



Contribution ID: 72

Type: **Invited oral presentation**

Study of the octupole collectivity of neutron-rich Ba isotopes

Tuesday, 21 April 2026 09:40 (20 minutes)

Octupole-deformed nuclei represent quantum many-body systems in which spatial reflection symmetry is broken in the body-fixed frame, while the symmetry must be restored in the laboratory frame. Such nuclei therefore provide a unique opportunity to investigate fundamental symmetry properties in atomic nuclei. However, the nature of octupole deformation remains insufficiently understood because most nuclei possessing octupole “magic numbers” are radioactive and experimentally difficult to access.

In the region around $Z \sim 56$ and $N \sim 88$, near the doubly octupole-magic nucleus ^{144}Ba , theoretical studies predict a systematic evolution of octupole deformation. In particular, both the emergence and disappearance of octupole collectivity are expected to occur as a result of the competition between quadrupole and octupole correlations.

At RIBF, using the energy-degrading and focusing device OED, we plan to investigate the evolution of octupole collectivity in neutron-rich Ce isotopes. For Ba isotopes, however, theoretical predictions indicate that the boundary of stable octupole deformation extends up to ^{150}Ba , which is presently beyond the experimental reach of RIBF. Therefore, we propose an experiment aimed at studying the octupole collectivity in neutron-rich Ba isotopes in order to clarify the evolution and limits of octupole deformation in this key mass region.

In this experiment, proton- and deuteron-induced inelastic scattering, together with Coulomb excitation, will be performed using re-accelerated radioactive ion beams. These complementary probes enable a systematic investigation of octupole and quadrupole collectivity through the measurement of transition strengths and excitation properties.

Primary author: IMAI, Nobu (Center for Nuclear Study, Univ. of Tokyo)

Presenter: IMAI, Nobu (Center for Nuclear Study, Univ. of Tokyo)

Session Classification: Gamma-ray Spectroscopy enabled by ARIEL re-accelerated rare isotope beams