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The CMS Outer Tracker for the HL-LHC

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The LHC machine is planning an upgrade program which will smoothly bring the instantaneous luminosity to about $5 - 7.5 \times 10^{34}$\,cm^{-2}s^{-1}, to reach an integrated luminosity of $3000 - 4000$\,fb^{-1} by the end of 2039. This High Luminosity LHC scenario, HL-LHC, will require an upgrade program of the LHC detectors known as Phase-2 upgrade. The current CMS Tracker, already running beyond design specifications, and CMS Pixel Detector will not be able to survive HL-LHC radiation conditions and CMS will need completely new devices, in order to fully exploit the HL-LHC data which will be recorded under highly demanding background conditions.

The Phase-2 Tracker will be made of two sections, an Inner Tracker and an Outer Tracker. Both detectors will feature increased radiation hardness, higher granularity and capability to handle higher data rate and longer trigger latency in order to ensure at least the same performances of the current detector, in terms of tracking and vertex reconstruction capabilities, at the high pileup (140-200 collisions per bunch crossing) expected at HL-LHC. Moreover the Phase-2 Outer Tracker will have also trigger capabilities since tracking information will be used at L1 trigger stage.

This report is focusing on the replacement of the CMS Outer Tracker system, describing new layout and technological choices together with some highlights on research and development activities.

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