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Exotic nuclei: Toward the dripline

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About half of the elements heavier than iron that exists in nature are believed to be synthesized by astrophysical rapid neutron capture process (r-process), a sequence of neutron captures and β decays in extreme neutron-rich stellar environments. The astronomical site and the mechanism of the r-process are not yet fully understood. Reliable nuclear data inputs such as nuclear masses, β -decay half-lives, β -delayed neutron-emission probabilities of very neutron-rich nuclei are required to connect the elemental distribution with the astrophysical conditions[2].

Various experiments have been performed for harvesting the nuclear properties toward the neutron dripline at the Radioactive Isotope Beam Facility (RIBF). In this talk, the highlights of recent experiments will be presented together with the perspective of future experimental programs[3].

[1] E.M Burbidge, G.R. Burbidge, W.A. Fowler, and F. Holye, Rev. Mod. Phys. 29, 547 (1957).

[2] M.R. Mumpower, R. Surman, G.C. McLaughlin, A. Aprahamian, Prog. Part. Nucl. Phys. 86 (2016).

[3] S. Nishimura, Prog. Theo. Exp. Phys. 2012, 03C006 (2012).

Field of work

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