



Magnetism and electronic structures of metallic systems

Lecturer: Prof. Ladislav Havela (Charles University, Czech Republic)

Course description:

The subject merges basic ideas from classical courses on magnetism with variations of electronic structures of d and t electron systems. It covers both basic theoretical models of band and localized magnetism as well as important issues of diluted alloys. Special emphasis is put on diverse experimental techniques. Information provided is classified on the basis of characteristic time of each technique.

Syllabus of the lecture subjects (enlisted):

1. Introduction - basic notions, Pauli paramagnetism, specific heat, Curie-Weiss law, Ising model, Heisenberg model.
2. Electronic structure of 3d, 4d, 5d, 4f, 5f systems. Localized magnetism 4f, Hund's rules, Itinerant magnetism, band splitting, Stoner model. Properties. Exchange interactions.
3. Diluted alloys, Anderson model, mean field solution, Kondo model, Schrieffer-Wolf transformation, bulk properties
4. Concentrated systems - Kondo lattice, mixed valence,
5. Real systems, Fe, Co, Ni, rare-earths, RCo₂ systems, exchange interactions, magnetic structures, magnetic excitations (magnons)
6. Actinide intermetallics, orbital magnetism in itinerant systems, magnetic anisotropy mechanisms
7. Heavy fermions, finite-T properties
8. What can be measured and what we can learn. Characteristic time scale approach. Bulk methods - Magnetic susceptibility, electrical resistivity, specific heat, Local-probe methods \rightarrow Neutron scattering, Photoelectron spectroscopy, Moessbauer spectroscopy, μ^+ -SR.

TERMINY WYKŁADÓW			
Data	Dzień tygodnia	Godzina	Sala
2013-11-18	Poniedziałek	14-17	3/14 (Centrum Nanotechnologii)
2013-11-19	Wtorek	14-17	3/14 (Centrum Nanotechnologii)
2013-11-20	Środa	14-17	3/14 (Centrum Nanotechnologii)
2013-11-21	Czwartek	14-17	3/14 (Centrum Nanotechnologii)
2013-11-22	Piątek	14-17	3/14 (Centrum Nanotechnologii)