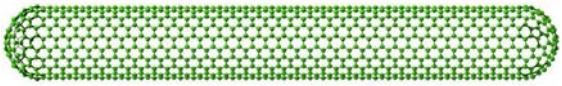
GCOE プログラム「機械システム・イノベーション国際拠点」
公開セミナー

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どうぞ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 anomolies. 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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