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First measurements of fourth and fifth order chromaticity in the LHC

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Chromaticity up to the third order in the LHC has been well observed in the LHC's first and second operational runs, with regular beam-based measurements performed during commissioning and machine development. In previous runs however, no higher-order chromaticity could be observed. In 2022, dedicated collimators setups meant optics measurements could benefit from an improved range of momentum-offset for the chromaticity studies. This allowed the observation of fourth and fifth order chromaticity in the LHC at 450GeV for the first time. Measurements were performed for several machine configurations. In this paper, results of the higher order non-linear chromaticity are presented and compared to predictions of the LHC magnetic model.

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Footnotes

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Yes

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