

Abstract

In the present thesis effects of deformation on the nuclei have been studied. In the first part the deformations are considered as constant form. By this consideration, Nilsson Hamiltonian is investigated and some discussion is argued. Then the (3)proxy-SU model is presented and its properties are used. Furthermore, effects of the deformations on the magic numbers are surveyed. In addition, with the help of the (3)proxy-SU model, a semi-empirical formula for the alpha-decay half-life is suggested which includes the deformation of the nucleus. After that the wobbling motion is presented and studied.

In the second part, by including the vibrations and rotations we come into the dynamical deformations and with the help of it even and odd nuclei are studied separately in some different situations. At the end by introducing the controlled single particle an opportunity is provided which makes the study of odd nuclei simpler.



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PhD Thesis in Nuclear Physics

Investigation of nuclei considering constant and dynamical deformation

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