GCOE プログラム「機械システム・イノベーション国際拠点」公開セミナー

GCOE プログラム「機械システム・イノベーション国際拠点」平成 20 年度公開セミナーを開催いたします。南カリフォルニア大学の Stephen Cronin 先生はラマン分光を用いたカーボンナノチューブの電子／熱移動の実験的な研究を精力的に進めている新進の研究者です。今回、来日の機会に機械系 GCEO でのセミナーをいただけることとなりました。ふるってご参加いただきますよう宜しくお願い申し上げます。

Professor Stephen B. Cronin

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題目：One-Dimensional Electron and Thermal Transport in Suspended Carbon Nanotubes

日時：2008 年 12 月 26 日（金）12:30 ～ 14:00
場所：東京都文京区本郷 7-3-1 東京大学工学部 2 号館 3 階機械系教員会議室(2-31A)
地図：http://www.u-tokyo.ac.jp/campusmap/cam01_04_03_j.html

概要：Individual suspended carbon nanotubes provide an ideal system for studying low-dimensional phenomena, including Kohn anomalies, exceptionally strong electron-phonon coupling, ballistic electron transport, and strongly correlated electrons. In this presentation, the ballistic electron transport in nearly defect-free, suspended carbon nanotubes is investigated using micro-Raman spectroscopy. I will report strikingly large variations in the Raman intensity of pristine metallic SWNTs in response to gate voltages. Under high applied bias voltages, we observe mode selective electron-phonon coupling, negative differential conductance (NDC), and non-equilibrium phonon populations. These phenomena are caused by the exceptionally strong electron-phonon coupling in nanotubes, which arises from Kohn anomalies. I will also report on the breakdown of the Born-Oppenheimer approximation, as deduced from the gate voltage induced changes in the vibrational energies of suspended carbon nanotubes. Spatially-resolved temperature measurements of carbon nanotubes under high applied bias voltages reveal a thermal conduction mechanism that is quite different from bulk materials. This mechanism enables these nanotube devices to operate at extremely high power densities.

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