

Microscopic analysis of giant monopole resonance in nuclear isotopic chains

Thursday, 30 May 2024 10:00 (20)

A systematic study of the isoscalar giant monopole resonance (ISGMR) in a variety of nuclear systems is performed within the microscopic self-consistent Skyrme HF+BCS method and coherent density fluctuation model. The calculations for the incompressibility in finite nuclei are based on several energy density functionals for nuclear matter. This theoretical scheme is successfully proved, for instance, in calculations of the nuclear symmetry energy [1-3], as well as of the ratio of its surface to volume components [4,5]. The good agreement achieved between the calculated centroid energies of the ISGMR and their recent experimental values for various nuclei demonstrates the relevance of the proposed theoretical approach [6]. The latter can be applied to analyses of neutron stars properties, such as incompressibility, symmetry energy, slope parameter, and other astrophysical quantities.

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Primary author(s) : GAIDAROV, Mitko (INRNE-BAS)

Co-author(s) : IVANOV, Martin (INRNE-BAS); KATSAROV, Yordan (INRNE-BAS); ANTONOV, Anton (INRNE-BAS)

Presenter(s) : GAIDAROV, Mitko (INRNE-BAS)

Session Classification : Session 11