

Integriertes Seminar

Aktuelle Probleme dimensionsreduzierter Festkörper

Ort: Seminarraum 718 (Wilhelm-Klemm-Straße 10)

Zeit: **Mittwoch, 24.04.2019, 10 Uhr c.t.**

Magnetic order in neodymium metal – a new type of spin glass?

Daniel Wegner

Institute for Molecules and Materials, Radboud Universiteit, Nijmegen, NL

Lanthanide metals can exhibit complex magnetic structures, e.g. helical/conical spin spirals or linear spin waves. Neodymium (Nd) shows the most complicated behavior exhibiting several magnetic phase transitions below its Néel temperature $T_N = 19.9$ K, resulting in multi- q order according to interpretations based on magnetic neutron diffraction experiments [1]. However, as these techniques lack spatial resolution, the variations in magnetic properties of Nd at the atomic length scale are unexplored. The local electronic structure of Nd(0001) surfaces has been studied only using spin-integrated STS [2,3].

I will present our most recent results of low-temperature (30 mK – 4 K) spin-polarized STM measurements of bulk-like Nd(0001) films grown on a W(110) substrate. We observe multi- q magnetic behavior on the surface, as evidenced by strong short-range order, but without the existence of long-range order. Magnetic field and temperature-dependent measurements reveal high sensitivity of the spectral weight of q -states to applied fields, without any clear unique ground state, as well as evidence of so-called aging behavior in the magnetic state, which is a hallmark of spin-glass behavior. I will discuss our findings in the context of a new type of unconventional spin glass.

[1] R. M. Moon & R. M. Nicklow, J. Magn. Mater. 100, 139 (1991).

[2] D. Wegner et al., Phys. Rev. B 73, 165415 (2006).

[3] D. Wegner et al., Jpn. J. Appl. Phys. 45, 1941 (2006).

Einladender: Markus Donath