Spin dynamics of spin-orbit coupled dimers on Pt(111)

Manuel dos Santos Dias¹, Samir Lounis¹

1) Peter Gruenberg Institut and Institute for Advanced Simulation, Forschungszentrum Juelich, Germany

Corresponding author: Manuel dos Santos Dias (m.dos.santos.dias@fz-juelich.de)

The interaction between two magnetic adatoms becomes anisotropic in the presence of spin-orbit coupling (SOC). The broken inversion symmetry at the surface leads to the Dzyaloshinskii-Moriya interaction (DMI), enabling chiral magnetic ground states. We investigate its impact on the spin dynamics of magnetic Fe dimers on the Pt(111) surface. As Fe adatoms show site-dependent magnetic anisotropy [1], we also consider the site-dependence of the DMI for dimers, with strong impact on the spin dynamics and ultimately on the functionality of Pt(111)-based magnetic nano-devices. We employ real-space time-dependent density functional theory for spin excitations of nanostructures [2], based on the Korringa-Kohn-Rostoker Green function approach, with SOC recently incorporated [3]. Extension of our theoretical inelastic scanning tunneling spectroscopy method [4] is in progress.

Work funded by the HGF-YIG Programme FunSiLab - Functional Nanoscale Structure Probe and Simulation Laboratory (VH-NG-717).