

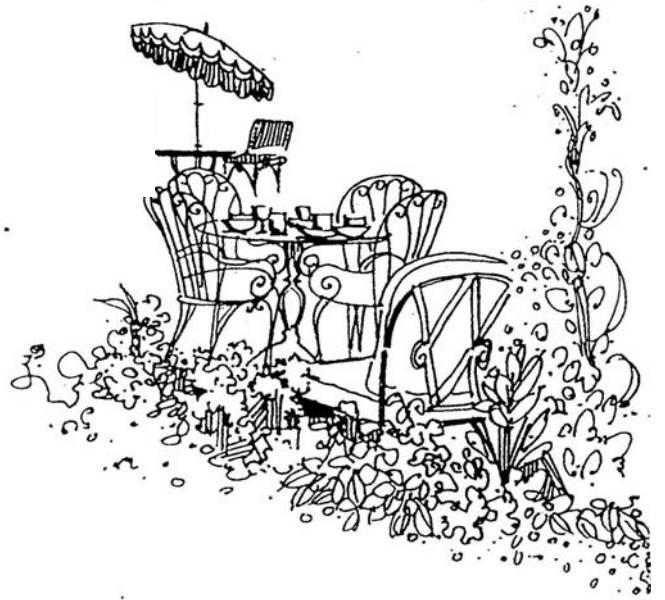
Chez Pierre

Presents ...

Monday, May 11, 2009

12:00pm

MIT Room 4-331



Michael Crommie

University of California at Berkeley

“Imaging Dirac Fermions in a Two-dimensional Sheet of Carbon”

Graphene, a single atomic layer of carbon, has generated much excitement due to its novel electronic, optical, and mechanical properties. Part of this excitement arises from the fact that electrons in graphene behave like massless relativistic particles (Dirac fermions). Novel scattering phenomena have been predicted to arise from the interplay between these Dirac fermions and various graphene imperfections and excitations. We have used scanning tunneling microscopy techniques to explore this behavior in back-gated graphene flake devices, a configuration that yields ultra-high spatial resolution of density-dependent graphene electronic behavior. These measurements provide new insight into the microscopic mechanisms that determine graphene properties. For example, we find that the graphene tunnel spectrum exhibits pronounced features that arise due to various collective excitations. Our measurements also reveal unexpected electronic interference patterns caused by electrons scattering off of static charge density inhomogeneities in graphene. Our highly spatially resolved measurements have allowed us to determine the microscopic origin of such charge "puddles".