

NEXT LITE-SEMINAR

Optics and plasmonics of Dirac and Weyl fermions

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Date and Time: **Tuesday, May 30th 2017, 16:00 ct**

Location: **TU Wien, Photonics Institute**
Gußhausstraße 27-29, 1040 Vienna,
Seminar room CBEG02, ground floor.

Host: K. Unterrainer

Abstract

Relativistic Dirac and Weyl fermions were extensively studied in quantum field theory. Recently they emerged in the nonrelativistic condensed-matter setting as gapless quasiparticle states in some types of crystals. Notable examples of 2D systems include graphene and surface states in topological insulators such as Bi_2Se_3 . Their 3D reincarnation is Dirac and Weyl semimetals that were recently discovered experimentally. Most of the research has been focused on their topological properties and electron transport. However, their optical and plasmonic properties are no less exciting. Optical phenomena can provide valuable insight into the fascinating physics of these materials. Moreover, their unique optical properties can be utilized in future optoelectronic devices. I will discuss several examples illustrating these points. They include plasmons and polaritons in Weyl semimetals, nonlinear optical response of graphene and topological insulators in the infrared and THz range, nonlinear generation of THz plasmons, and optical properties of chiral Dirac/Weyl fermions in a quantizing magnetic field.