

## Atomic nucleus at the edge of stability

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Loosely bound nuclei are currently at the centre of interest in low-energy nuclear physics. The deeper understanding of their properties provided by the shell model for open quantum systems changes the comprehension of many phenomena and offers new horizons for spectroscopic studies from the driplines to the well-bounded nuclei for states in the vicinity and above the first particle emission threshold [1]. Systematic studies in this broad region of masses and excitation energies will extend and complete our knowledge of atomic nuclei at the edge of stability.

In this talk, I will review the recent progress in the open quantum system shell model description of nuclear states, in particular, the understanding of (i) near-threshold collectivity and clustering, (ii) modification of effective NN interactions and shell occupancies in weakly bound/unbound states, and (iii) low-energy reactions of astrophysical interest.

[1] N. Michel, M. Płoszajczak, *Gamow Shell Model - The Unified Theory of Nuclear Structure and Reactions*, Lecture Notes in Physics **983** (Springer, Cham, 2021).