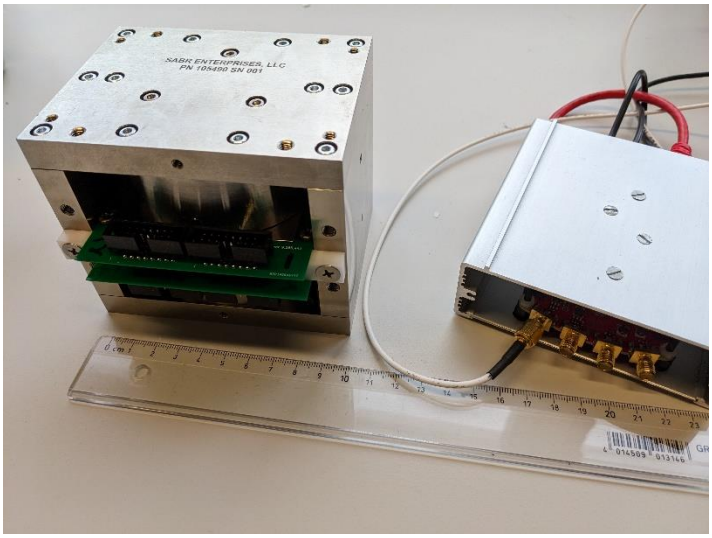
Master Thesis: Building a 25 MHz NMR spectrometer

Nuclear Magnetic Resonance (NMR) spectroscopy is the most powerful tool in analytical sciences and a wonderful playground for quantum physics. Due to the high costs, currently, countries of the Global South have no access to NMR spectrometers. Our vision is to build a NMR spectrometer, which will cost less than CHF 10'000.

A Master project starting in Summer 2024 is available in the group of Prof. Roland Riek, Laboratory for Physical Chemistry (D-CHAB). The student will build a 25 MHz Nuclear Magnetic Resonance (NMR) spectrometer. The spectrometer is running on a compact board (SDR Lab, Red Pitaya). A permanent magnet will (10 x 10 x 10 cm^3) generate a field of 0.6 T, corresponding to a ^1H NMR frequency of 25 MHz.

The next step is to implement shimming to spectrally resolve chemical shifts and *J*-couplings.

- Do you want to build your own spectrometer?
- Are you interested in or would like to learn more about: programming (e.g., Python), electronics and hardware (magnetic resonance)?
- Are you a student in physics, electrical engineering, quantum engineering, information technology, interdisciplinary natural sciences, physical chemistry,…?



Curious to know more? Please contact Dr. Takuya Segawa: segawat@ethz.ch.