

Transformation of the Nilsson orbitals to the proxy-SU(3) irreps

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Abstract

In deformed nuclei protons and neutrons are assumed to occupy certain Nilsson model orbitals. The convenient Nilsson model basis for medium or high deformations is the asymptotic one. Using for instance covariant density functional theory, one may predict the occupied Nilsson orbitals by hadrons. But, to proceed to calculations concerning the collective nuclear observables, the use of another collective nuclear model is necessary. The proxy-SU(3) symmetry [1], [2] is such a model, since it departs from the occupied non-deformed shell model orbitals to arrive at the collective nuclear quantities. Thus, a code is designed to transform the asymptotic Nilsson orbitals into the non-deformed spherical shell model orbitals and them into the proxy-SU(3) irreps. Afterwards, all the collective nuclear observables (transition rates, energy spectrum, nuclear moments,...) can be calculated.

References

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- [2] A. Martinou, D. Bonatsos, N. Minkov, *et al.*, *Eur. Phys. J. A* **56** (2020) 239, <https://doi.org/10.1140/epja/s10050-020-00239-0>