

Joint CQSE and CASTS Seminar

Weekly Seminar
May 13, 2016 (Friday)

TIME May 13, 2016, 14:30 ~ 15:30
TITLE Nonlocality in graphene and Weyl Semi-Metal
SPEAKER Prof. Hsien-Chung Kao
Department of Physics, National Taiwan Normal University
PLACE Rm716, CCMS & New Physics Building, NTU

Abstract

Due to the combination of the unscreened long-range interactions and the linear dispersion relation in graphene and Weyl semi-metal, their longitudinal conductivity σ_L and transverse conductivity σ_T are different in the long wave length limit. Consequently the standard local Ohm's law description does not apply in these materials. This leads to several remarkable effects in transport and optical response. We predict a charging effect in DC transport that is a direct signature of the nonlocality. In graphene, the polarization of reflected and transmitted light is modified, without either the magnetic field or anisotropy. In Weyl semi-metal, p-polarized light generates bulk plasmons as well as the transversal waves. At a specific frequency the two modes coincide, a phenomenon impossible in a local medium. Remarkably, for any frequency there is an incident angle where total absorption occurs, turning the WSM opaque.

