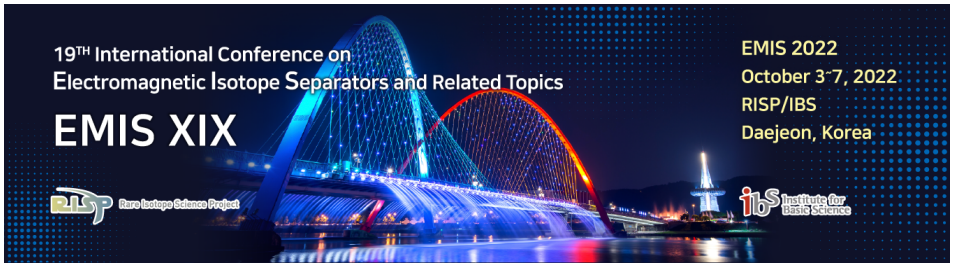

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Design study of re-bunching systems for the RAON low-energy experiments

Tuesday, 4 October 2022 22:32 (8 minutes)

RAON (Rare Isotope Accelerator complex for ON-line experiments) being constructed in Korea will provide both rare isotope and stable ion beams for nuclear physics as well as other applications, at a wide energy range of about 5 –200 MeV/nucleon. One of low-energy experimental facilities, so-called KoBRA (Korea Broad acceptance Recoil spectrometer and Apparatus), will be utilized to produce rare isotope beams with a stable ion beam at an energy range of about 5 - 20 MeV/nucleon in early-phase experiments. The rare isotopes produced at a production target of KoBRA are identified to determine the nuclear charge and mass particle-by-particle from the measurements of position, energy loss, and time of flight together with a pulsed stable ion beam of less than 2.5 MHz. In addition, another facility, named as NDPS (Nuclear Data Production System), also requires a pulsed ion beam of less than 0.2 MHz repetition rate for time-of-flight measurements. The bunch length of the ion beam increases during passing through a transport beam line from the end of the linac to a target, thereby requiring the re-bunching system for longitudinal focusing. The parameters of the re-bunching systems for KoBRA and NDPS were evaluated by electromagnetic field calculations and particle tracking simulations.
An IH-DTL (Interdigital H-mode Drift Tube Linac), designed as a re-buncher for KoBRA, is being manufactured since June 2022. The existing HWR (Half-Wave Resonator) cavities are considered as a re-buncher for NDPS. We will present the status of the re-bunching systems for the RAON low-energy experimental facilities.

Primary author: KWAK, Donghyun

Co-authors: MOON, SeokHo (UNIST); JEONG, Junyeong (UNIST); CHUNG, Moses (UNIST); HAM, Cheolmin (RISP); TSHOO, Kyoungho (RISP/IBS); HAHN, Garam (Pohang Accelerator Laboratory); SHIN, Taeksu

Presenter: KWAK, Donghyun

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