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The Status of RIB Facilities at IMP and Future-Project HIAF

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Increasing new experimental results for high resolution nuclear spectroscopy have been achieved by using RIB facilities at IMP [1-3]. Recent improvements for the two in-flight fragment separators RIBLL1 and RIBLL2, and the experimental storage ring of the HIRFL-CSR accelerator complex [4-6] at IMP are presented, including the newly-developed detector system and instrumentation updates [7-8]. The future project High-Intensity Accelerator Facility (HIAF) for RIB physics, high energy density physics, and electron-ion collisions will be introduced, which is composed of a superconducting heavy-ion linac, a large acceptance superconducting booster ring, multi-functional storage synchrotron rings, and RIB experimental setups. A linac injector is designed to deliver U^{34+} ions up to ~25MeV/u (possible updated to several hundred MeV/u) with a high beam intensity of ~40 pμA by using two superconducting ECR sources. With multi-turn injection, the booster will accumulate and accelerate U^{34+} and U^{76+} ions up to ~1.2 GeV/u and ~3.4 GeV/u with a particle number of $\sim 1\times 10^{11}$ per pulse, respectively. One fragment separator for the RIB physics by using beams from the linac and the second one between the booster and a storage ring for high precision mass measurement are planned. The β-decay beam line and short-lived nuclei-electron collision are also considered at multi-functional storage synchrotron rings. The HIAF project is proposed to begin the construction end of 2014 and start the commissioning in 2019, which will give a possibility to study nuclei at extreme neutron-rich region.

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