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Capacitive pick-up type bunch shape monitors for low-energy ion beams at RAON

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For Time Of Flight (TOF) experiments in the Rare isotope Accelerator complex for ON-line experiments (RAON), specifically at the Korea Broad Acceptance Recoil spectrometer and Apparatus (KoBRA) and the Nuclear Data Production System (NDPS), the beam repetition rate must not be excessively high, and the bunch length needs to be suppressed. The pre-bunching and re-bunching systems will be operational to achieve these objectives. To measure the bunch shapes near the production targets of KoBRA and NDPS without disrupting the beam, we optimized and manufactured capacitive pick-up monitors for installation upstream of the production targets. Furthermore, an algorithm was developed to reconstruct the shape of non-relativistic ion beams using experimental results measured by capacitive pick-up type monitors. An experiment using bunched hydrogen ion beams was conducted to verify the pick-up monitors' capability to measure bunch shapes. This presentation discusses the design methodology, simulation results, and bench tests of the capacitive pick-up monitors for ion beams with non-relativistic speed and nanosecond-order bunch lengths. Additionally, experimental results using hydrogen ion beams are also presented.

Footnotes

Funding Agency

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Yes

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