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First access to isomeric transitions in $N > 126$ nuclei at RIKEN

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The exotic neutron-rich region around and beyond $N=126$ has long been pursued for investigation in many radioactive ion beam (RIB) facilities and it is still one of the major milestones of the latest generation of RIB laboratories. Because of the challenges in accessing the region due to the technical difficulties in producing, separating, and investigating neutron-rich $N \approx 126$ nuclei, the experimental information available to test shell-model calculations south of 208Pb is almost non-existent at present. Such information are essential not only for our understanding of the foundations of nuclear structure –how the shell structure evolves below and beyond $N=126$, and if deformation or new shell gaps develop in the region–, but to calculate more complex configurations in the more exotic, inaccessible nuclei on the r-process pathway towards the trans-bismuth fissile elements [Hol19].

Until now, the most exotic nuclei in the south-east quadrant around doubly-magic 208Pb have been at the exclusive reach of GSI (Germany), the only laboratory with favourable conditions to produce and separate them through fragmentation of relativistic 238U beams with energy enough to provide a full in-flight isotopic identification. In the present contribution, we will show how the RIBF factory in RIKEN (Japan) has broken the long-term rampart of heavy-ion identification with an innovative Si telescope system used for the first time during the 2021 spring campaign of the BRIKEN collaboration [Wu17,Tol19]. We will provide evidence on how the required resolution in both A/Q and Z is currently achievable in RIBF for $A \sim 220$ nuclei through the identification of the reported (8+) seniority isomer in 216Pb [Got12]. Previously observed isomeric transitions in 210Hg and 213Tl , and newly observed ones in 213Tl will be presented. Based on this information, the level schemes of these nuclei will be revisited and discussed in terms of the latest shell-model calculations in the region [Yuan21]. Future perspectives to continue with the investigation of isomerism beyond 208Pb at RIKEN [Mor21] will be discussed as well.

References

- [Got12] A. Gottardo et al., Phys. Rev. Lett. 109, 162502 (2012)
- [Hol19] E.M. Holmbeck et al., Ap. J. 870, 23 (2019)
- [Mor21] A.I. Morales et al., Shell evolution beyond 208Pb : Isomer and β -decay spectroscopy of neutron-rich Ir to Po isotopes. RIBF NP-PAC Proposal NP2112-RIBF208
- [Tol19] A. Tolosa-Delgado et al., Nucl. Instr. And Methods A, 925-133 (2019)
- [Wu17] J. Wu et al., β -decay spectroscopy in the vicinity of the $N=126$ closed shell. RIBF NP-PAC Proposal NP1712-RIBF158
- [Yuan21] Cenxi Yuan et al., arXiv:2111.04537 (2021)

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