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Beam-beam long-range wire compensators in LHC Run 3

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Beam-beam effects are known to undermine the performance of the LHC during proton-proton collisions. In order to enhance the luminosity production and increase the tolerance of the working point of the machine after the High Luminosity upgrade of the LHC, it is relevant to study the possibility of using current-carrying wires to compensate long-range beam-beam effects. Following proof of principle studies in LHC Run 2, beam-beam wire compensators embedded in the collimators of the LHC are used in standard operation since the start of Run 3. In this paper, a figure of merit quantifying the efficiency of luminosity production is introduced and measurements from LHC Run 3 are presented. Bunch-by-bunch data is used to demonstrate the successful compensation of beam-beam effects in the LHC.

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Footnotes

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