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Exploring Nuclei at the Edge of Nuclear Landscape

Friday, 23 August 2024 09:00 (30 minutes)

How many more neutrons can be added to a given atomic nucleus, and how do such extremely neutron-rich nuclei behave? These are fundamental questions for understanding nuclear structure and relevant nuclear interactions at the edge of stability of nuclei, the driplines. I will show the recent progress of spectroscopic studies of neutron-rich nuclei near and beyond the neutron drip line using direct reactions. After introducing the characteristic experimental methods with a variety of direct reactions, I focus on some of the selected experimental studies at RIBF, RIKEN. I show the first observation of the candidate doubly magic nucleus, 28O (Z=8, N=20)[1], beyond the neutron drip line. I also show the study of the deformed halo nuclei, such as 31Ne in the island of inversion, by using the combinations of different direct reactions: Coulomb breakup, inelastic scattering, and nucleon knockout reactions. Future perspectives on the spectroscopy of such extremely neutron-rich nuclei are also discussed.
[1] Y. Kondo et al., Nature 620, 964 (2023).

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