CENTER FOR NANOSCALE SCIENCE AND TECHNOLOGY

University of Illinois at Urbana-Champaign

Electronics and Mechanics with Carbon Nanotubes

Carbon nanotubes - nanometer diameter cylinders made from rolling up single graphene sheets - offer an unprecedented opportunity to explore the physics of electrons in one dimension. The electrons in the nanotube occupy one-dimensional subbands that result from the quantization of the electron motion around the circumference of the tube. The mathematics of this is reminiscent of early versions of string theory. The tubes can be metals or semiconductors, depending on the detailed structure of the tube. The mean free path for electron scattering in metallic tubes can be extremely long, and semiconducting tubes can be fashioned into field-effect transistors with significantly better intrinsic properties than Si MOSFETs. This talk will review measurements by our group of the electronic and electromechanical properties of nanotubes. We will address both the basic properties of electrons confined to these tiny cylinders and also discuss a few potential applications.

Paul L. McEuen

Professor of Physics

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Paul L. McEuen received his B.S. degree in Engineering Physics from the University of Oklahoma in 1985 and his Ph.D. in Applied Physics from Yale University in 1991. He joined the faculty at UC-Berkeley in 1992, where he was an Assistant and later Associate Professor of Physics and a researcher at LBNL. He joined the Cornell faculty in 2001 as a Professor of Physics. His research focuses on the science and technology of nanostructures, including nanotubes, quantum dots, and single molecules. He also develops advanced measurement techniques to probe nanometer-scale systems. Awards and honors include an Alfred P. Sloan Foundation Fellowship, a Packard Foundation Fellowship, a National Young Investigator Fellowship, an LBNL Outstanding Performance Award, and the Agilent Europhysics Prize in 2002 for pioneering studies of carbon nanotubes. He is a Fellow of the American Physical Society.

Wednesday, April 21, 2004
4:00 p.m.
B02 Coordinated Science Lab
Reception immediately following in the lobby of CSL

All seminars are free and open to the public. Times, dates, locations, and titles of events are subject to change. For additional information, please call (217)333-3097, email nano@cnst.uiuc.edu

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