MA 11: Spin-dependent Transport Phenomena II

Time: Monday 17:15–17:45 Location: H 1012

MA 11.1 Mon 17:15 H 1012

Electronic and magnetic phase separation in semimetallic ferromagnet EuB_6 — •Pintu Das[1], Adham Amyan[1], Jens Brandenburg[1], Peng Xiong[2], Stefan von Molnár[2], Zachary Fisk[3], and Jens Müller[1] — [1]Institute of Physics, Max von Laue Str. 1, J. W. Goethe University, 60438 Frankfurt (M), Germany — [2]Department of Physics, Florida State University, Tallahassee, USA — [3]Department of Physics, University of California, Irvine, USA

EuB_6 is a semimetallic correlated electron system, which undergoes an interesting paramagnetic to ferromagnetic transition displaying two consecutive features (at $\sim$15.5 K and $\sim$12.5 K) in electrical transport, magnetic properties and specific heat. Although widely studied, this complex nature of the magnetic ordering and its interplay with the colossal magnetoresistance effect is far from being understood and is currently being actively investigated [1]. In this work, we have carried out fluctuation spectroscopy and non-linear electrical transport measurements in order to investigate the dynamical behaviour of charge carriers in the vicinity of the phase transitions and to understand the microscopic nature of the carrier transport properties. Our results indicate that a magnetically driven percolation occurs at the lower transition temperature which is consistent with the scenario in which the magnetic phase transition involves the formation of magnetic polarons.

[1] X. Zhang et al., Phys. Rev. Lett. **103**, 106602 (2009).

MA 11.2 Mon 17:30 H 1012

Spin-orbit scattering in molecular transport — •Pengxiang Xu, Daniel Wortmann, and Stefan Blügel — Peter Grünberg Institut & Institute for Advanced Simulation, Forschungszentrum Jülich and JARA, 52425 Jülich, Germany

Spin-orbit interaction generally does not play an important role in molecular junctions since many molecules considered for molecular transport devices typically contain only light elements. Therefore, the use of heavier elements in molecules proposed for magnetic transport setups can lead to interesting behavior in spin-polarized transport due to the coupling of the spins to the electric polarization of the molecule.

Applying ab-initio density functional theory in the framework of the linearized-augmented plane-wave method [1] and the Green function formalism for transport [2], we study some model systems with different magnetization states (collinear/non-collinear) and molecular dipole moment. We report on our investigations of transport through molecules with ferromagnetic transition-metal centers and demonstrate that angular magnetoresistance (AMR) can be found in the transmission properties of the molecule under the influence of the spin-orbit coupling.

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[1]http://www.flapw.de

[2]D. Wortmann, H. Ishida, S. Blügel. PRB **66**, 075113 (2002)