

Vector Boson Model with symmetry-dependent effective charges

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Abstract

This study employs the Vector Boson Model (VBM) with broken SU(3) symmetry [1] to describe collective ground- and γ -bands and the attendant transition rates across even-even deformed nuclei characterized by weak, medium and strong mutual displacement between the two bands. Leveraging recent experimental data [2], we extend the previous theoretical framework to test the model’s validity for nuclear states with high angular momentum. By introducing effective charges dependent on the SU(3) irreducible representations (irreps) used, we minimize the root mean square (RMS) deviation between theory and experiment to identify the optimal irrep. The comparison of the results with the SU(3) irreps predicted by the proxy SU(3) scheme [3, 4] confirms that the VBM serves as a reliable tool for the evaluation of fundamental symmetry properties of deformed nuclei.

References

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