Kolloquium des SFB/TR 49
gemeinsam mit Theoretisch-Physikalischem Kolloquium

Donnerstag, den 04.12.2014 um 15:30 Uhr in Raum 46-576

Es spricht:
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zum Thema:
Silicon Spintronics

Abstract
Worldwide efforts are underway to create a revolutionary and energy-efficient information technology in which digital data is represented by the spin orientation of electrons. Implementing spin functionality in silicon, the mainstream semiconductor, has the potential to create broad impact. Remarkable advances in the creation and control of spin polarization in silicon have therefore generated much excitement. This lecture provides a transparent picture of silicon spintronics, including the key developments and achievements, our current understanding, as well as the unsolved puzzles and challenges that stimulate researchers in the field.

First, the basic idea of spin-based information technology and silicon spintronics is introduced. Ferromagnets have non-volatile memory functionality, whereas semiconductors provide amplification and transistor action. What if we integrate ferromagnets and silicon — magnetic memory and logic computing? Then the main building blocks are described: one needs to be able to create spin polarization in the silicon, to manipulate it, and thereafter detect the spins. The generation of a spin flow by electrical means (driven by a bias voltage) or thermal means (driven by a heat flow) are discussed. Ferromagnetic tunnel contacts are shown to provide a robust method to do this, at room temperature. The lecture concludes with a prospect on future developments, which certainly includes more surprises as silicon spintronics comes of age.


Dr. Jansen is Distinguished Lecturer 2014 of the IEEE Magnetics Society.

Gäste sind herzlich willkommen. Die Dozenten der Theoretischen Physik