SFB 608

Einladung zum Kolloquium

Ort: Universität zu Köln
II. Physikalisches Institut
Seminarraum 201

Zeit: Freitag, 10. Juli 2009, 13:00 Uhr s.t.

Sprecher: **Prof. Dimitri Basov**
University of California, San Diego

Thema: Infrared spectroscopy of correlated electron matter at the nano-scale

One common attribute of several classes of correlated electron systems is that the onset of conducting state in these systems typically occurs in the regime of nano-scale phase separation of chemical, and/or electronic/magnetic origin. These intrinsic non-uniformities have been systematically documented using scanning probe and scattering techniques. However, the dynamical properties of multiple electronic phases coexisting in macroscopic heterogeneous samples remain unexplored because methods appropriate to study dynamics (transport, infrared/optical and many other spectroscopies) lack needed spatial resolution. To circumvent this fundamental limitation, we applied a new technique: scanning near field infrared microscopy to investigate the transition from a correlated insulator to a correlated metal driven by temperature in vanadium dioxide (VO2) at length scales down to 10 nano-meter. In combination with more conventional far field infrared ellipsometry these studies uncover spectroscopic signatures of the Mott transition including divergent effective mass and electronic pseudogap. These findings may help to settle decades long debate on the respective roles played by the lattice and by the electron-electron correlations in the insulator-to-metal transition of VO2. /Science 318, 1750 (2007)/.

gez. Grüninger