

Course description

Course Title Magnetic Resonance Spectroscopy Espectroscopia de Ressonância Magnética		
Type/Attendance Time Lecture: 2 hours per week Tutorial: 2 hours per week	Credit points (ECTS) 5	Type of Examination Examination, Exercises
Recommended Prerequisites [Requirements necessary for entrance to be entered]		
Content <p>1. Physical fundamentals of NMR spectroscopy Magnetic moments in magnetic fields, quantization of nuclear and electron spin; Magnetization, longitudinal and transversal relaxation, motion of magnetic moments under the influence of static and rotating magnetic fields (Bloch equations); Fourier transformation of free induction decay, molecular exchange processes</p> <p>2. One- and two-dimensional high resolution NMR spectroscopy Phenomenological description of NMR spectra, chemical and magnetic equivalence; Spin systems of the first order and of higher orders, two-dimensional NMR experiments</p> <p>3. Chemical Shift Physical background, anisotropy of the chemical shift, determination of anisotropy by rotational diffusion and sample rotation around the magic angle</p> <p>4. Dipolar Interaction Physical background, energy-level diagram of two-spin systems with dipolar interactions. Influence of dipolar interactions on solid-state NMR spectra, influence of dipolar interactions on liquid-state NMR spectra: Relaxation and the Nuclear Overhauser effect</p> <p>5. Scalar Coupling Physical background, structural dependence of scalar coupling, analysis of NMR spectra of higher order spin systems</p> <p>6. Quadrupolar Interaction Physical background, energy-level diagram of single-spin systems with quadrupolar interaction. Influence of quadrupolar interactions on solid-state NMR spectra, influence of quadrupolar interactions on liquid-state NMR spectra</p> <p>7. Dynamic NMR spectroscopy</p> <p>8. EPR Spectroscopy</p>		
Conteúdo <ol style="list-style-type: none"> 1. Fundamentos físicos de espectroscopia RMN 2. Espectroscopia RMN uni- e bidimensional de alta resolução 3. Deslocamento químico 4. Interação dipolar 5. Acoplamento escalar 6. Interação quadrupolar 7. Espectroscopia de RMN dinâmica 8. Espectroscopia de EPR 		