QPhysics
AT QUEENS COLLEGE

Colloquium Notice

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Mott transition in VO_2 observed by infrared spectroscopy and nano-imaging

Materials with significant electronic correlations tend to display remarkable and unconventional properties like insulator-to-metal transitions, high temperature superconductivity and colossal magneto-resistance. Many of these exotic properties have defied understanding most likely because the complex interactions in these materials lead to phase segregation on the nano-scale. For example, the driving mechanism for the temperature-induced insulator-to-metal transition (IMT) in vanadium dioxide (VO_2) has been debated for several decades. Central to this debate is the relative importance of electron-electron correlations and charge-ordering to the IMT. I report near-field infrared images of VO_2 films that directly show coexisting phases in the vicinity of the percolative IMT. In combination with far-field infrared spectroscopy, the new data reveal the Mott transition with divergent optical mass in the metallic puddles that emerge at the onset of the IMT. These results illuminate a new path towards spectroscopic exploration of electronic inhomogeneities in correlated electron systems.

Wednesday
February 6, 2008
Starts at 12:15 PM
Coffee at 12:00 PM
Physics Conference Room, SB B326