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Decay spectroscopy at RIBF: The EURICA project and its impact on nuclear structure and astrophysics

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Isomer- and β-decay spectroscopy are very effective approaches to study nuclear structure far from the β stability, where the production rates are extremely low. Thus they are capable to address many open questions in nuclear physics such as persistence of shell gaps, evolution of nuclear structure, shape coexistance and deformation in exotic nuclei with unbalanced neutron to proton ratio. Furthermore, β-decay studies on exotic nuclei provide important inputs for astrophysics such as β-decay half lives and β-delayed neutron- and proton-emission probabilities. This information are of great importance to model the astrophysical r- and rp-process and to understand the nucleosynthesis in the universe.

In order to take advantage of the high intensity primary beams at the RIBF facility, the EURICA project has been launched at RIKEN in 2012 with the goal of performing spectroscopic studies of very exotic nuclei. Many experimental campaigns have been completed successfully using fragmentation of ^{124}Xe beam and in-flight fission of ^{238}U beam. Many key nuclei and their neighboring isotopes have been produced and studied in details, such as ^{78}Ni, ^{110}Zr, ^{128}Pd, ^{100}Sn, ^{138}Sn, and ^{170}Dy. This contribution highlights the EURICA experiments performed at RIKEN and results obtained so far, covering isotopes from $Z = 26$ to $Z = 66$ with a large variety of physics case.

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