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Optimizing beam-beam beta-beating for luminosity enhancement at the LHC

Wednesday 4 June 2025 16:00 (2 hours)

The optimization of LHC operation is focused on achieving the highest possible integrated luminosity to maximize experimental data collection. Given the limitations of current detector systems, maintaining a constant level of integrated luminosity has become more critical than achieving a high peak luminosity. Techniques such as beta-leveling and separation levelling have already been implemented to adjust luminosity and enhance operational efficiency. This study describes how the beam-beam beta-beating effects propagating between the multiple experimental interaction points can serve as an additional mechanism to further increase the total integrated luminosity. The operational solutions and impact on performance will be shown for both the current LHC and its future High Luminosity upgrade.

Footnotes

Paper preparation format

LaTeX

Region represented

Europe

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