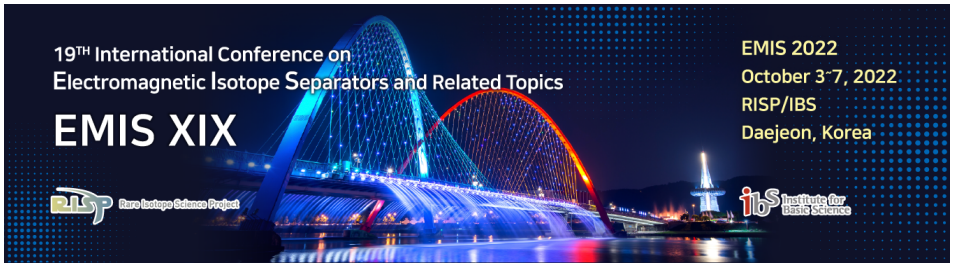

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Current Status of In-flight Fragment Separator for RAON

Tuesday, 4 October 2022 10:10 (20 minutes)

The in-flight fragment (IF) separator of RAON, the main device for producing rare isotope (RI) beams for nuclear science research and applications, is under development. For the purpose of using not only in-flight fission of uranium beams but also projectile fragmentation reactions, the IF separator of RAON is designed to have angular acceptance and momentum resolution of ±40 mrad and ±3%, respectively. The IF separator mainly consists of a target, beam dump, magnets, and detector systems. The high-power target and beam dump, up to 80 kW, were fabricated using graphite. The off-line test of the target and beam dump has been completed and a heat loading test using induction heating is being prepared. The IF magnet system consists of a total of 8 dipole magnets, 15 sets of quadrupole magnet triplet, 2 sextupole magnets, and power supply systems. High field and large aperture quadrupole magnets are required to accommodate the high angular acceptance of the IF separator design, for which low and high temperature superconducting (LTS and HTS) magnets are used. In the high radiation region near the production target, warm iron HTS quadrupole magnets are used to reduce the cold mass and to remove large radiation heat loads effectively at the temperature of ~40K. In the other region, cold iron LTS quadrupole triplets are used. The production of the IF electromagnet has been completed, and the performance test of the LTS quadrupole magnet triplets is in progress. Also, detectors for particle identification (PID) and data acquisition (DAQ) systems are currently being installed at the focal planes of the IF separator. All the components of the IF separator will be installed by end of this year, and the integrated machine commissioning will be started in 2023. Details on the development status of the IF separator of RAON will be discussed in the presentation.

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