

Abstract Submitted  
for the MAR15 Meeting of  
The American Physical Society

**Effects of exchange interactions on magnetic anisotropy and spin-dynamics of adatoms on metallic surfaces** PEDRO RUIZ DIAZ, Max Planck Institute of Microstructure Physics, OLEG STEPANYUK, Physics Department, Moscow State University, VALERI STEPANYUK, Max Planck Institute of Microstructure Physics — A common belief is that magneto-crystalline anisotropy energy (MA) mainly arises from the spin-orbit coupling interaction. Here, throughout an ab initio study we show that direct exchange interactions ( $E_{ex}$ ) together with substrate-mediated interactions rules the MA nature in Co interacting adatoms supported on Cu(001) and Pt(001) surfaces. MA exhibits a non-trivial behavior and is found to be strongly sensitive to  $E_{ex}$ , magnetic order and substrate composition. Oscillatory magnetization switching is also revealed. Further, by means of a stochastic method, for the first time to our knowledge, the spin-dynamics of these single-spin systems assessed in the hysteresis loops is presented. Insights about the interplay between  $E_{ex}$  and MA which determines the onset of the magnetization curves and their shape are inquired as well.

Pedro Ruiz Diaz  
Max Planck Institute of Microstructure Physics

Date submitted: 14 Nov 2014

Electronic form version 1.4