Contribution ID: **86** Contribution code: **THPT33** Type: **Poster Presentation**

High-intensity beam tests in the CERN Proton Synchrotron

Thursday, October 23, 2025 5:10 PM (20 minutes)

A study campaign to identify potential limitations at highest intensities has been performed in the Proton Synchrotron (PS) in view of future requirements for fixed-target beams at CERN. Previous explorations of the maximum intensity date back more than two decades, and they required two injections from the PS Booster (PSB) with a long flat-bottom in the PS. This scheme resulted in unacceptably high beam loss. The limitations in the PSB have been removed with the upgrades in the framework of the LHC Injectors Upgrade (LIU) project. In combination with improvements to the PS RF systems, these upgrades enabled the acceleration of more than $4 \cdot 10^{13}$ protons for the first time. Coupled-bunch instabilities during the first part of acceleration are mitigated by a dipole mode feedback system. Additionally, careful adjustment of the working point at transition crossing was vital for reducing beam loss. A barrier-bucket RF system with a wideband cavity introduces a gap in the longitudinal distribution for the extraction kicker. The focus recently moved to evaluating the impact of beam induced voltage in this cavity, as well as the residual population of the gap.

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

Author: DAMERAU, Heiko (European Organization for Nuclear Research)

Co-authors: HUSCHAUER, Alexander (European Organization for Nuclear Research); LASHEEN, Alexandre (European Organization for Nuclear Research); ASVESTA, Foteini (European Organization for Nuclear Research); BOZATZIS, Miltiadis (Aristotle University of Thessaloniki); ALBRIGHT, Simon (European Organization for Nuclear Research); PREBIBAJ, Tirsi (European Organization for Nuclear Research)

Presenter: DAMERAU, Heiko (European Organization for Nuclear Research)

Session Classification: THPT poster session

Track Classification: WGA:Beam Dynamics in Rings