Contribution ID: **1423** Contribution code: **MOPA125** Type: **Poster Presentation**

Analysis of orbit measurements with the new High Luminosity LHC collimator beam position monitors in the LHC run 3

Monday, 8 May 2023 16:30 (2 hours)

The High Luminosity Large Hadron Collider (HL-LHC) project foresees the upgrade of a large fraction of primary and secondary collimators of the betatron cleaning system to reduce the collimation impedance. The new collimator design also includes the installation of in-jaw beam position monitors (BPMs) to align the collimators faster and to continuously monitor the beam orbit, ensuring an optimum collimation hierarchy. This upgrade is being done in two stages: 12 of the 22 new collimators were already installed during the Long Shutdown 2 (2018-2021), four primary collimators and eight secondary collimators. They have been used in normal operation since the recommissioning in 2022. This paper discusses the experience gained with collimator BPMs during the recommissioning of the LHC, in particular orbit stability throughout a complete cycle, comparison of the alignment with BPMs and the traditional method based on beam loss monitors, as well as interlock strategies.

Funding Agency

This work was supported by the HL-LHC project

Footnotes

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Session Classification: Monday Poster Session

Track Classification: MC1: Colliders and other Particle Physics Accelerators: MC1.T19: Collimation