Vector Boson Model Application with Proxy-SU(3) Symmetry

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We show that the model scheme with proxy SU(3) symmetry [1, 2] can be naturally implemented through the algebraic structure of the vector boson model (VBM) with broken SU(3) symmetry [3]. We demonstrate that the application of the VBM with the use of the microscopically determined highest weight irreducible representations of the proxy SU(3) symmetry provides a well justified algebraic description of collective spectra and transition rates in even-even deformed nuclei. In this way it is possible to unambiguously determine the structure of the ground and γ bands in terms of split proxy SU(3) multiplets. The approach allows one to test the limits of validity of the SU(3) symmetry and explain the corresponding evolution of collectivity in different mass regions.

References

[1] D. Bonatsos, I.E. Assimakis, N. Minkov, A. Martinou, R.B. Cakirli, R. F. Casten, K. Blaum, *Phys. Rev. C* **95** (2017) 064325.

[2] D. Bonatsos, A. Martinou, S.K. Peroulis, T.J. Mertzimekis, N. Minkov, *Symmetry* **15** (2023) 169.

[3] N. Minkov, S. Drenska, P. Raychev, R. Roussev, D. Bonatsos, *Phys. Rev. C* **55** (1997) 2345.