

January 22, 2008

11:00 a.m.

SNS-Iran Thomas Auditorium

STM Atom/Molecule Manipulation: Realizing Single Molecule Switches and Devices

Saw Hla

Ohio University

Abstract:

Scanning tunneling microscope (STM) manipulation of single atoms and molecules on surfaces allow construction of novel quantum structures on an atom-by-atom basis and demonstration of single molecule devices on a one molecule at-a-time basis. STM is not only an instrument used to 'see' individual atoms by means of imaging, but also a tool used to 'touch' and 'take' atoms/molecules or to 'hear' their vibration by manipulations. Therefore, STM can be considered as the 'eyes', 'hands' and 'ears' of the scientists connecting our macroscopic world to the exciting atomic and nanoscopic world.

In our research projects, we combine STM manipulation schemes with a variety of tunneling spectroscopy measurements to investigate properties specific to the type of atoms/molecules. These innovative experiments are tailored to address several critical issues covering both fundamental understanding, and demonstration of novel atom/molecule based nano-devices. In this talk, our recent results of single atom/molecule manipulations using low-temperature STMs will be presented. The presentation will include measurement of lateral force to move an atom, atom manipulation on 3-D nanoclusters, manipulation of nanoscale bio-molecules to realize a multi-step single molecule switch, manipulation of molecular Kondo effect, and an atom-molecule hybrid device.

Host: Luis Dias, 574-1298, diasdasilval@ornl.gov