Weekly Seminar

Optical nano-imaging of gate-tuneable graphene plasmons

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Time: 4:00pm, Jan. 8, 2014 (Wednesday)
时间：2014年1月8日（周三）下午4:00
Venue: Room 607, Science Building 5
地点：理科五号楼607会议室

Abstract

Graphene holds great promise for ultra-compact and electronically controlled plasmonics. Recently, resonant coupling of propagating THz waves to plasmons in micro-ribbons has been demonstrated, while IR near-field microscopy has been applied to observe the coupling of graphene plasmons to phonons. In our work we use scattering-type scanning near-field optical microscopy (s-SNOM) to visualize propagating and localized infrared plasmon modes in graphene nanostructures in real space. By spectroscopic imaging we measure the graphene plasmon wavelength λp as a function of excitation wavelength, which confirms the theoretically predicted plasmon dispersion. We observe that the plasmon wavelength λp=λ0/40 is remarkably reduced compared to the illumination wavelength λ0, which can directly be attributed to the two-dimensionality and unique conductance properties of graphene. Furthermore, we demonstrate tunability of the plasmon wavelength by gating graphene nanoribbons on a SiO2 substrate. The possibility to tune plasmons of extreme subwavelength electronically opens up a new paradigm in optical and opto-electronic telecommunications and information processing.

About the Speaker

Jianing Chen obtained his Ph.D of Physics from Dalian University of Technology and Institute of Physics of CAS in Beijing in 2008. Afterwards in 2009 he worked as postdoc in the Department of Solid State Physics, Lund University, Sweden. Consecutively in 2010 he moved to Spain, where he was awarded junior researcher fellowship from the Spanish Council for Science and Renovation (CSIC), and joined the Center for Material Science and CIC Nanogune for the work on the near-field optics. He returned to Institute of Physics of CAS in 2013. Currently he is holding professorship in the laboratory of Optical Physics. His research covers optical properties of optical antennas, IR antennas, graphene plasmonics and near-field spectroscopy.