The Interacting Boson Model of Dipole-Octupole Strong Correlations in SU(3) Limit for Positive Parity States

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Abstract: Within the framework of the $U_{sdpf}(16)$ interacting boson model (IBM), the effects of strong correlations of the dipole (p^--boson) and the octupole (f^--boson) degree of freedom on the positive-parity states of even-even nuclei in SU(3) limit are discussed. It is shown that configurations of an even number of many p- and f-bosons can not only be incorporated into the usual low-lying collective rotational bands, such as the ground state band, β- and γ-vibrational bands, but also naturally form the $K^{\pi}=1^+$, 3^+ rotational bands, etc. These results are similar to that of $U_{sdg}(15)$-IBM and in good agreement with the experimental data of the $^{176}Hf_{104}$ nucleus. Besides, several intraband E2 transition probabilities are given, which are consistent with that of $U_{sd}(6)$-IBM.

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