

Master-Thesis

Design and Implementation of an NMR Probe for Comprehensive Characterization of Low-Field MRI Magnet Systems

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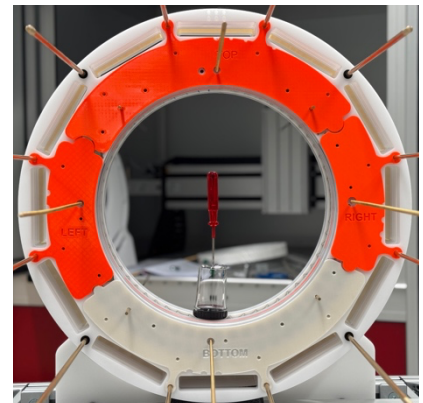
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Keywords

Low-Field MRI | Electrical Engineering | NMR spectroscopy | Embedded Systems

Background

Magnetic resonance imaging (MRI) is an imaging technique that uses magnetic fields and radio waves to create detailed images of the inside of the body. Low-field MRI systems work with a weaker magnetic field. In the DeLoRi project, together with the Fraunhofer MEVIS Institute, we are developing a low-field MRI device to support cancer diagnostics. For the construction of the main magnet, a precise measuring probe is needed to measure the homogeneity of the field consisting of permanent magnets and thus improve the image quality in the later course of the project.



Tasks

In this master thesis, a simple NMR probe derived from an existing design will be constructed and a suitable digital computer interface will be developed. The work can be adapted to your interests and ideas. On the one hand there is the possibility of the electrical design and construction of the NMR probe, on the other hand the construction of the RF electronics. A further step can also be the design and programming of the interface to a computer.

Your Profile

For the successful implementation of the project, you should have an interest in one or more of the following subject areas:

- Electrical Engineering | PCB Design | Rapid Prototyping
- RF Electronic Design | Simulation
- Embedded Systems | FPGA Development

Our Offer

The call for applications is aimed at master's students with a technical background (e.g. electrical engineering or technical computer science) and is carried out in cooperation with Fraunhofer MEVIS. A workstation can be provided at the Chair of Image Processing, includes modern IT infrastructure, includes access to modern IT infrastructure, a workshop and rapid prototyping facilities.