



Berliner Physikalisches Kolloquium

im Magnus-Haus, Am Kupfergraben 7, 10117 Berlin

Eine gemeinsame Veranstaltung der Physikalischen Gesellschaft zu Berlin e.V. (PGzB), der Freien Universität Berlin (FUB), der Humboldt-Universität zu Berlin (HUB), der Technischen Universität Berlin (TUB) und der Universität Potsdam (UP), gefördert durch die Wilhelm und Else Heraeus-Stiftung.

Am Donnerstag, dem **6. November 2014**, um **18:30 Uhr**

spricht

Dr. Wolfgang Wernsdorfer
Institut Néel, CNRS, Grenoble, Frankreich

über das Thema

„Molecular quantum spintronics using single-molecule magnets“

Moderation: Wolfgang Kuch (FU Berlin)

The field called molecular quantum spintronics combines the concepts of spintronics, molecular electronics and quantum computing. Various research groups are currently developing low-temperature scanning tunnelling microscopes to manipulate spins in single molecules, while others are working on molecular devices to read and manipulate the spin state and perform basic quantum operations. We will discuss this still largely unexplored field and present our first results. For example, we have built a novel spin-valve device in which a non-magnetic molecular quantum dot, consisting of a single-wall carbon nanotube contacted with non-magnetic electrodes, is laterally coupled to a TbPc₂ molecular magnet. The localized magnetic moment of the single molecule magnet (SMM) led to a magnetic field-dependent modulation of the conductance in the nanotube with magnetoresistance ratios of up to 300% below 1 K. Using a molecular spin-transistor, we achieved the electronic read-out of the nuclear spin of an individual metal atom embedded in an SMM. We could show very long spin lifetimes (> 10 s). Using the hyperfine Stark effect, which transforms electric fields into local effective magnetic fields, we could not only tune the resonance frequency by several MHz, but also perform coherent quantum manipulations on a single nuclear qubit faster than a μ s by means of electrical fields only, establishing the individual addressability of identical nuclear qubits.