

Z(4): γ -rigid Solution of the Bohr Hamiltonian for $\gamma = 30^\circ$ Compared to the E(5) Critical Point Symmetry

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Abstract

A γ -rigid solution of the Bohr Hamiltonian for $\gamma = 30^\circ$ is derived, its β -part being related to the second order Casimir operator of the Euclidean algebra E(4). The solution is called Z(4), since it corresponds to the Z(5) model [1] with the γ variable “frozen”. Parameter-free (up to overall scale factors) predictions for spectra and B(E2) transition rates are in close agreement to the E(5) critical point symmetry, as well as to experimental data in the Xe region around $A = 130$.

References

[1] D. Bonatsos, D. Lenis, D. Petrellis, and P. A. Terziev, Phys. Lett. B 588 (2004) 172.