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[B02] The CMS Outer Tracker for the High Luminosity LHC

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The High Luminosity LHC (HL-LHC) is expected to deliver an integrated luminosity of 3000 – 4000 fb⁻¹ by the end of 2039 with peak instantaneous luminosity reaching to about 5 – 7.5 × 10³⁴ cm⁻² s⁻¹. During the Long Shutdown 3 period, several components of the CMS detector will undergo major changes, called Phase-2 upgrades, to be able to operate in the challenging environment of the HL-LHC. The current silicon outer tracker has to be replaced with a new one for operating in the HL-LHC period. The Phase-2 Outer Tracker (OT) will have high radiation tolerance, higher granularity and capability to handle higher data rates. Another key feature of the OT will be to provide tracking information to the Level-1 trigger, allowing trigger rates to be kept at a sustainable level without sacrificing physics potential. For this, the OT will be made out of modules which have two closely spaced sensors read-out by a common front-end ASIC, which can correlate hits in the two sensors creating short track segments called “stubs”. The stubs will be used for tracking in the L1 trigger stage. In this contribution, the design of the CMS Phase-2 OT, the technological choices and highlights about research and development activities will be reported.

contact person e-mail

fabio.ravera@cern.ch

Primary author: RAVERA, Fabio (Fermi National Accelerator Lab. (US))

Presenter: RAVERA, Fabio (Fermi National Accelerator Lab. (US))

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