Contribution ID: **1703** Contribution code: **THPS102** Type: **Poster Presentation**

Advancements in RadiaBeam's multi-dimensional bunch shape monitor: updated testing results and improvements

Thursday 5 June 2025 15:30 (2 hours)

The Bunch Shape Monitor (BSM) is a versatile diagnostic device designed to measure longitudinal beam parameters, which are essential for the operation and development of high-intensity linear accelerators. However, these measurements remain challenging for proton and ion beams at non-relativistic energies. RadiaBeam has developed an enhanced BSM prototype with several key innovations to improve performance. These include a focusing field between the wire and entrance slit for improved collection efficiency, a redesigned microwave deflector for enhanced beam linearity, and a moving mechanism enabling both transverse profile and longitudinal measurements. Following the initial tests at the Spallation Neutron Source (SNS) presented last year, this work details updated testing results including characterization and optimization, and additional component improvements based on the beam tests conducted at the SNS facility.

Footnotes

Paper preparation format

Word

Region represented

America

Funding Agency

This work was supported by the U.S. Department of Energy, Office of Basic Energy Sciences, under contract DE-SC0020590.

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Session Classification: Thursday Poster Session

Track Classification: MC6: Beam Instrumentation and Controls,Feedback and Operational Aspects: MC6.T03 Beam Diagnostics and Instrumentation