THE UNIVERSITY OF HONG KONG JOINT COLLOQUIUM OF DEPARTMENT OF PHYSICS & DEPARTMENT OF CHEMISTRY

Carbon Nanoscience and Electronic Structure

Prof. Louis Brus

Columbia University

Time: Friday, July 26, 2013, 4:00 p.m. Venue: Lecture Theatre P2, Chong Yuet Ming Physics Building, The University of Hong Kong

Abstract:

We explore the fundamental nature and dynamics of electrons in graphitic carbon materials. In semiconducting carbon nanotubes, near-infrared two photon luminescence excitation spectra quantitatively reveal very-strongly-bound exciton excited states. Electron-electron interactions are compared among CdSe nanocrystals, graphene, and carbon nanotubes. The independent contributions of screening and dimensionality are analyzed. Electronic and vibrational degrees of freedom are significantly coupled in graphene. The metallic versus molecular nature of single sheet graphene is strongly affected by charge transfer doping by adsorbed molecular species. Asymmetric doping in bilayer graphene can open a band gap, as revealed by the Raman spectra. Optical absorption bleaching and Raman Fano lineshapes are observed in few layer graphenes very highly doped by adsorbed alkalis.

About the Speaker:

Prof. Brus is the S. L. Mitchell Professor of Chemistry at Columbia University. He is the discoverer of the colloidal semi-conductor nanocrystals known as quantum dots.

Prof. Brus received the Franklin Institute's 2012 Bower Award and Prize for Achievement in Science, and was chosen for the 2010 NAS Award in Chemical Sciences. He received the inaugural Kavli Prize for nanoscience in 2008, and was co-recipient of the 2006 R. W. Wood prize of the Optical Society of America. He received the Distinguished Alumni Award from the Association of Rice University Alumni in 2010, and was elected to the United States National Academy of Sciences in 2004. He is also a member of the Norwegian Academy of Science and Letters.



Physics colloquium series is organized to introduce cutting edge researches and new development in physics, designed to be *suitable to graduate and undergraduate students, and also to scientists working on different fields*. Each colloquium will generally start with an extensive introduction of the background of the field, followed by forefront research topics and results. The colloquium will serve as an education forum for students and laymen alike, and also serve as a platform for exchange and update their knowledge of various branches of physics among academic staff members.

Coffee and tea will be served 20 minutes prior to the colloquium **Anyone interested is welcome to attend** Physics Department, HKU Phone: 28592360 Fax: 25599152.