

Module name	Magnetic resonance - Fundamentals and Applications
Number	2010-M06
Aims	Magnetic resonance, in particular NMR, is one of the very few local probes of bulk matter with applications in almost all natural sciences. Leipzig has a great tradition in applying and developing magnetic resonance in various areas. The powerful spectroscopic insight from magnetic resonance requires, however, a special knowledge of its methods, techniques, and hardware. Therefore, <i>basic</i> courses in magnetic resonance will be provided that lay the foundation for its application. Due to the exceptional breadth of applications, <i>advanced</i> courses will focus on current research needs.
Basics	Magnetic resonance (NMR and EPR) for the investigation of materials, which are the focus of the Graduate School, and their properties
Contents	Basic principles of NMR and EPR. NMR of liquids and of solids as basic analytical tool. Advanced methods (e.g., in biological systems, quantum solids, surfaces). Hardware development for special applications (thin films, high fields and frequencies).
Methods	Given the great expertise in magnetic resonance, interdisciplinary teaching (already practiced in Leipzig) will provide first-hand knowledge from leading experts in various fields. The teaching will also profit from a long-standing experience with GDCh courses where we combine lectures on various subjects with concrete experimental training at instruments, which provides hands-on education in complicated methods.
Type	Two-day block course/ September 12 to 15 (see schedule)
Work load	15 hours presence/ 45 hours self-study
Examination	Written, Friday, 24.9.2010, 14.00, SR 101
Credit points	2
Responsible scientists	Berger, Haase
International guest lecturers	none
Industrial partners	none
Recommendations for literature, e-learning	M. Levitt, <i>Spin Dynamics</i> , VCH-Wiley S. Berger, S. Braun, <i>200 and More NMR Experiments</i> , VCH-Wiley C. P. Slichter, <i>Principles of Magnetic Resonance</i> (Springer Verlag, New York, 1990).

SCHEDULE

Time	Lecturer	Program	Location
Sunday, September 12th			
	Compulsory participation in tutorials and plenary lectures of the MRPM 2010 conference	http://ingo.exphysik.uni-leipzig.de/mrpm10/ (visit the URL for updates)	Great Lecture Hall Physics
Thursday, September 14th			
9.00- 10.30	Berger, Haase	In-depth discussion of Sunday's lectures	SR 101
11.00-12.30	Berger, Haase	In-depth discussion of Sunday's lectures	SR 101
14.00-15.30	Haase	Introduction into Spin Resonance	SR 101
16.00-17.30	Berger	2 D NMR	SR 101
Wednesday, September 15th			
9.00-10.00 11.00-12.00	Berger, Group of seven attendees	Seminar (group 1) Experiments (group 2): Practical aspects of 2D NMR, NOESY, COSY	DRX 400
14.00-15.00 16.00-17.00	Berger, Group of seven attendees	Seminar (group 2) Experiments (group 1): Practical aspects of 2D NMR, NOESY, COSY	DRX 600
9.00-10.00 11.00-12.00	Haase, Group of seven attendees	Seminar (group 3) Experiments (group 4): Hardware, Solid-State NMR Techniques	
14.00-15.00 16.00-17.00	Haase, Group of seven attendees	Seminar (group 4) Experiments (group 3): Hardware, Solid-State NMR Techniques	