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Multipolar ordering in d - and f -electron systems

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d - and f -shells support a large number of local degrees of freedom: in addition to magnetic dipoles, we find also electric quadrupoles, magnetic octupoles, etc. Multipolar interactions originate from kinetic exchange and need not be weaker than the dipole interactions which drive usual magnetic ordering phenomena. For a number of systems, quadrupolar or octupolar order precedes or replaces magnetic order, and the thermodynamic properties are dominated by multipolar interactions.

The talk gives an introduction to the concept of multipolar moments and their ordering phenomena, illustrated on the example of several actinide and rare earth compounds for f -shells, and LiNiO_2 and BaVS_3 for d -shells.

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