O 1: Invited talk (Alexander Ako Khajetoorians)

Time: Monday 9:30–10:15 Location: HE 101

Invited Talk O 1.1 Mon 9:30 HE 101

Spin LEGOs - Bottom-up Fabrication of Model Magnetic Systems — •Alexander Ako Khajetoorians — Institute of Applied Physics, Hamburg University, Hamburg

With the development of sub-Kelvin high-magnetic field STM, two complementary methods, namely spin-polarized scanning tunneling spectroscopy (SP-STS) [1] and inelastic STS (ISTS) [2-3], can address single spins at the atomic scale. While SP-STS reads out the projection of the impurity magnetization, ISTS detects the excitations of this magnetization as a function of an external magnetic field. They are thus the analogs of magnetometry and spin resonance measurements pushed to the single atom limit. We have recently demonstrated that it is possible to reliably combine single atom magnetometry (SAM) with an atom-by-atom bottom-up fabrication to realize complex atomic-scale magnets with tailored properties. As a first such example of this, we demonstrated that it is possible to realize an all-spin based atomic logic gate comprised of coupled Fe atoms [4] on a metallic surface [5]; a demonstration of a fundamental nano-spintronic concept. In this talk, I will address novel developments illustrating advances in the realization of artificially constructed magnetic nanostructures, like complex two-dimensional indirect-exchange based nanomagnets, as well as investigations of the magnetization dynamics of single and coupled spins.

[1] R. Wiesendanger, *RMP*, **81**, 1495 (2009); [2] A. J. Heinrich, *et al.* , *Science*, **306**, 466 (2004); [3] A.A. Khajetoorians, *et al.* , *Nature*, **467**, 1084 (2010); [4] A.A. Khajetoorians, *et al.* , *PRL*, **106**, 037205 (2011); [5] A.A. Khajetoorians, *et al.* , *Science*, **332**, 1062 (2011)