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Recent Beam Test Results of RadiaBeam's Multi-Dimensional Bunch Shape Monitor at SNS facility

Monday 11 August 2025 16:00 (2 hours)

Accurate measurement of longitudinal beam parameters is critical for optimizing high-intensity linear accelerators, yet remains difficult for non-relativistic proton and ion beams. The Bunch Shape Monitor (BSM) is a diagnostic device designed to measure the longitudinal profile of charged particle beams. It operates by inserting a thin wire into the beam path, which emits secondary electrons upon interaction with the main beam. These electrons retain the temporal charge distribution information of the primary beam, which is then converted into a spatial distribution using an RF deflector. Existing BSM models suffer from low electron collection efficiency and are limited to one-dimensional measurements of the longitudinal phase coordinate. To address these limitations, RadiaBeam has developed a next-generation BSM prototype featuring a refined focusing field between the target wire and entrance slit to increase secondary electron collection efficiency, an improved RF deflector for greater temporal resolution and linearity, and an upgraded movable mechanism to enable both longitudinal and transverse profile measurements. In this talk, we will present recent beam test results performed at the Spallation Neutron Source (SNS), highlighting improvements to the BSM based on insights from initial experimental data. Additionally, we will discuss further modifications to the BSM needed for compatibility with other facilities, such as PIP-II at Fermilab.

Please consider my poster for contributed oral presentation

Yes

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

Funding Agency

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I have read and accept the Privacy Policy Statement

Yes

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