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TECHNISCHE UNIVERSITÄT WIEN
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Einladung zum Seminar

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" Modification of magnetic and transport properties of thin magnetic layers at interfaces with nonmagnetic materials "

The ferromagnetic metallic oxide La0.67Sr0.33MnO3 (LSMO) is a system with very complex and rich physics, whose electronic and magnetic properties may be altered by applying various perturbations such as electric and magnetic fields, strain, light, etc. In addition, when LSMO is embedded in heterostructures with other materials, new issues of physics, chemistry, and material science arise from the interfacial interaction. The presence of an interface represents, by itself, a significant perturbation of the electronic properties of perovskite manganites. For instance, the strain strongly affects the bandwidth of thin LSMO layers depressing their metallic properties and giving rise to the phase separation and so-called dead-layer at the interfaces between LSMO films and substrates.

In this work transport and magnetic properties of ultrathin LSMO films capped with gold has been investigated. We found a huge increase of the resistivity of the manganite (by four orders of magnitude, for a nominal thickness of 2 nm of Au) which is accompanied to a strong decrease of the Curie temperature. We observed that for low Au nominal thicknesses, Au nanoparticles are formed, producing a deterioration of the manganite properties below them and thus increasing the film phase separation. NMR data support this scenario showing a strong attenuation of the double exchange signal upon formation of Au nanoparticles. A combined HRTEM and EELS analysis shows that interfaces are atomically sharp and strain effects are negligible. We suggest that the high chemical reactivity of Au nanoparticles can account for a partial deoxygenation of LSMO below the Au nanoparticles, thus providing the driving force for the increase of phase separation in the film and suppression of ferromagnetism and conductivity.

Host: S. Bühler-Paschen

Freitag, 25. September 2009, 11:00 Uhr
Seminarraum 138B, 7. OG, Turm C (rot)
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