IPAC'25 - the 16th International Particle Accelerator Conference



Contribution ID: 2375 Contribution code: SUPS020

Type: Student Poster Presentation

Cavity loops Influence on the single-bunch Instability thresholds of the CERN PS Booster

Sunday 1 June 2025 14:00 (2 hours)

The CERN Proton Synchrotron Booster (PSB) delivers a wide variety of high-intensity and high-brightness proton beams to several destinations, including operations at the Large Hadron Collider (LHC) and various fixed-target experiments. Following the Long Shutdown 2 (LS2) upgrades, discrepancies between beam measurements and macro-particle simulations were observed, highlighting the need for a deeper understanding of the longitudinal impedance and related effects in the PSB. To address this, longitudinal single-bunch instability studies have been conducted to evaluate the impedance model through the intensity and energy thresholds across different radio-frequency configurations. This contribution presents experimental results that explore instability mechanisms and the effect of the beam loading compensation feedback system. These results are used to benchmark a new cavity loop simulation, which enables more detailed studies of the accelerator impedance.

Footnotes

Paper preparation format

LaTeX

Region represented

Europe

Funding Agency

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Session Classification: Student Poster

Track Classification: MC5: Beam Dynamics and EM Fields: MC5.D05 Coherent and Incoherent Instabilities Theory, Simulations, Code Development