

Nonlinear by Design: Magnetic Particle Imaging (MPI)

Dr. rer. nat. Thomas Friedrich,

University of Lübeck, Institute of Medical Engineering, Lübeck

Abstract

Magnetic particle imaging is a novel imaging technique that has been under investigation by numerous research groups worldwide since 2005. The use of static and dynamic magnetic fields makes it possible to map the concentration distribution of magnetic nanoparticles three-dimensionally and dose-free. The real-time capable, highly sensitive and spatially highly resolved method thus allows new preclinical approaches in biomedical research. At the present time, MPI is being evaluated preclinically, which means that the method can be refined in a targeted manner. Promising results have already been achieved. The focus of development is on clinical application, with the spectrum ranging from angiography and interventional imaging to functional imaging and cell tracking. In addition, the magnetic fields used also make it possible to manipulate objects magnetically, making the method a powerful theranostic instrument for the future.