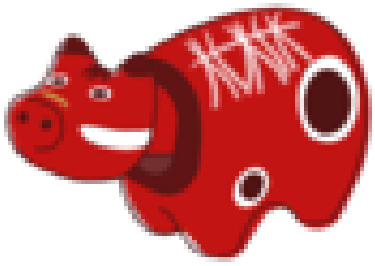

Contribution ID: **34** Type: **not specified**

Exotic structures in N~20 neutron-rich nuclei investigated by spin-polarized β-γ spectroscopy

Tuesday, 4 March 2025 17:20 (20 minutes)

One of the long-standing subjects of nuclear physics is the exotic structure of nuclei located far from the β-stability line. Particularly, neutron-rich nuclei around $N \sim 20$ have been attracting significant attention, and intensive experimental and theoretical studies have been performed to reveal their nuclear structures. Various structures have been predicted, as a result of the competition between the mean field, favoring spherical shape and the nuclear correlations, causing deformation, for the excited states as well as the ground states, such as shell evolution, shape coexistence and so on. To experimentally clarify these exotic structures should provide valuable insights into the isospin dependence of nuclear interactions in the neutron-rich region. However, up to now, experimental information on the excited states has been very limited. We have developed a unique method of β-decay spectroscopy with spin-polarized nuclei, enabling experimental spin-parity assignments of the excited states. The experimental spin-parity assignments enabled level-by-level comparisons between the experimental and theoretical levels.
So far, we have successfully applied this method to the $N = 20$ island-of-inversion nuclei, ^{28,29,30,31}Mg and ^{31,33}Al isotopes, to investigate the variation of the structure as a function of neutron number. In Mg isotopes, our results not only demonstrated structural changes as a function of neutron number but also revealed the coexistence of various types of structures in a narrow excitation energy region, *i.e.*, the shape coexistence of such as spherical and prolately-deformed states, a γ-vibrational band, and a candidate state for scissors mode. In this presentation, the experimental methods and the structures of Mg and Al isotopes will be discussed.

Type of contribution

Are you a student or postdoc?

no

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