

In-beam γ -ray spectroscopy of exotic ^{79}Cu with HiCARI

M. Kaci¹, S. Franchoo¹, R. Taniuchi², D. Suzuki³ and the HiCARI collaboration

¹ *Laboratoire Irene Joliot Curie, Orsay, France*

² *School of Physics, Electronics and Technology, York, United Kingdom*

³ *RIKEN Nishina center, Tokyo, Japan*

The in-beam γ -ray spectroscopy of ^{79}Cu was carried out at the Radioactive Isotope Beam Factory of the RIKEN laboratory during the 2021 HiCARI campaign [1]. In-flight fission of ^{238}U at 345 MeV/nucleon produced a wide range of exotic nuclei, including ^{80}Zn . These nuclei were sent through the BigRIPS separator onto a beryllium target, where knock-out reactions took place. The emitted γ rays were detected by an array of germanium detectors positioned around the target, whilst the outgoing fragments were identified in the ZeroDegree separator. Among these fragments, our interest was focused on ^{79}Cu , which contains one proton more than doubly-magic ^{78}Ni . To the extent that the magicity of ^{78}Ni is maintained, the γ spectra of ^{79}Cu are expected to relate to the single-particle transitions of the last proton [2]. Based on the comparison of the shapes of the energy peaks with simulations, the experiment specifically aimed at the determination of the lifetimes of the de-exciting states, the first results of which show the presence of both collective and single-particle structures at low energy in ^{79}Cu .

References

- [1] K. Wimmer *et al.*, *Hicari: High-resolution Cluster Array at RIBF, Riken Accel. Prog. Rep.* **54**, S27 (2021).
- [2] L. Olivier *et al.*, *Physical Review Letters* **119** (2017) 192501.