Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Spin-resolved measurements of single molecular magnets on graphene JENS BREDE, REGIS DECKER, JOERG SCHWOEBEL, MACIEJ BAZARNIK, ROLAND WIESENDANGER, Institute of Applied Physics, University of Hamburg — The use of magnetic molecules opens a gateway to a flexible design of novel spintronic devices to store, manipulate, and read spin information at the nanoscale. Crucial is the precise knowledge of molecular properties at the interface towards an electrode. Progress in this field relies on resolving and understanding the physics at the relevant interfaces. In particular the role of individual molecular constituents and the impact of the atomic environment on molecular properties determine device relevant parameters, such as conductance and spin polarization. Recently, the incorporation of a graphene sheet to electronically decouple molecules from a ferromagnetic surface has been addressed by surface averaging high-resolution electron energy loss spectroscopy. Here, we applied spin-polarized scanning tunneling microscopy to resolve the physics of the molecule-graphene-ferromagnet interface. The analysis focuses on different phthalocyanine molecules adsorbed on cobalt-intercalated graphene on Ir(111). The phthalocyanine constitutes of an organic macrocyclic ligand and can be functionalized with various metal ions in order to modify, e.g. the molecular spin state. We will discuss the spin-dependent transport from magnetic surfaces through such molecules. In particular, the spin polarization of molecular frontier orbitals is resolved with sub-molecular spatial resolution and the variations in the lifetimes of different orbitals are discussed.

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Date submitted: 08 Nov 2012 Electronic form version 1.4