Simple models of nuclear moments

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Nuclear magnetic dipole and electric quadrupole moments are sensitive probes of the single-particle as well as the collective properties of nuclei. In this talk I review the predictions of the shell model and the interacting boson model as regards nuclear moments. The emphasis is on elementary properties that can be understood from symmetry-based principles such as, for example, the consequences of (generalised) seniority in the shell model or the predictions in the dynamical symmetries of the interacting boson model. A number of applications of interest to current nuclear-structure studies are discussed. They include the notion of effective charges in the E2 operator of the shell model derived from quadrupole moments as opposed to B(E2) values and the description of dipole and quadrupole moments in terms of aligned neutron-proton pairs or high-angular-momentum bosons. The interplay between quadrupole and octupole collectivity will also be discussed in view of recent measurements of quadrupole moments in 208Pb.

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