

Analytical description of shape transition in nuclear alternating parity bands

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Angular momentum dependencies of the parity splitting and electric dipole transitions in the alternating parity bands of heavy nuclei have been analyzed. It is shown that these dependencies can be treated in a universal way with a single parameter of critical angular momentum, which characterizes phase transition from octupole vibrations to the stable octupole deformation. Using the simple but useful model of axially-symmetric reflection-asymmetric mode, the analytical expression for the parity splitting and electric dipole transitional moment have been obtained. The results obtained are in a good agreement with the experimental data for various isotopes of Ra, Th, U, and Pu.

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