

# New half-lives of r-process nuclei in the vicinity of $^{78}\text{Ni}$

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The  $\beta$ -decays of neutron-rich nuclei near the doubly magic  $^{78}\text{Ni}$  were studied at the Holifield Radioactive Ion Beam Facility (HRIBF) using an electromagnetic isobar separator. The half-lives of  $^{82}\text{Zn}$  ( $228\pm 10$  ms),  $^{83}\text{Zn}$  ( $117\pm 20$  ms) and  $^{85}\text{Ga}$  ( $93\pm 7$  ms) were determined for the first time. These half-lives were found to be very different from the predictions of the global model used in astrophysical simulations [1]. The experimentally measured values were applied to calibrate a new Density Functional used for half-life calculations. It was observed that in the region of interest of this work, half-lives are very sensitive to the ordering of proton single particle states. A sample rapid neutron capture nucleosynthesis calculation using our new set of measured and calculated half-lives shows a significant redistribution of isobaric abundances and a strengthened yield of  $A > 140$  nuclei.

This work was supported by the U.S. Department of Energy Office of Nuclear Physics

## References

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