



Contribution ID: 88

Type: Talk

The CMS Tracker Upgrade for the High-Luminosity LHC

Tuesday, April 2, 2019 5:00 PM (25 minutes)

The LHC machine is planning an upgrade program, which will smoothly bring the luminosity at about $5 - 7.5 \times 10^{34} \text{ cm}^{-2} \text{ s}^{-1}$ in 2028, to possibly reach an integrated luminosity of 3000-4500 fb^{-1} by the end of 2039. This High-Luminosity LHC scenario, HL-LHC, will require a preparation program of the LHC detectors known as Phase-2 upgrade. The current CMS Outer Tracker, already running beyond design specifications, and recently installed CMS Phase-1 Pixel Detector will not be able to survive the HL-LHC radiation conditions. Thus, CMS will need completely new devices in order to fully exploit the high-demanding operating conditions and the delivered luminosity. The new Outer Tracker should also have trigger capabilities. To achieve such goals, the R&D activities have investigated different options for the Outer Tracker and for the pixel Inner Tracker. The developed solutions will allow including tracking information at the Level-1 trigger. The design choices for the Tracker upgrades are discussed along with some highlights on the technological choices and the R&D activities.

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Track Classification: 4: Intelligent tracking detectors and sensors