

Critical Behavior in Nuclear Structure from Spherical to γ -Soft Deformed Shape in IBM

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Abstract: Comparing with the predictions of the transitional dynamical symmetry E(5) proposed by Iachello [Phys. Rev. Lett. 85 (2000) 3580], the critical behaviors from U(5)-O(6) are studied in the space of two control parameters in the interacting boson model. A simple shape phase diagram has been presented. It is found that E(5) predictions cannot be exactly reproduced by our calculations and that the best agreement is close to the calculations with boson number $N=9$. By comparing with experimental data on E(5)-like nuclei, we find that E(5) predictions and IBM calculations can reproduce the energy ratios and E2 transition ones.

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Key words: nuclear structure, critical behavior, E(5) nuclei, IBM

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