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Study of the performance and beam loss limitations during injection of high-intensity LHC proton beams

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The LHC Injectors Upgrade project at CERN optimized the injection accelerator chain to deliver proton intensities per bunch of $2.3e+11$ ppb. Throughout 2023, the LHC was filled with up to 2464 bunches per beam using a hybrid injection scheme, involving up to 236 bunches per injection, with a maximum intensity per bunch of $1.6e+11$ ppb. These beam parameters already revealed significant beam losses at the primary collimator in Point 7 during injection, with large fluctuations from fill to fill, limiting in several cases the machine performance. This contribution analyses the performance of the LHC during injection and discusses possible improvements.

Footnotes

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Europe

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