

Colloquium Cukrovarnická

**Ve čtvrtek dne 2. října 2014 v 10:00 hod.
ve Fyzikálním ústavu Cukrovarnická v seminární
místnosti (budova A, 1. patro)**

Controlling magnetism in atomically engineered nanostructures



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Magnetism in nanostructured materials provides an exciting field where technology development and fundamental research meet. Often the collective magnetic behavior of a nanostructure intricately depends on the details of spin-dependent interaction between atoms on sub-nanometer length scales. Recent advances in scanning tunneling microscopy make it possible to not only observe magnetism at the single atom level but also shape it.

We use the probe tip of a low-temperature scanning tunneling microscope to arrange magnetic atoms into arrays of our own design. Thin insulating films decouple the atoms from the metallic substrate and extended spin states form that show quantum-magnetic properties. I will discuss a method to identify coherent coupling in chains of atoms by using atoms with different spin magnitude. Arrays of several nanometers length can be placed into spin-correlated singlet ground states. To gain access to the dynamics of these few-atom magnets we make use of GHz bandwidth electronic pulse generators to implement pump probe spectroscopy in the STM. This technique measures the nanosecond-fast spin relaxation of individual atoms. The time domain information enables non-local measurements of magnetic states and sheds light onto possible pathways to controllably interact with atom-sized quantum spins.