

Joint CQSE and CASTS Seminar

Weekly Seminar
Dec. 1, 2017 (Friday)

TIME Dec. 1, 2017, 14:30 ~ 15:30
TITLE Electron Optics in Ballistic Graphene
SPEAKER Prof. Ming-Hao Liu
Department of Physics, National Cheng Kung University
PLACE Rm716, CCMS & New Physics Building, NTU

Abstract

Electrons in clean graphene are known to behave like “charged photons”, exhibiting both electronic and optical properties, due to its celebrated energy dispersion linear in momentum, providing an ideal platform for exploring electron optics. Despite its discovery in 2004, ballistic graphene devices with micron-scale mean free paths became accessible only recently. Reliable quantum transport simulations in the ballistic limit for understanding and predicting high-quality transport experiments have therefore become increasingly demanded nowadays. The major part of this talk is devoted to an overview of my recent progress on simulating a variety of ballistic graphene transport experiments, including Fabry-Perot interference in single- and bilayer graphene, conductance oscillation due to snake states, and guiding of electrons in a few-mode ballistic graphene channel. Keys to these simulations will be briefly introduced. In the last part of the talk, my recent proposal for creating and manipulating electron beams in graphene will be illustrated. The proposed lens composed of a parabolic pn junction and a point-like source shows unprecedented control over the electron propagation in ballistic graphene, and will possibly bring the field of electron optics one step forward.

