

IMPRS on Multiscale Biosystems

Project description

Title: Assembled Nanomagnets: Ferromagnetic Resonance Spectroscopy of Magnetotactic Bacteria

PI: Damien Faivre

In collaboration with: Peter Strauch, Stefan Klumpp

Project description: Magnetotactic bacteria are microorganisms that make use of assembled internal magnets as compass to orient in the Earth magnetic field. Typically, these nanomagnets are arranged in chains. However, some species exhibit other structures such as e.g. cluster-like assemblies. Ferromagnetic Resonance Spectroscopy (FMR) is a technique that permits to rapidly characterize magnetic nanoparticles. We have initiated the systematic study of bacteria exhibiting different assembly of magnetosomes. In parallel, a theoretical model has been recently proposed to help in the understanding of the FMR spectra. This models need to be refine in order to use experimentally more relevant parameters than those currently used. Special emphasis will be laid on interdisciplinary research so that close collaboration with scientists working on chemical, biological and physical and theoretical aspects of biomineralization and biomimetics of magnetic assemblies will be expected.

Required background: We seek for a student with background in biophysics, physics or chemistry. Skills in simulation tools, as well as in magnetism (FMR) will be highly appreciated. Good knowledge in English is required.

Paper to read before the interview:

Charilaou M., Sahu K. K., Faivre D., Fischer A., Garcia-Rubio I., and Gehring A. (2011), Evolution of magnetic anisotropy and thermal stability during nanocrystal-chain growth, *Applied Physics Letters* **99**, 182504.

Contact: email: damien.faivre@mpikg.mpg.de

Web: <http://www.mpikg.mpg.de/135282/MBMB>