Magnetism/Superconductivity - physics634

Degree - M.Sc. in Physics (PO von 2014)

Module	**Specialization: Advanced Experimental Physics**
Module No.	physics62a

Course	**Magnetism/Superconductivity**
Course No.	physics634

Category	**Type**	**Language**	**Teaching hours**	**CP**	**Semester**
Elective	Lecture with exercises	English	3+1	6	ST

Requirements for Participation:

Preparation:

Form of Testing and Examination: Requirements for the examination (written): successful work with the exercises

Length of Course: 1 semester

Aims of the Course: To give an introduction to the standard theories of both fields as major example of collective phenomena in condensed-matter physics and comparison with experiments

Contents of the Course:

Magnetism:

orbital and spin magnetism without interactions, exchange interactions, phase transitions, magnetic ordering and domains, magnetism in 1-3 dimensions, spin waves (magnons), itinerant magnetism, colossal magnetoresistance

Superconductivity:

macroscopic aspects, type I and type II superconductors, Ginzburg-Landau theory, BCS theory, Josephson effect, superfluidity, high-temperature superconductivity

Recommended Literature:

L. P. Lévy: Magnetism and superconductivity (Springer; Heidelberg 2000)

P. Mohn: Magnetism in the Solid State - An Introduction (Springer, Heidelberg 2005)

J. Crangle: Solid State Magnetism, Van Nostrand Reinhold (Springer, New York 1991)

C. N. R. Rao, B. Raveau: Colossal Magnetoresistance […] of Manganese Oxides (World Scientific 2004)

J. F. Annett: Superconductivity, super fluids and condensates (Oxford University Press 2004)

A. Mourachkine: High-Temperature Superconductivity in Cuprates […] (Springer/Kluwer, Berlin 2002)