ISTA

Seminar/Talk

Opto-electronics in topological materials

Justin Song
Caltech

Host: Maksym Serbyn

The winding of Bloch wavefucntions in topological materials can produce a wealth of new phenomena. For example, carriers in gapped two-dimensional Dirac materials possess Berry curvature that enable Hall currents in the absence of an applied magnetic field. Another striking example are three-dimensional topological semimetals where the winding of Bloch wavefunctions produces topological surface states that exhibit an unusual open surface Fermi arcs.I will discuss new types of carrier dynamics that can emerge in Dirac/Weyl materials that reveal a new kind of opto-electronics. One salient example is how photoresponse in GDMs with narrow bandgaps is enhanced by Berry curvature. In these materials, that include G/hBN, or dual-gated Bilayer graphene, even a small number of photoexcited carriers can carry large anomalous Hall currents - orders of magnitude larger than those previously observed in TMDs - enabling a new "Berry transport" regime to be accessed. Another example is the unusual optical response of Fermi arc surface states. Hosted on particular surface terminations of topological semimetals, I will discuss how Fermi arcs in Dirac and Weyl semimetals possess distinctly anisotropic optical responses that are locked to the direction of the crystal axes. These responses range from an unconventional and large linear dichroic behavior in the Fermi arcs of Dirac semimetals to a hyperbolic dispersions for the collective modes in Weyl semimetal surfaces, and underscore the essential role that Fermi arc surface states play in the opto-electronics of topological semimetals.1 Justin, Song, Institute of High Performance Computing, A*STAR, Singapore, and2 Justin, Song, Division of Physics and Applied Physics, Nanyang Technological University, Singapore

Monday, November 27, 2017 11:30am - 12:30pm

Big Seminar room Ground floor / Office Bldg West (I21.EG.101)

This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.
Please find a schedule of the ISTA Shuttle on our webpage:
https://ista.ac.at/en/campus/how-to-get-here/ The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.