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ENERGY SPECTRUM OF COLLECTIVE STATES OF ODD-ODD NUCLEI

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The presence of an energy gap in the spectrum of single nucleon states of even-even nuclei facilitates the identification of collective excitations corresponding to a change in the surface shape and rotation of atomic nuclei. In odd atomic nuclei, the energy of single-nucleon excitations usually differs little from the energy of collective excitations; therefore, their separation is possible only in some special cases. The interaction between the rotation of the nucleus and the external nucleon, on the one hand, changes the structure of the rotational spectrum corresponding to the adiabatic approximation, on the other hand, this interaction changes the spectrum of single-particle excitations. The above circumstances make it difficult to classify the excited states of odd nuclei by analogy with the classification of the excited states of even-even nuclei. And the excited collective states of odd-odd nuclei are even more complex and is an interesting subject, and this phenomenon has been little studied.

In the non-adiabatic collective model, where the Hamilton operator includes the operators of longitudinal and transverse vibrations of the surface of an even-even remainder and the energy operator of an external proton and neutron in the core field, the interactions of an external proton and neutron are also taken into account. However, the general solution of the Schrodinger equation by such a Hamiltonian is complex. Therefore, the present work attempts to describe the collective excitations of odd-odd nuclei in the framework of a non-adiabatic collective model with effective non-axiality. The rotationally single-nucleon spectrum of the excited states of odd-odd nuclei is determined. These states were calculated and compared with experimental data for nuclei ^{100}Y, ^{104}Rb, ^{162,164}Ho, ^{242}Am.

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