

$$H = E_0 + \sum_t \varepsilon_t \sum_{i < j} V_{ij} X_i X_j + \dots$$

The total problem with such hamiltonian can be decided, if own function and own meaning of algebra's elements X are found. The interacting boson model (IBM) is an example of the dynamical symmetry problem. It has achieved a significant success in the phenomenological description of collective motion in medium and heavy nuclei at low excitation energies. The interacting boson model for description of nuclear states structure in which collective configurations strongly mixed with a quasiparticle ones has been generalised in this work. In this work we also studied [1] in more detail whether the structure of the whole energy spectrum including yrast, β and γ bands and the observed backbanding phenomena of the deformed nuclei can be described in terms of the whole basic states of the IBM-1 plus two-quasiparticle pairs.

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SUPERSYMMETRICAL PROPERTIES OF NUCLEAR STATES AND STRUCTURE OF EVEN-EVEN DY NUCLEI

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In this work we have investigated the structure of energy spectra and backbanding phenomena of the isotope string of Dy with mass number between 154 and 164. We extend the SU(3)-limits of Interacting boson model to allow a boson to break to form a quasiparticle pair, which can occupy $h_{11/2}$ u $i_{13/2}$ orbitals. The calculated energy levels, intensity of the electromagnetic transitions, including the ground state, β , and γ band are in satisfactory agreement with observed values for the whole string of Dy isotopes. Backbanding of the moment of inertia of the yrast and β states can be reproduced reasonably.

Recently, very high spin states up to $I \sim 40$ and a double backbanding have been observed in some nuclei in rare-earth region [1]. These phenomena might hopefully be interpreted by considering two or more bosons to break to form more quasiparticle pairs and make more bands crossings to form the double backbanding. Our calculation suggests a very easily to handle the recently observed very-high-spin states in some rare-earth nuclei. •

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