Research Thesis – Position Calibration of an NMR Field Camera

Nuclear magnetic resonance (NMR) is the method of choice for high accuracy and high-resolution measurements of magnetic fields. We utilize CMOS single-chip integrated transceivers and external field probes for our NMR field camera. Knowledge of the positions of field probes is necessary for monitoring the $B_0$ field. By switching the gradients with known strengths, we can calculating the positions using the phases of the FIDs.

You will characterize our PCB gradient coils in the lab (Labview, Matlab). Depending on the result, you will optimize the previous design with COMSOL/Altium. Finally, you will design a 3D-printed platform to fix the gradient coil and hold our NMR field camera. Position calibration of the sensors highly depends on the quality of gradient fields and mechanical structure.

Requirements:

- Knowledge of Elektrodynamik
- Knowledge in Labview programming /Matlab data analysis
- Knowledge of tools like Altium/COMSOL/Solidworks is a plus

Duration: 3 months, 40 hours per month (or upon agreement)

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