New generation of physics with exotic nuclei at RIBF

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I would illustrate the new facility of RIBF through introducing heavy-ion experimental programs at several experimental devices.

RIBF is the world-class radioactive-isotope beam (RIB) facility, which is based on a new high-power heavy-ion accelerator complex [1] and a new in-flight fragment separator BigRIPS [2]. In 2007, RIBF started to deliver radioactive isotope beams. High performances and potentialities of this facility have been demonstrated by discovery of two new isotopes [3] in 2008 and of 45 new isotopes in 2010 [4].

The accelerator system has been upgraded since 2007. Additional beam monitors have been installed to strengthen a beam diagnostic and to improve a transmission-efficiency. In 2009, an 18GHz SC-ECR ion source was installed to increase heavy-beam intensities. Maximum intensities achieved for ^{48}Ca and ^{238}U beams at 345A MeV are 230 pnA and 0.8pnA, respectively.

Based on the powerful ^{48}Ca beam, the first spectroscopy experiments at BigRIPS and ZeroDegree Spectrometer (ZDS) [5] were performed for the island-of-inversion region as a DayOne experiment campaign in December, 2008 [6, 7]. In this year, missing mass spectroscopy with the state-of-art detector MUST2 made in France was organized to investigate exotic structure of ^{24}O. By using the U beam, the first decay spectroscopy was performed at the end of last year.

Concerning the other devices, a high resolution spectrometer SHARAQ [8] has been served for charge-exchange programs since 2009. A large acceptance spectrometer SAMURAI [9], which is dedicated for exclusive measurements, will be ready in 2011. A system to achieve electron scattering with unstable nuclei SCRIT [10] will be constructed in 2011. An rf ion-guide gas-catcher system SLOWRI [11], Rare-RI Ring dedicated for mass measurement [12] are to be funded in near future.

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