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Quest for Nuclear Properties Beyond ^{132}Sn Towards $A=140$

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Neutron-rich nuclei close to the r-process path and waiting-point nuclei give extremely essential information about intrinsic nuclear properties vital both for nuclear physics and for astrophysics. They reveal how structure effects are of importance for theoretical modeling and can be crucial to understanding deviations of microscopic-macroscopic self-consistent models treating both neutron and gamma emission from data [1,2].

Such studies can be performed on long-lived excited and ground states, predominantly disintegrating by beta decay, on the neutron-excess side of the stability line. Some of the nuclei in the neighborhood of ^{132}Sn , although exotic and neutron-rich, have rather simple structures, dominated by shell effects, and the evolution of low-lying proton-neutron orbitals [3,4].

Furthermore, these effects are possible to study in beta decay coincidences with gamma-ray detection. Recently, we performed several investigations reporting on the structure and FF / GT rates by spectroscopy [5,6]. Confronted with purely neutron emission detection methods and $T_{1/2}$ measurements [8,9], they provide complementary and rather complete data sets to better describe astrophysical scenarios away from the stability line. Examples will be presented together with the available theoretical picture.

[1] P. Möller et al., At. Dat. Nucl. Dat. Tabl. 125, 1 (2019).[✉](#)

[2] F. Minato et al., Phys. Rev. C 104, 044321 (2021).

[✉](#)[3] R. Lozeva et al., Phys.Rev. C 98, 024323 (2018).[✉](#)

[4] R. Lozeva et al., Phys. Rev. C 110, 064303 (2024).

[5] V. Phong et al., Phys. Rev. Lett. 129, 172701 (2022).[✉](#)

[6] J. Liang et al. Nucl Dat. Sh. 168, 1 (2020).

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