Physics
AT QUEENS COLLEGE

Colloquium Notice

Michael Zamkov

University of Illinois at Urbana-Champaign

Ultrafast electron dynamics on a nanoscale unveiled by optical and photoelectron spectroscopies

FORMATION OF TUBULAR ELECTRONIC STATES AROUND CARBON NANOTUBES.
Using two-color photoelectron emission we can populate and subsequently observe the special group of electronic states with wave functions enclosing a carbon nanotube. These cylindrical "electronic rings" constitute a new class of "image" states due to their quantized angular motion. The electron rotation about the axis of the nanotube gives rise to a centrifugal force that virtually detaches the electron charge-cloud from the tube's body. By experiencing the lattice structure parallel to the tube's axis these rings can act as powerful scanning probes of nanotube electronic properties.
PHOTOCHEMISTRY OF NANOENERGETIC MATERIALS.
Mixing of reactants on the nanometer length scale represents a new frontier for energetic materials, providing an increased performance in terms of energy release, stability, sensitivity and mechanical properties. Our group is exploring new ways for optimizing these nanoenergetic materials, by using novel fabrication and optical characterization approaches. Specifically, we incorporate metal nanoparticles coated with an inert oxide layer into thin films of a polymer. This mixture exhibits high potential for an efficient conversion of photoenergy into heat or mechanical energy. The dynamics of chemical changes in investigated systems is monitored in real time through time-resolved vibrational spectroscopy.

Monday
March 12, 2007
Starts at 12:15 PM
Physics Conference Room, SB B326