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## Results of the First Physics Experiment with $^{132}\text{Xe}$ and $^{208}\text{Pb}$ Targets at the SCRIT Facility

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Electron elastic scattering is a simple but very powerful tool to investigate the detailed internal structures of nuclei since it can measure the precise charge density distribution through the well-known electromagnetic interaction. Although the charge density distributions have been already measured for many stable nuclei by former electron scattering experiments, the method has yet to be applied to short-lived RIs since it has been technically difficult to realize a high luminosity ( $> 10^{27} \text{ cm}^{-2}\text{s}^{-1}$ ) for electron-RI scattering to complete the measurement within a reasonable experiment period of time. SCRIT (Self-Confining RI Ion Target) method is a novel and unique technique to realize such a high luminosity of the electron-RI scattering by trapping RI targets 3-dimensionally inside an electron storage ring (SR2) with a barrier potential applied by a SCRIT device and the electron beam potential itself. Following the success of the feasibility test of the SCRIT method, the construction of the SCRIT facility at RIKEN RIBF building has begun in 2008.

The SCRIT facility consists of the SR2 with the SCRIT device, an ISOL system called ERIS (Electron-driven RI separator for SCRIT) which utilizes the photo-fission process of uranium to produce RIs, a race-track microtron which provides 150 MeV electron beams to the SR2 and the ERIS, and SCRIT detectors to measure the angular cross-section of scattered electrons. At the SCRIT detectors, the angular distribution of scattered electrons is measured by WiSES (Window-frame Spectrometer for Electron Scattering), and the absolute luminosity of electron-RI scattering is obtained from the bremsstrahlung photons measured by LMon (Luminosity Monitor). After a decade of developments, the SCRIT facility has finally come to the stage of physics experiment. In 2015-2016 the first physics experiment has been performed using stable  $^{132}\text{Xe}$  and  $^{208}\text{Pb}$  targets with the electron beam energy of 150-300 MeV. The SCRIT device has achieved a luminosity above  $10^{27} \text{ cm}^{-2}\text{s}^{-1}$ , and angular cross-sections of elastically scattered electrons have successfully been measured by the SCRIT detectors. In this contribution, we will present the results of the first physics experiment with  $^{132}\text{Xe}$  and  $^{208}\text{Pb}$  targets as well as the performances of the SCRIT device and detectors, then discuss some technical difficulties and on-going developments aiming at the world first electron scattering experiment with short-lived RI targets.

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