

## O 36: Invited talk (Joseph A. Stroscio)

Time: Wednesday 9:30–10:15

Location: HE 101

**Invited Talk**

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**Exploring the Physics of Graphene with Local Probes —****•JOSEPH A. STROSCIO —** Center for Nanoscale Science and Technology, NIST Gaithersburg, MD 20899

The recent ability to isolate and study the single atomic sheet of graphene has created a great deal of excitement in the scientific community. Graphene is composed entirely of exposed surface atoms, which offers a unique opportunity to examine a 2-dimensional electron system with local probe measurements. In this talk I will describe our studies using scanning tunneling spectroscopy (STS) to examine interactions and disorder in various graphenes produced by different methods with varying degrees of disorder. Electron interactions are observed in tunneling spectroscopy measurements in high mobil-

ity graphene produced by thermal decomposition of SiC [1]. In these graphene samples Landau level (LL) degeneracies are lifted with energy scales that vary as function of magnetic field and filling factor. Additionally, enhanced energy splittings are measured when LL sublevels are emptied or filled as they cross the Fermi level. Using a back-gated exfoliated graphene device on SiO<sub>2</sub> we observe a Landau level spectrum and charging resonances [2,3] that are completely different from the above STS measurements on weak disorder graphene systems. Applying a gating potential allows us to obtain \*STS gate maps\*, which allow a detailed examination of the transitions from compressible to incompressible electron systems.

[1] Y. Jae Song et al., Nature 467, 185 (2010). [2] S. Jung et al., Nature Physics 7, 245 (2011). [3] G. M. Rutter et al., Nature Physics 7, 649 (2011).