

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

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Shape evolution from spherical to deformed nuclear system as a function of neutron number has been studied to reveal the change of residual nuclear interactions in finite quantum many-body system. Neutron-rich 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 structures with prolate collectivity and octupole correlation are expected to appear in these nuclei which are known in neighboring nucleus ^{144}Ba ($Z = 56$ and $N = 88$). Experiment was performed as a part of EURICA campaign based on β - and isomer-decay spectroscopy. Neutron-rich nuclei were produced at RIBF, RIKEN by in-flight fission of ^{238}U beam with energy of 345 MeV/nucleon and intensity of ~ 5 pnA, bombarding on a 3 mm Be target. The fragments were 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 with $A \sim 140$ are investigated by the β decay and the β -delayed neutron decay of I isotopes. Nuclear structure of Xe isotopes will be discussed by comparing to the theoretical calculation.

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