

Ma 3 - NMR

Prerequisites:

- Quantum mechanics: (spin-)Hamiltonian and operators

Physics:

- Nuclear spin / Zeeman effect / dipole-dipole interaction
- Larmor precession, rotating frame
- Interaction of nuclear spins with radio frequency waves: resonance phenomenon
- Bloch equations
- Coherence/decoherence, relaxation processes, paramagnetic relaxation enhancement
- Free induction decay, spin echo

Technical:

- Oscilloscope handling: trigger settings, scaling, cursor measurements
- Magnetic field shimming: field homogeneity
- NMR spectrometer: setup of pulse sequences, rf coil matching
- Data acquisition with Labview

Data analysis:

- Least-squares linear or exponential fitting
- Error analysis / propagation
- Suitable plotting of data