

## Experiments related to *r*-process nucleosynthesis at RIBF

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The rapid neutron capture process (*r* process), sequence of neutron capture and  $\beta$ -decay processes, is known to be responsible for the synthesis of approximately half of nuclides heavier than iron. Recently, binary neutron star coalescence candidate was discovered together with an evidence of a kilonova powered by the radioactive decay of *r*-process nuclei in the ejecta<sup>[1]</sup>.

Experimental measurements for the masses, the neutron capture rates ( $n, \gamma$ ), the  $\beta$ -decay half-lives ( $T_{1/2}$ ), and the  $\beta$ -delayed neutron emission probabilities ( $P_n$ ) of very neutron-rich nuclei are required to understand the mechanism of the *r*-process nucleosynthesis. We will present the recent results and future perspective of the RIBF experimental programs relevant to the *r*-process nucleosynthesis<sup>[2,3]</sup>.

[1] B.P. Abbott *et al.*, *Astrophys. Jour. Lett.* **848**: L12, (2017).

[2] S. Nishimura, *Prog. Theor. Exp. Phys.* **2012**, 03C006 (2012).

[3] A. Tarifenño-Saldivia *et al.*, *JINST* **12**, 04006 (2017).