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Seniority and Isomerism in Nuclei

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The nuclear isomers are long-lived excited states, with half-lives ranging from nanoseconds to years. The reason behind their existence may vary from a region-to-region on the basis of hindrance mechanisms and nucleonic surroundings. Understanding the existence of isomers can shed light on both the basic modes of nucleonic motion, single-nucleon as well as collective, and their interplay. Symmetries also play an important role in the isomeric population. In spherical, or near spherical region, symmetries due to pairing correlations exist in terms of seniority quantum number. Our recent works (as listed below) manifest the governing role of seniority and generalized seniority in isomers and other low-lying excitations along with their various spectroscopic properties. A few interesting and important results on the basis of generalized seniority approach, such as the discovery of a new kind of seniority isomers, resolution of double-hump B(E2) trends, existence of isomers beyond the capacity of intruder orbital etc. will be discussed in the talk.

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Primary author: MAHESHWARI, Bhoomika (IIT Ropar, Rupnagar 140001, India)

Presenter: MAHESHWARI, Bhoomika (IIT Ropar, Rupnagar 140001, India)

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