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Beam Position Monitor Calibration Through Correlation with Accelerator Models During LIPAc Phase B+ Commissioning

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The Linear IFMIF Prototype Accelerator (LIPAc) validates key features of the IFMIF. After completing Phase B+, it is preparing for Phase C. Beam Position Monitors (BPMs), essential non-interceptive diagnostics for beam alignment and time-of-flight measurements, were only partially calibrated but provided key data for commissioning. As BPMs will be even more critical in Phase C, a full calibration and validation campaign has been undertaken. This work presents the correlation between experimental data, obtained during B+ phase, and TraceWin simulations. The TraceWin model has also been migrated to PyORBIT, validating the tool as a flexible, Python-based tool for future LIPAc operations. Cable calibration procedures and methods to determine accurate parameters for the Operator Interfaces are detailed. Results show excellent agreement between simulations and measurements, confirming the reliability of both TraceWin and PyORBIT models. An exploratory Bayesian optimization approach is proposed to refine BPM parameters and improve future commissioning activities.

Footnotes

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Commission. Neither the European Union nor the European Commission can be held responsible for them.

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