

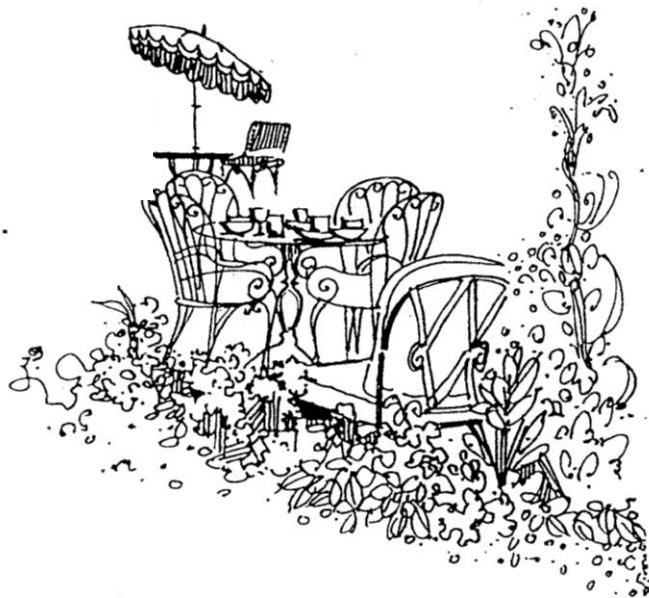
Chez Pierre

Presents ...

Monday, May 2, 2011

12:00pm

MIT Room 4-331



David Cobden

University of Washington - Seattle

"Adsorption on Individual Carbon Nanotubes"

The interactions of atoms and molecules with graphitic carbon underlie many technologies. Single-walled carbon nanotubes afford the ability to study them with unprecedented control and sensitivity. The amount of matter adsorbed on an individual nanotube nanobalance can be measured with single-atom precision by monitoring changes in its vibrational resonances, while transport measurements can simultaneously determine how the adsorbates influence the electrical properties via for instance carrier scattering, charge transfer to the carbon, and changing band gap. For simplicity we work initially with noble gases. We find that cylindrical Kr, Ar and He monolayers exhibit phase transitions similar to those seen on two-dimensional graphite. The sharp density changes during these transitions can have a dramatic effect on the nanotube conductance, especially when it is undoped. A number of quasi-one-dimensional phenomena should be accessible in the system of a monolayer on a nanotube.