Physics Seminar on Wednesday
Michigan Technological University

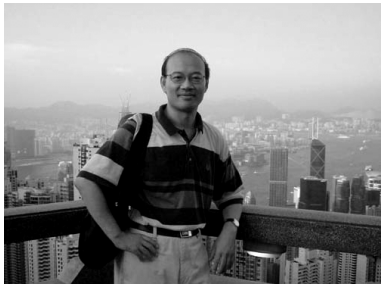
October 4 (Wednesday) 2006, 3 to 4 pm
Room 126, Fisher Hall

Attempts in CNT Engineering: Nanocone, Nanobell, and Beyond

Professor Enge Wang
Director, Institute of Physics, Chinese Academy of Sciences, Beijing, China

Nanoscale carbon-based materials exhibit a wealth of interesting structural, electronic, and optical property behaviors. Chemical vapor deposition technology allows almost unlimited freedom to produce functional nano-materials with controllable compositions and structures approaching the nanometer scale among light elements. Tubular graphite nanocones with nanometer-sized tips and micrometer-sized roots, have been synthesized. These nanocones have hollow interiors and identical chiralities of a zigzag type across the entire diameter. Aligned polymerized carbon nitride (CN) nanobells have been grown on a large scale. Separation of single CN nanobells and fabrication of heterojunctions between CN nanobells and pure carbon nanotubes are achieved. Electronic effect and related tunneling mechanism of polymerized CN nanobells are studied by scanning tunneling spectroscopy. Ab-initio local density functional calculations for the electronic structure of CN nanobells have been performed by using a real space approach and the LCAO formalism. It is found that nitrogen atoms, which are attracted to the open-edge sites of the bells, may play as stoppers during the nanobell growth. Also discuss cactus-like boron carbonitride (BCN) nanofibers, which present strong blue-violet photoluminescence at room temperature. Finally, in situ study of the property of a single nanoobject inside TEM will be presented.

Biography



Dr. Wang received his PhD of physics from Peking University in 1990. He spent one year in Laboratoire d'Etude des Surface at Interfaces (CNRS, France) and four years in University of Houston (USA) as a postdoc and research staff. In 1995, he joined the Institute of Physics (CAS) as a professor and later on became the director. From 1995 to 2003, he was a visiting professor in Univ. of Oxford (UK), Univ. of Texas (USA), Univ. of Michigan (USA), Univ. of Muenster (Germany), Technical Univ. of Denmark (Denmark), Oak Ridge National Lab. (USA), Univ. of Genova (Italy), Harvard Univ.etc.. He was a JSPS Professor in the Institute for Materials Research, Tohoku University (Japan) (2001-2002). He is an Adjunct Advisor, International Center for Young Scientists (ICYS), National Institute for Materials Sciences (NIMS), Tsukuba, Japan, since 2004 and a honor professor of Hong Kong Univ., since 2000. Wang has co-authored 185 papers in peer-reviewed journals (3 in Science, 15 in PRL, 30 in APL, and 7 Invited review articles) and 6 patents, and delivered more than 30 invited talks in international conference.