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Status of the RAON Facility

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The construction of the RAON (Rare Isotope Accelerator complex for ON-line experiments) facility was launched in 2011 as the Rare Isotope Science Project (RISP). The RAON was designed to produce a variety of stable and rare isotope beams to be used for basic science research and applications. The RAON consists of a heavy ion superconducting linear accelerator (SCL2) as the driver for the In-flight Fragmentation (IF) system, a proton cyclotron as the driver for the ISOL (Isotope Separation On-Line) system, and a superconducting linac (SCL3) for the post-acceleration of ISOL beams. The ISOL and IF systems can be operated independently, while the rare isotopes produced by the ISOL system can be injected to the superconducting linac SCL3 and then to the SCL2 for further acceleration to produce even more exotic rare isotopes through a two-step method (ISOL+IF). This combined scheme (ISOLIF) for producing more exotic rare isotopes in sequence is the uniqueness of the RAON facility.

The first phase of the RISP, constructing the superconducting linear accelerator SCL3, cryo-plant systems, an ISOL system with a cyclotron, supporting facilities, buildings, and seven experimental systems is completed. The construction of the superconducting linac SCL2 to deliver a wide range of heavy ion beams, e.g. uranium beams of 200 MeV/u with a beam current of 8.3 μA and proton beams of 600 MeV with 660 μA will be done as the second phase.

The first beam commissioning of the SCL3 was carried out successfully by accelerating the Argon beam through 22 QWR modules up to 2.47 MeV/u with 34 μA , and then through 32 HWR modules to accelerate Ar beams to 17.6 MeV/u with 21 μA . The accelerated Ar beams were delivered to the KoBRA (Korea Broad acceptance Recoil Spectrometer and Apparatus) system to produce rare isotopes.

Also, the ISOL system was commissioned by bombarding the SiC target with proton beams to generate radioactive isotopes such as Na and Al. The beam commissioning of other low energy experimental facilities such as the MMS (Mass Measurement System), CLS (Colinear Laser Spectroscopy), and NDPS (Nuclear Data Production System) will also be prepared soon. We will report on the current status of the RAON facility.

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