

Basic Theory of Magnetism of Atoms, Molecules and Solids

Vladimir Antropov

US Department of Energy, Ames Laboratory, Physics Dpt A-508, Ames, IA 50011,
USA

With respect to similar courses in magnetism, this course will focus on the fundamental aspects of different mechanisms of exchange coupling and magnetic anisotropy in localized and itinerant magnets. Together with usual textbook definitions we will analyze several qualitative models of the exchange and anisotropy that allow both experimentalists and theoreticians to discuss and analyze many magnetic effects in real magnets. These models are illustrated with the help of Mathematica. A broader review or current practical needs in the area of magnetism will be given.

The course is composed of the following lectures:

1. Basic theory of magnetism of atoms and molecules
2. Theory of magnetism of solids.
3. Basic experiments in magnetism (different scales and times)
4. Exchange coupling (fundamentals and applications)
5. Non-collinear magnetism and spin dynamics in magnets
6. Magnetic anisotropy (fundamentals and applications)

Time: 5, 8, 12, 15, 19, and 22 September 2014, from 16h00-18h00

Place: Auditorium of IPCMS