Contribution ID: **92** Type: **Oral Presentation**

Isomer spectroscopy of heavy nuclei beyond the 126-neutron closed shell at RIBF

Exploring the heavy neutron-rich region around and beyond N=126 is one of the major aims of nuclear facilities worldwide. The foremost reason is understanding the nucleosynthesis of the actinides existing in nature, formed only by the rapid neutron-capture process. At the third waiting point, the only observable measured systematically up to date -some beta-decay half-lives near stability- reveals the largest discrepancies among the models used to calculate nuclear inputs for r-process simulations. Measuring observables better suited to obtain detailed structural information in nuclei with few tens of nucleons above or below is key to obtain higher-quality calculated nuclear inputs getting far away from stability, in the inaccessible regions of the r-process reaction path. In this talk, I will discuss some spectroscopy results from the first two decay experiments successfully carried out at the RIBF facility (Japan) in this mass region [1-3]. The first involved the BRIKEN + HPGe hybrid setup [4], while the second exploited the DTAS Total Absorption Spectrometer [5]. The combined use of these arrays with the DSSSD-based active stopper system WAS3ABi allows one to measure a variety of nuclear observables of interest, including Meitner-Ellis electrons. The discovery of new isomeric states in neutron-rich N>126 nuclei and their impact in our understanding of shell evolution beyond 208Pb will be the main focus of the talk.

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[5] J.L. Tain et al., Nucl. Instrum. and Methods Phys. Res. Sect. A 803, 36 (2015)

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Session Classification: Parallel session

Track Classification: Nuclear Structure, Spectroscopy and Dynamics