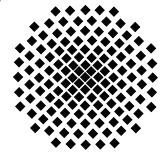


# Stuttgarter Physikalisches Kolloquium

Max-Planck-Institut für Intelligente Systeme  
Max-Planck-Institut für Festkörperforschung  
Fachbereich Physik, Universität Stuttgart

Ansprechpartner: Dr. Michael Hirscher  
E-Mail: [hirscher@mf.mpg.de](mailto:hirscher@mf.mpg.de)  
Telefon: 0711 - 689-1808



Dienstag, 8. Januar 2013

17.15 Uhr

Hörsaal 2 D5

Stuttgarter Max-Planck-Institute, Heisenbergstraße 1, 70569 Stuttgart-Büsnau

Gastgeber: Prof. Gisela Schütz, Max-Planck-Institut für Intelligente Systeme, Telefon: 0711 - 689-1950

## Making magnets by microbes: Biomineralization and engineering of bacterial magnetic nanoparticles

**Prof. Dirk Schüler**

Ludwig-Maximilians-Universität München

### Abstract

The ability of magnetotactic bacteria to orient in magnetic fields is based on the synthesis of magnetosomes, which nano-sized crystals of a magnetic iron mineral that are aligned in well-ordered intracellular chains. Magnetosome biomineralization and assembly involves a number of specific genes and proteins, which are under current investigation. Bacterial magnetic nanoparticles are also of interest for biotechnological and biomedical applications as they represent a unique class of small (15-120 nm), uniform particles with well defined magnetic and crystalline characteristics. It will be shown that both sizes and shapes of magnetite crystals as well as the composition of the enveloping membrane can be genetically and chemically engineered, which provides biosynthetic routes to design tailored size- and shape-modified nanoparticles with altered physical and biochemical characteristics. In addition, by genetic fusions magnetic nanoparticles can be further functionalized in vivo and in vitro, as by the introduction of biomolecular coupling groups, fluorescence markers, antibodies and other functional moieties.