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Collective alternating-parity spectrum of the even-even nuclei with effective triaxiality

In present work model of effective triaxiality of even-even nuclei with quadrupole and octupole deformation is developed. To solve for radial part the Schrodinger equation the Davidson potential was used. The alternating parity energy spectrum and wave functions of Schrodinger equation was obtained. The contribution of quantity e - eigenvalues for angular part of polar coordinate taken into account. At the same time, in the expressions for the components of the moments of inertia of the nucleus, the variable of the angular part of the polar coordinates remained as a constant. In presented model energy levels of yrast-band of the alternating parity spectrum determined by six adjusted parameters. And energy levels of the yrast- and first-non-yrast-bands determined by eight adjusted parameters. The application of the model to energy levels of the yrast- and first-non-yrast alternating-parity bands in several rare-earth and actinide nuclei shows a good reproduction of the corresponding experimental energy levels. A description of the alternating parity energy spectrum of even-even nuclei taking into account rotational and vibrational (longitudinal and transverse) degrees of freedom is carried out for the first time. The proposed model is used to describe the excited alternating-parity collective states yrast- and first-non-yrast-bands of even-even nuclei: ^{146,148}Ba, ^{154}Sm, ^{158}Gd, ^{160}Dy, ^{170}Yb, ^{220,224}Ra, and ^{224,226,230,232}Th, was proposed.

Section

Nuclear structure: theory and experiment

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