Universität Karlsruhe (TH)
Forschungsuniversität • gegründet 1825

Fakultät für Physik

Physikalisches Kolloquium

Wolfgang Wernsdorfer, CNRS Grenoble

»Nanospintronics using molecular nanomagnets«

Einführung: W. Wulfhekel

Everyday life is full of useful magnets, solids, oxides, metals and alloys. On the contrary, molecules are most often considered as non-magnetic materials. However, recent discoveries show that molecules can bear large magnetic moments that can have a stable orientation like traditional magnets. They have therefore been called single-molecule magnets and they might be the ultimate limit for information storage. They do not only exhibit the classical macroscale property of a magnet, but also new quantum properties such as quantum tunnelling of magnetization and quantum phase interference, the properties of a microscale entity. Such quantum phenomena are advantageous for some challenging applications, e.g. molecular information storage or quantum computing. In order to explore these possibilities, we are building new and very precise setups, developing new methods and strategies, and studying the best candidate systems, together with our colleagues physicists, chemists and engineers.
This presentation will also address the field of Molecular Electronics and Spintronics, which are both rapidly emerging fields of Nanoelectronics with a strong potential impact for the realization of new functions and devices helpful for information storage as well as quantum information. Our project aims at the merging of the two fields by the realization of molecular junctions that involves magnetic molecules. In order to tackle the challenge of controlled connection at the single molecule level, we design a process of molecular self assembly on nanojunctions obtained by the technique of electromigration. Futhermore, we are developing new micro-SQUIDs with carbon nanotube Josephson junctions, which should be sensitive enough to study individual magnetic molecules that are attached to the carbon nanotube.

Freitag, 18.01.2008, 17 Uhr c.t.,
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Anschließend Nachsitzung im Gastdozentenhaus „Heinrich Hertz“

Universität Karlsruhe (TH)
Fakultät für Physik
76128 Karlsruhe

Telefon (07 21) 6 08 - 35 18
Telefax (07 21) 6 08 - 35 19
E-Mail: fakultaet@physik.uni-karlsruhe.de
http://www.physik.uni-karlsruhe.de

Besucheradresse:
Wolfgang-Gaede-Straße 1
Physik-Hochhaus, Geb. 30.23
76131 Karlsruhe