

SFB 608

Einladung zum Kolloquium

Ort: Universität zu Köln
II. Physikalisches Institut
Seminarraum 201

Zeit: Freitag, 18.01.2008
14:00 Uhr

Sprecher: Dr. Steffen Wirth
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Stoffe, Dresden

Thema: Tunneling Spectroscopy on
Manganites

In a number of strongly correlated electron systems, competing long-range interactions may result in the formation of nanometer-sized regions of different phases. Intense research is going on to understand, or even tailor, the resulting remarkable and complex properties. We investigated the phase separation between insulating paramagnetic and conducting ferromagnetic regions in mixed valence manganites of perovskite type by Scanning Tunneling Spectroscopy (STM). Our work concentrated on orthorhombic $\text{Pr}_{0.68}\text{Pb}_{0.32}\text{MnO}_3$ single crystals which exhibit a metal-insulator transition at $T_{MI} \sim 255$ K and a ferromagnetic transition with a Curie temperature (T_C) at about 210 K. Topographic STM images in the insulating state showed regular stripe-like patterns on a scale of 0.4 – 0.5 nm possibly related to a high temperature polaronic state. Spectroscopic studies revealed inhomogeneities of the zero-bias conductance G_0 on a length scale of 2 – 3 nm only within a narrow temperature range close to T_{MI} . These results present direct evidence for phase separation on the nanometer scale in the paramagnetic metallic state, and for a homogeneous ferromagnetic state. An intriguing finding is a significant broadening of the zero-bias conductance in the phase separated regime.

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