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LHC BLM-based beam loss pattern recognition algorithm for off-momentum losses

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The Beam Loss Monitoring System (BLM) of the Large Hadron Collider (LHC) protects the accelerator against energy deposition from beam losses. One of the most critical moments regarding beam losses is the start of the beam acceleration. During this process, particles outside the bucket will not be captured in the first seconds of the start of ramp thus being lost at the machine aperture. This is expected to be the moment of minimum beam lifetime in the LHC cycle. During Run 3, losses from these off-momentum particles triggered multiple beam dumps. Several studies are on-going to assess a possible limitation from this loss scenario. This contribution quantifies the beam power lost at that moment and how the losses are distributed along the accelerator by the use of a dedicated BLM loss pattern recognition algorithm.

Footnotes

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