Chirality: From Symmetry to Dynamics

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Chirality of rotating triaxial nuclei is introduced as spontaneously broken symmetry of the mean field.

The weak symmetry breaking must be described by dynamical approaches, which account for chiral vibrations as precursors of the static chirality. As such, The Multi-Quasiparticle +Triaxial Rotor Model, Tilted Axis Cranking+Random Phase Approximation, and the Triaxial Projected Shell Model are reviewed. Selected results are discussed to illustrate the consequences of chirality for energies and transition probabilities. The probability distribution of the total angular momentum with respect to the body fixed frame is calculated, which displays the chiral geometry in a clear way. The I->I transitions between the chiral partners are suggested as a new and stringent signature for chirality. The relation to transverse and longitudinal wobbling excitations is discussed. The classification of chiral vibrations as “transverse” and “longitudinal” is introduced.