

Nuclear Structure Study of Neutron-Rich Odd Xe Nuclei by β - γ Spectroscopy

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Shape evolution from spherical to deformed nuclear system is being studied to reveal the effect of nuclear interactions as an increase of neutron number in finite quantum many-body system. Neutron-rich odd Xe nuclei with $A \sim 140$ are located at the northeast transitional-mass region of the doubly-magic ^{132}Sn ($Z > 50$ and $N > 82$). Various nuclear structure with prolate collectivity and octupole correlation are expected to appear this mass region, which is also located around ^{144}Ba ($N = 88$), well known for octupole collective properties.

Neutron-rich Xe nuclei are investigated as a part of EURICA campaign at RIBF, RIKEN, based on β - and isomer-decay spectroscopy. Neutron-rich nuclei with $A \sim 140$ were produced by in-flight fission of ^{238}U beam with energy of 345 MeV/nucleon and intensity of ~ 5 pA, bombarding on a 3 mm Be target. The fragments were then separated and identified through BigRIPS separator and ZeroDegree spectrometer. Ion and β ray were detected by WAS3ABi which consists of 5 DSSSD with 60 vertical and 40 horizontal strips. The parent β decaying nucleus was identified by the same detected position of ion and β ray at the WAS3ABi. Gamma ray was detected by using EURICA, a γ ray detector array consisting of 12 cluster-type Ge detectors.

In this work, neutron-rich odd Xe nuclei are investigated by the β decay and the β -delayed neutron decay of I isotopes and the decay schemes were carefully constructed. Nuclear structure in low-lying states in odd Xe nuclei will be discussed.

Experimental study on nuclear physics

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