



Contribution ID: 110

Type: Oral presentation

Contemporary aspects of the theory for the nuclear giant dipole resonance

Thursday, October 9, 2025 9:00 AM (45 minutes)

The isovector giant dipole resonance (IVGDR) is one of the dominant excitations of the atomic nucleus. In addition to providing insights on nuclear structure, it is involved in many applications, such as in nuclear astrophysics. Characterizing the IVGDR over the nuclear chart is of fundamental importance, and experimental data in both stable and exotic nuclei provide cornerstones in the validation of the theoretical description of the IVGDR. Calculations can be undertaken in specific nuclei to compare to the data and learn about their structure. Large-scale predictions in many stable and exotic nuclei, where the IVGDR has not yet been measured, are also of interest. In recent years, an increased variety of complementary theoretical methods could predict the IVGDR, such as improved energy density functional approaches, shell-model based calculations, or ab initio related ones. They allow for the microscopic investigation of the IVGDR in various cases, including deformed nuclei.

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Session Classification: Session I