briefly introduce topological states of matter and related concepts of Berry phases, Berry curvatures, pseudospin and the topological classification of band structures.

As an example, I will discuss our recent work on ultrafast Floquet band formation and local pseudospin textures induced by laser modulation of Berry curvatures in a model calculation for graphene [1]. Furthermore, I will outline possible future developments in theory as well as experiments, highlighting the intriguing possibility of tailoring band structures and their topology using specifically tailored laser pulses.

[1] M. A. Sentef et al., Nature Communications 6, 7047 (2015)