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Machine protection perspective on the restart of the large hadron collider after long shutdown 2

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In 2022, the Large Hadron Collider started its third operational run. Following the three-year Long Shutdown 2, a careful re-commissioning of the machine protection system (MPS) took place. The initial hardware and beam commissioning period was followed by a 30-day-long intensity ramp-up, during which the number of circulating bunches was successively increased to 2460 bunches per beam. After each pre-defined intensity step, a detailed analysis of the functionality of the MPS was performed before advancing to the next step. It paved the way to reach a record stored energy of 400 MJ per beam in 2022. This was achieved without observing any beam-induced damage, confirming the excellent performance of the MPS.

The paper reviews the strategy for the LHC re-commissioning and intensity ramp-up from a machine-protection perspective.

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Footnotes

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Yes

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