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Investigation of the Mo isotopes based on the collective model

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The work is devoted to the study of the shapes of the Mo isotopes chain based on the collective model with the Bohr Hamiltonian. Isotopes of even nuclei Mo, namely 94Mo, 96Mo, 98Mo and 100Mo, demonstrate a change in shape from nucleus to nucleus. The low-lying spectrum of these nuclei indicates that the 94Mo nucleus has a spherical structure, 96Mo and 98Mo has a transformed transition, and 100Mo has almost deformed structure. Also recently, there has been an increased interest in the phenomenon of coexistence of forms, which can be observed in the nuclei 98Mo. Such a change in forms can be investigated in the taxonomy of low-lying levels. This phenomenon occurs when the nucleus has different shapes at different excitation energies. Using a geometric model, this paper describes the properties of collective quadrupole excitations and weak mixing of spherical and deformed configurations. In this work, the potential was selected in such a way as to describe the experimental data on the lower excitation energies and the probabilities of E2 transitions. It is shown that the low-energy spectrum of Mo isotopes can be satisfactorily described using a geometric model with a potential function that supports the coexistence of forms.

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