

Physikalisches Kolloquium

Dienstag, 01.10.2019, 16:30 Uhr

Hörsaal 6A

Tuning magnetic anisotropy in nanostructures for biomedical applications

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Magnetic nanoparticles have been building blocks in applications ranging from high density recording to spintronics and nanomedicine. Magnetic anisotropies in nanoparticles arising from surfaces, shapes and interfaces in hybrid structures are important in determining the functional response in various applications.

In this talk I will first introduce the basic aspects of anisotropy, how to tune it in nanostructures and ways to measure it. I will discuss resonant RF transverse susceptibility, that we have used extensively, as a powerful method to probe the effective anisotropy in magnetic materials. Tuning anisotropy has a direct impact on the performance of functional magnetic nanoparticles in biomedical applications such as contrast enhancement in MRI and magnetic hyperthermia cancer therapy. There is a need to improve the specific absorption rate (SAR) or heating efficiency of nanoparticles for hyperthermia and I will focus on the role of tuning surface and interfacial anisotropy with a goal to enhance SAR.

Strategies going beyond simple spherical structures such as exchange coupled core-shell nanoparticles, nanowire, nanotube geometries can be exploited to increase saturation magnetization, effective anisotropy and heating efficiency in magnetic hyperthermia. This lecture will combine insights into fundamental physics of magnetic nanostructures along with recent research advances in their application in nanomedicine.

Ab 16:00 Uhr Kaffee, Tee und Gebäck im Foyer vor dem Hörsaal (Gebäude 26.11. Ebene 00)

Für die Dozenten der Physik

Prof. Dr. M. Getzlaff & Jun.-Prof. Dr. C. Monzel