Société Française de Physique

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Nuclear physics at the edge of stability

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Loosely bound nuclei are currently at the center 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. In this talk, I will present the recent progress in the open quantum system description of nuclear states and reactions based on the Gamow shell model which provides a comprehensive description of bound states, resonances and scattering many-body states in a single theoretical framework. Selected examples of the unified description of spectra and low-energy reactions and, in particular, appearance of the salient near-threshold correlations/clustering will be demonstrated.

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