

## Generalized seniority for isomers and low-lying excitations in nuclei

### Contenu

#### Abstract

Isomers are the long-lived excited states of nuclei and are of particular interest due to their capacities to provide insights into the nuclear structure [1]. The reason behind their occurrence depends mostly upon the structural surroundings and can vary from region to region. Symmetries of pairing Hamiltonian for the shell model in terms of seniority and generalized seniority are known to play a crucial role in explaining the semi-magic spherical/ near-spherical isomers, particularly for the Sn isotopes [2, 3]. Our recent works provide more credence to the generalized seniority approach to decipher the decay probabilities as well as moments of isomers and other low-lying excited states [4–7]. In this conference, I will focus on the solution for the puzzle of finding consistent nuclear configurations to understand both the decay probabilities and moments of the  $9/2^-$ ,  $8^+$ , and  $21/2^-$  isomers in and around  $N = 126$  closed shell in terms of generalized seniority [8]. Though  $h9/2$  is the dominant orbital for these isomers, the role of configuration mixing from the surrounding  $f7/2$  and  $i13/2$  orbitals is found to be very important for the consistent explanation of all the isomeric properties such as the  $B(E2)$  rates,  $Q$ -moments, and  $g$ -factors. Further, recent efforts to understand the  $B(E3)$  rates in both odd- $A$  and even- $A$   $N = 80, 82, 84$  isotones using the generalized seniority will also be discussed [9].

#### Acknowledgments

BM acknowledges the financial support from the Croatian Science Foundation and the Ecole Poly-technique Fédérale de Lausanne, under the project TTP-2018-07-3554 “Exotic Nuclear Structure and Dynamics”, with funds of the Croatian-Swiss Research Programme.

#### References

- [1] A. K. Jain, B. Maheshwari, A. Goel, Nuclear Isomers - A Primer, Springer Nature, Switzerland (2021).
- [2] B. Maheshwari and A. K. Jain, Phys. Lett. B 753, 122 (2016).
- [3] B. Maheshwari, A. K. Jain and B. Singh, Nucl. Phys. A 952, 62 (2016).
- [4] B. Maheshwari and A. K. Jain, Nucl. Phys. A 986, 232 (2019).
- [5] B. Maheshwari, H. A. Kassim, N. Yusof and A. K. Jain, Nuclear Physics A 992, 121619 (2019).
- [6] B. Maheshwari, European Physical Journal Special Topics 229, 2485 (2020).
- [7] B. Maheshwari, D. Choudhury and A. K. Jain, Nucl. Phys. A 1014, 122277 (2021).
- [8] B. Maheshwari, D. Choudhury and A. K. Jain, Phys. Rev. C 105, 024315 (2022).
- [9] B. Maheshwari, et al., communicated.

**Auteur principal:** MAHESHWARI, Bhoomika (Department of Physics, Faculty of Science, University of Zagreb, HR-10000 Zagreb, Croatia)

**Orateur:** MAHESHWARI, Bhoomika (Department of Physics, Faculty of Science, University of Zagreb, HR-10000 Zagreb, Croatia)

Déposé par MAHESHWARI, Bhoomika le lundi 14 mars 2022