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Precision Luminosity Measurement with the CMS detector for HL-LHC

Monday 30 September 2019 15:00 (30 minutes)

The High Luminosity upgrade of the LHC (HL-LHC) is foreseen to increase the instantaneous luminosity by a factor of five to seven times the LHC nominal design value. The resulting, unprecedented requirements for background monitoring and luminosity measurement create the need for new high-precision instrumentation at CMS, using radiation hard detector technologies. This contribution presents the strategy for bunch-by-bunch online luminosity measurement based on various detector technologies. A main component of the system is the Tracker Endcap Pixel Detector (TEPX) with an additional 75 kHz of dedicated triggers for online measurement of luminosity and beam-induced background. Real-time implementations of algorithms such as pixel cluster counting on an FPGA are explored for online processing of the resulting data. The potential of the exploitation of the Outer Tracker, the Hadron Forward calorimeter and muon trigger objects will also be discussed.

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