

University of Stuttgart Institute of Smart Sensors



Research Thesis

Employing inductive power transfer to drive nuclear magnetic resonance transceivers

When placed in a static magnetic field B_0 , atomic nuclei with a magnetic moment align with the field and precess around its direction at a specific frequency known as the Larmor frequency. Applying a perpendicular B_1 field that oscillates at this frequency allows manipulation of these magnetic moments, enabling applications such as magnetic resonance imaging (MRI) and nuclear magnetic resonance (NMR) spectroscopy.

At the Institute of Smart Sensors, integrated NMR transceivers are designed that provide compact size and power-efficient operation. However, some applications require wireless operation, which introduces challenges for powering and transferring data to these ICs. This project aims to develop a prototype setup to assess the feasibility of inductive power transfer for wireless operation.

In this thesis, you will:

- ✓ Revise the design of an existing prototype PCB for inductive powering of NMR transceivers.
- ✓ Investigate solutions for wireless data transfer.
- ✓ Optionally: Practical implementation and testing of your design.

Required skills:

- ✓ Experience in PCB design tools, such as Altium Designer.
- ✓ Preferably, experience with CAD software such as SolidWorks and /or EM simulation software like COMSOL Multiphysics.
- ✓ Curiosity, open-mindedness, high level of motivation.

What we offer:

- ✓ Dedicated supervision.
- ✓ State-of-the-art equipment.
- ✓ Impactful research.

Fields of Work

PCB design, Wireless Power Transfer, System Design

Course of studies

Electrical Engineering, Mechanical Engineering

Start

As soon as possible

Duration

3-4 Months

Contact person

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