Seminar of the Department. 26
Thin Layers and nanostructures

Fyzikální ústav AVČR, Cukrovarnická 10, Praha 6

Date : 12. 02. 2019 , Tuesday
Time : 10:00 am
Place : Library,Building A, 1st floor

Topic

Investigation of Single Atom Magnets using Scanning Tunneling Microscopy enabled Electron Spin Resonance

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The smallest classical storage unit is a single atom bit. Its recent discovery in form of magnetically bistable holmium single atom magnets on MgO exemplified how miniaturization could be realized down to fundamental limits[1] . Here we discuss the experiments leading to the observation of magnetic remanence[1] , the reading and writing of single atom magnets [2] , and the investigation of their thermal and magnetic stability[3] . Using STM enabled electron spin resonance[4,5] , we find a magnetic moment of (10.1±0.1) Bohr magnetons and we prove the magnetic origin of the tunneling bias voltage dependent 2-state switching observed with spin-polarized current. We briefly review the used measurement concept of ESR-STM and illustrate new avenues for this technique.

1. Donati, F. et al. Magnetic remanence in single atoms. Science 352, 318–321 (2016).

2. Natterer, F. D. et al. Reading and writing single-atom magnets. Nature 543, 226–228 (2017).

3. Natterer, F. D., Donati, F., Patthey, F. & Brune, H. Thermal and Magnetic-Field Stability of Holmium Single-Atom Magnets. Phys. Rev. Lett. 121, 027201 (2018).

4. Baumann, S. et al. Electron paramagnetic resonance of individual atoms on a surface. Science 350,417–420 (2015).

5. Natterer, F. D. et al. Upgrade of a low-temperature scanning tunneling microscope for electron-spin resonance. ArXiv181003887 Cond-Mat Physics (2018).

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