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The Phase 2 upgrade of the CMS Inner tracker

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The High Luminosity Large Hadron Collider (HL-LHC) at CERN is expected to collide protons at a center-of-mass energy of 14 TeV and to reach the unprecedented peak instantaneous luminosity of $7 \times 10^{34} \text{ cm}^{-2} \text{ s}^{-1}$ with an average number of pileup events of 200. This will allow the ATLAS and CMS experiments to collect integrated luminosities up to 4000 fb^{-1} during the project lifetime. To cope with this extreme scenario the CMS detector will be substantially upgraded before starting the HL-LHC, a plan known as CMS Phase-2 upgrade. The entire CMS inner tracker (IT) detector will be replaced and the new detector will feature increased radiation hardness, higher granularity and capability to handle higher data rate and longer trigger latency. The detector is composed of pixel sensors with pixel size of 2500 um^2 and a new ASIC, designed in 65 nm CMOS technology, powered in a novel serial scheme. The system mechanics will be lightweight, based on carbon fiber, with a CO₂ cooling. In this contribution, we describe the design of the IT system along with the latest results on the system testing of the prototypes.

In-person participation

Yes

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