

Experimental investigations of nuclear structure around $A = 180$

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Abstract

Nuclei around $A = 180$ are an important group in the nuclear chart. The collective behavior often dominates their ground-state bands, while single-particle degrees of freedom can drive interesting phenomena as the number of nuclear constituents progress towards the drip lines. To explore their nuclear structure, a few experiments have been carried out recently at the Tandem Accelerator Lab of IFIN-HH in Romania, using the ROSPHERE detector array and ancillary devices, and focusing on neutron-rich isotopes of Ba, Gd, Yb and Hf isotopes. This paper provides an overview on the findings of detailed spectroscopic studies in these isotopes using transfer, capture and fusion-evaporation reactions aiming at understanding the evolution of shapes and deformation, as well as testing new and older theoretical models by studying lifetimes, reduced matrix elements and quadrupole moments. The findings are further discussed in terms of open questions of nuclear structure as masses approach the proton shell closure at $Z = 82$.

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