



29th November 2010 - 10:00
Building 49, Seminar Room (108)

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Electron spectroscopic studies of the electronic structure of atoms and molecules

The electron spectroscopy research group at the University of Oulu has long tradition in experimental and computational photoelectron spectroscopy. This presentation introduces some group's experimental studies of alkali halide molecules and of metal atoms and presents examples of how measurements have been interpreted using theoretical calculations based on quantum mechanics. These studies are combined to receive information about both the electronic structure and dynamics of the studied samples, and the quantum mechanical phenomena in general.

These studies are the basic research of materials and the key word combining the studies together is electronic structure of the studied atoms and compounds. The electronic structure, i.e. the spatial and angular momentum distribution of the electrons, determines the chemical properties of an atom and how a specific atom behaves when it is being irradiated for example with sunlight. One of the puzzling questions in the material science is how the properties of a single isolated atom are transferred to the properties of molecules, clusters and even solids consisting of these atoms, and how this information can be used in materials science. In some cases when two atoms form a molecule the complexity of the system increases due to new effects, like molecular field effects, created in these systems. On the contrary, some electronic transitions seem to be more easily described in molecules and elemental solids than in isolated atoms. Examples of both of these cases will be presented.

Host: H. Chapman, CFEL Coherent Imaging Division