Karlsruher Institut für Technologie

Fakultät für Physik

Physikalisches Kolloquium

Roderich Moessner, MPI-PKS Dresden

»Magnetic monopoles in spin ice«

Einführung: J. Schmalian

Fractionalisation is a counterintuitive phenomenon, in which an elementary particle appears to break into two independent entities. A celebrated example of this is spin-charge separation, in which an electron's magnetic (spin) and electric (charge) properties appear to become independent degrees of freedom.

Spin ice materials – $Dy_2 Ti_2 O_7$ and $Ho_2 Ti_2 O_7$ – provide a rare instance of fractionalisation in three dimensions. Their elementary excitations result from the fractionalisation of their microscopic magnetic moments; these excitations can be thought of as magnetic monopoles [1].

This talk presents an elementary introduction to theoretical concepts for, and experiment studies of, spin ice. It focuses on the unique signatures of the peculiar nature of its excitations. These include unusual neutron scattering structure factors [2-4], dynamical arrest and long lived non-equilibrium metastable states [5], as well as a response to external magnetic fields that promotes spin ice as a new type of magnetic system which has been called a magnetic plasma, a magnetic Coulomb liquid, or a magnetolyte [6]. This talk reviews several of these striking phenomena, and discusses open questions and future perspectives.

Freitag, 06.07.2012, 17 Uhr c.t.,

KIT, Campus Süd,
Otto-Lehmann-Hörsaal, Physik-Flachbau (Geb. 30.22).
Anschließend Nachsitzung im Gastdozentenhaus „Heinrich Hertz“

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