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High Luminosity LHC collimation system performance for different optics configurations

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The High Luminosity Large Hadron Collider (HL-LHC) presents significant collimation challenges due to its high stored beam energy. An effective collimation system is critical for ensuring stable operation, protecting the superconducting magnets and minimizing background to the experiments. This paper examines the current baseline collimation configuration and potential changes to the collimation insertion optics to improve the performance in various areas, for both proton and heavy ion beam operation. The study encompasses on- and off-momentum beam loss simulations across various stages of the operational cycle. Collimation performance is assessed based on leakage to superconducting magnets, as well as losses on the tertiary collimators, to probe this source of induced background to the experimental detectors.

Footnotes

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