Third Article

Expansion of deformed harmonic oscillator wavefunctions in terms of spherical wavefunction bases: deformation effects

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Abstract

The interbasis expansion of deformed cylindrical 3D harmonic oscillator (HO) wavefunctions in terms of spherical wavefunction bases is introduced. The spatial overlap integral is rewritten in a simplified form and presented in terms of the axis ratio of the deformed nucleus. Deformed nuclear spheroidal shapes are considered, including both quadrupole and hexadecapole deformations. The effect of deformation on the oscillator lengths of deformed 3D-HO, and in turn on the spatial overlap coefficients, is discussed. For the description of the geometrical shape of deformed nuclear systems, the collective and extended Nilsson models for surface parametrization are used.