Universität Konstanz

SFB 767 Kolloquium

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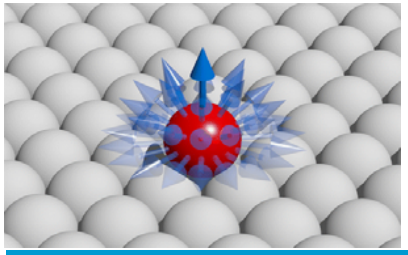
Dynamical spin excitations in nanoscale magnets: from single adatoms to skyrmions.

Stabilising, probing and manipulating the magnetic signal of single adatoms are crucial toward their successful usage in widespread technological applications such as high-density magnetic data storage devices. Ultimately a single magnetic atom is the smallest magnetic bit of information, thus the great interest in grasping its excitation behavior pertaining to any writing or reading process. I will present an overview of our investigations for different atoms deposited on several substrates. Combining time-dependent density functional theory and many-body perturbation theory, we showed that current-driven spin-state manipulation in nano-devices leads to rich transport patterns with new many-body features, resulting from the interaction of the electrons and the spin-excitations detectable with state of the art inelastic scanning tunneling spectroscopy. The intricate interplay between the intra- and interatomic exchange interactions and the spin-orbit interaction dramatically modify the dynamical behaviour of the nanomagnets and the lifetime of the newly produced magnetic state. Furthermore, I will address zero-point spin-fluctuations leading to a collapse of the magnetic anisotropy energy barrier even at absolute zero temperature and I will provide practical guidelines for designing magnetically stable nanomagnets with minimal quantum fluctuations. If I have time, I will briefly discuss our planned investigations on dynamical spin-excitations in large magnetic objects such as skyrmions containing hundreds of atoms.



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22.06.2017, 15:15 in P 603

Kaffee und Tee um 15:15 Uhr, Vortrag um 15:30 Uhr in P 603

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