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Characterization of transverse profiles along the LHC injector chain at CERN

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Following the successful implementation of the LHC Injectors Upgrade (LIU) project, the CERN injectors were re-commissioned in 2021 and have been delivering beam to the LHC since 2022. The operationally delivered beam is well within the specifications regarding its brightness. However, heavy population of non-Gaussian tails of the transverse beam profiles were observed.

These tails lead to high losses at LHC injection and degrade the luminosity reach of the LHC.

This paper follows the studies to characterize the transverse profiles along the accelerator chain: the Proton Synchrotron Booster (PSB), the Proton Synchrotron (PS) and the Super Proton Synchrotron (SPS). The methodology to measure the emittance and the tail population as the studies aimed at reducing this population will also be discussed.

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Footnotes

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Yes

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