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Beam characterization and lessons learned from beam commissioning prior to SRF linac integration

Tuesday 23 September 2025 14:30 (3 hours)

The Linear IFMIF Prototype Accelerator (LIPAc) is a deuteron linear accelerator (linac) designed to validate the acceleration of a 125-mA beam up to 9 MeV in continuous wave (CW) operation, contributing to the realization of the IFMIF project. The 125-mA deuteron beam is initially accelerated to 5 MeV by a radio-frequency quadrupole (RFQ) and subsequently to 9 MeV by a superconducting radio-frequency (SRF) linac. In LIPAc, even slight particle losses can lead to SRF linac quenching, component damage, and radioactivation. Therefore, ensuring stable beam transport with minimal particle losses is crucial to the success of this project. LIPAc is assembled and commissioned in phases, and the installation of the SRF linac into the beamline is underway. The validation of the functionality of the beam diagnostic devices and the characterization of the beam properties were conducted during phase B+ beam commissioning prior to operating with the SRF linac. Particle losses and discrepancies were observed between the measured and simulated beam sizes. However, through iterative optimization, these particle losses were minimized achieving a matched beam. In this conference, the details of the beam characterization and lessons learned from Phase-B+ will be presented, as well as the beam optics for commissioning with the SRF linac.

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Yes

Footnotes

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