Karlsruher Institut für Technologie

Fakultät für Physik

Physikalisches Kolloquium

Khalil Zakeri Lori, KIT

»Spin Excitations in Ultrathin Ferromagnets«

Einführung: W. Wulfhekel

Elementary excitations play a fundamental role in the physics of many-body systems. In a spin system, e.g. a magnetic solid, the collective modes of spin excitations are referred to as spin waves and their representative quasi-particles are called magnons. Magnons are the key for understanding many phenomena in solids e.g. ordering at a finite temperature, electrical/heat transport, spin reversal and dynamics. In addition to their fundamental importance, magnons may also be used for high-speed information processing in modern spintronics.

We have demonstrated that the high-energy (terahertz) magnons in ultrathin magnets can be excited and probed by spin-polarized electrons. As a result the key properties of magnons, such as their dispersion relation and lifetime, have been investigated in various low dimensional magnets.
By presenting different examples, we will discuss how the magnons' properties change when the dimensionality of a three-dimensional bulk ferromagnet is reduced to a two-dimensional ultrathin film. We will further illustrate how the magnon spectroscopy can provide a unique way of quantifying the pattern of the magnetic exchange interaction in ultrathin magnetic films and multilayers.
In layered magnetic structures the inversion symmetry is broken due to the presence of the surface and interface. It will be shown that the broken inversion symmetry leads to new and fascinating phenomena, which are absent in bulk magnets.

Freitag, 13.05.2016, 15:45 Uhr,

KIT, Campus Süd,

Otto-Lehmann-Hörsaal, Physik-Flachbau (Geb. 30.22).

Anschließend Nachsitzung im Gastdozentenhaus „Heinrich Hertz“

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