Department of Chemical Sciences

Graduate Course on

Principles of Modern Nuclear Magnetic Resonance Spectroscopy

Course content:

- Fundamentals of nuclear magnetic resonance (NMR) spectroscopy in solution and in the solid state
- Basic principles of magnetic resonance
- Full quantum mechanical description of modern NMR spectroscopy
- NMR interactions in their representation by Hamiltonians
- Mathematical description of the spectral line shapes resulting from the individual NMR interactions
- Principles of simulating NMR spectra
- Product operator formalism
- Applications include modern protein NMR methods in solution
- Basic experiments for the assignment of protein NMR signals in solution from two- and three dimensional NMR experiments (COSY, TOCSY, HSQC, or HNCA)
- Determination of distance constraints from NOESY experiments
- Solid state NMR applications include the concept of separated local field spectroscopy
- Cross polarization, proton-driven spin diffusion, DipShift and REDOR

Prerequisites: Basic quantum mechanics

Mode Assessment: 30% assignment (homework problems, computer programs), 30% midterm project (short talk), 40% final exam (written)

Recommended reading:

John Cavanagh, Wayne J. Fairbrother, Arthur G. Palmer III, Nicholas J. Skelton. Protein NMR Spectroscopy. Principles and Practice. Academic Press, 2006

Klaus Schmidt-Rohr, Hans Wolfgang Spiess. Multidimensional Solid-State NMR and Polymers. Academic Press, 2012

Venue: AG80
Hours: Tue, Thu 9:30 am – 11:00 am
Instructor: Prof. Danil Huster (Email: daniel.huster@medizin.uni-leipzig.de)
First lecture on Jan 16,2020 (Thursday)