

O 8 Hauptvortrag Gambardella

Zeit: Freitag 14:00–14:45

Raum: TU EB301

Hauptvortrag

O 8.1 Fr 14:00 TU EB301

Dimensionality-dependent magnetic properties: from single atoms at surfaces to 1D and 2D structures — ●PIETRO GAMBARDILLA — Institut de Physique des Nanostructures, Ecole Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland

The magnetic moment of gas-phase transition-metal atoms deposited on nonmagnetic substrates undergoes significant changes depending on the surface electronic structure, morphology, and coupling to magnetic neighbours [1]. The controlled assembly of metal nanostructures on crystalline surfaces combined with x-ray magnetic circular dichroism experiments in strong magnetic fields is used here to track the evolution of the spin and orbital magnetization from single adatoms to one-dimensional nanowires and two-dimensional clusters on nonmagnetic substrates. Giant magnetic anisotropy energy values are reported for single adatoms, while scaling with the orbital magnetic moment and atomic coordination is observed in finite-sized clusters [2]. Unusual oscillations of the easy axis of magnetization and magnetic anisotropy energy are observed in one-dimensional atomic wires constructed on a Pt vicinal surface as a function of the wire transverse width [3], an effect attributed to the filling of d-orbitals with different symmetry [4]. Finally, we will discuss the conception of novel metal-organic magnetic networks at surfaces in analogy with supramolecular grid structures.

[1] P. Gambardella et al., Phys. Rev. Lett. 88, 047202 (2002). [2] P. Gambardella et al., Science 300, 1130 (2003). [3] P. Gambardella et al., Phys. Rev. Lett. 93., 077203 (2004). [4] J. Dorantes-Dávila and G.M. Pastor, Phys. Rev. Lett. 81., 208 (1998).