



THE CHINESE UNIVERSITY OF HONG KONG

Department of Physics

COLLOQUIUM

Quantum Controlling at the Molecular Scale

by

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Date: February 3, 2009 (Tuesday)

Time: 11:30 - 12:30 a.m.

Place: LT1, Lady Shaw Building, CUHK

(Light refreshments will be served 20 minutes prior to the colloquium.)

ALL INTERESTED ARE WELCOME

Abstract

In electronics and functional material applications, it is very desirable to precisely control the quantum state of a single molecule on surface. Scanning tunneling microscopy (STM), combined with first-principles simulation, provides a powerful technique for this purpose. We try to manipulate the electronic structures of molecules and nanoparticles by controlling of size, doping, ordering and bond chemistry. By introducing single molecules or nanoparticles into the tunnel junctions in which the tip of scanning tunneling microscope (STM) and supporting surface are two electrodes, quantum transport properties were studied and their electronic structures were determined from the results of STM combined with the theoretical modeling. Novel effects associated with the discrete energy levels and the charging energy of ultra small tunneling junction, like negative differential resistance(NDR), rectifying and Kondo effects in single molecules, co-tunneling between nanoparticles and coupling in single electron tunneling and discrete energy level effect are reported.

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