O 95: [MA] Surface magnetism V

Time: Friday 10:15–10:45 Location: HSZ 04

Invited Talk O 95.1 Fri 10:15 HSZ 04

Spin-dependent quantum interference within a single magnetic nanostructure — •Dirk Sander[1], Hirofumi Oka[1], Pavel Ignatiev[1], Sebastian Wedekind[1], Guillemin Rodary[1,2], Larissa Niebergall[1], Valeri Stepanyuk[1], and Jürgen Kirschner[1] — [1]Max Planck Institute of Microstructure Physics, Halle, Germany — [2]now at: LPNS, CNRS UPR20, Marcoussis, France

We present results of a combined experimental and theoretical study of spin-polarized electron confinement on individual nm small Co islands on Cu(111) [1]. Spin-polarized low-temperature STM in magnetic fields is used [2] to identify and prepare parallel (P) and antiparallel (AP) states of the magnetization orientation between a Co island and the magnetic tip of the STM. We find a pronounced spatial modulation of the differential conductance within one island, which is ascribed to electron confinement. The modulation patterns for P and AP magnetization states differ. Maps of the asymmetry of the differential conductance show strong spatial variations, where the contrast depends on the gap voltage. These results are ascribed to a spatial modulation of the spin-polarization within the Co islands. In conjunction with theory we conclude that the modulation of the spin-polarization, and its variation with energy, can be described by the relative magnitudes of the spin-resolved density of states, where the spatial modulation is mainly due to electron confinement of majority electrons. [1] H. Oka, P. Ignatiev, S. Wedekind, G. Rodary, L. Niebergall, V. Stepanyuk, D. Sander, J. Kirschner, Science 327, 843 (2010). [2] G. Rodary, S. Wedekind, H. Oka, D. Sander, J. Kirschner, Appl. Phys. Lett. 95, 152513 (2009).