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Characterization of an IRRAD beam profile monitor at the CERN T8 beamline and possible improvements via cross-analysis with multiwire proportional chamber

Thursday 5 June 2025 15:30 (2 hours)

A new Beam Profile Monitor (BPM) system has been recently developed at the IRRAD Proton Facility to monitor the high-intensity 24 GeV/c proton beam from the CERN Proton Synchrotron accelerator. Thanks to the use of a new sensor manufacturing technology based on the microfabrication of metal nano-layers and updated readout electronics based on a Charge-Sensitive Amplifier with integrated 20-bit ADC and ARM controller, this system features minimal particle interaction, improved radiation hardness and higher sensitivity than earlier solutions.
The growing users'demand for precise irradiation of modern electronics, requiring ever more detailed beam information, is driving the introduction of future IRRAD upgrades, by leveraging on the presence of additional detector, a Multiwire Proportional Chamber, a detailed comparison-based analysis was performed to better characterize the IRRAD BPM system. It allowed us to introduce improvements in beam monitoring via advanced software and data processing. These results are crucial for future improvements at IRRAD by formulating requirements for the profile monitoring of new types of beams in IRRAD, e.g. heavy-ion and low-intensity proton beams.

Footnotes

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Author: SZUMEGA, Jaroslaw (European Organization for Nuclear Research)

Co-authors: BOUGUEROUA, Lamine (École FRançaise d'Électronique et d'Informatique); GKOTSE, Blerina (MINES Paris); JOUVELOT, Pierre (MINES ParisTech); MINAFRA, Nicola (European Organization for Nuclear

Research); PELISSOU, Pierre (European Organization for Nuclear Research); PEZZULLO, Giuseppe (European Organization for Nuclear Research); RAVOTTI, Federico (European Organization for Nuclear Research)

Presenter: SZUMEGA, Jaroslaw (European Organization for Nuclear Research)

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