

# X-ray Magnetic Circular Dichroism and its applications

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X-ray Magnetic Circular Dichroism (XMCD) is the difference of two absorption spectra taken with left and right circularly polarized X-rays. Basically, the phenomenon signifies the occupation difference in the spin up and spin down bands of ferromagnetic materials and it is expected to be the next order of absorption intensity. However, in the *L* absorption edges of *3d* transition metals it is amplified by the spin-orbit splitting of core levels and it has the same order of magnitude with the absorption itself. When compared with the other magnetic tools, it has two advantages: Firstly, it is elemental and chemical specific. It is very advantageous when we are going to study the element by element magnetic properties of chemical compounds and magnetic artificial structures composed of different elements. Secondly, by applying the sum rule to XMCD spectrum we can obtain the orbital and the spin magnetic moments separately. It is very useful to investigate the microscopic origin of the ferromagnetic properties.

In this talk, I would like to present the principle of XMCD and give a few research examples, where the XMCD analysis were critically used.