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Rare-RI Ring as an isomer beam filter mode

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The Rare-RI Ring (R3) is an isochronous mass spectrometer aimed at measuring the masses of exotic nuclei that are rarely produced with short lifetimes (<10 ms). Since the successful commissioning experiment ten years ago, the technical developments have been continued to improve the efficiency and precision for mass measurements. The vertical steering magnets recently installed at the injection beamline has improved the measurement efficiency of R3. We will soon be able to achieve mass measurements of extremely short-lived nuclei with ppm-order precision in just a few events.
While continuing with mass measurements, we are considering utilizing R3 as an isomer beam filter device. This would be possible by making full use of the unique technique developed for mass measurements: self-triggered individual injection for each event after selecting one nuclide, high-precision isochronous magnetic field, and event-by-event extraction with changing the storage time. Our goal is to deliver only isomer as a beam from R3, rather than simply tagging it with Schottky detector. For example, a first candidate for application would be to measure cross sections with a pure isomer beam of even low intensities. The feasibility of the isomer beam filter mode will be discussed in this presentation.

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Storage rings

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