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## **Refurbishment of the CMS Pixel Detector during LS2 and projected lifetime in Run 3**

*Tuesday 22 February 2022 14:50 (20 minutes)*

An upgraded silicon pixel detector, called the phase-1 pixel detector, was constructed for the higher instantaneous luminosity and total radiation fluence experienced during the Run 2 period of the Large Hadron Collider (LHC) and was installed in the Compact Muon Solenoid (CMS) in 2017. The upgraded detector is comprised of four barrel layers and three end-cap disks, with modules in the innermost layer positioned at a smaller radius compared to its predecessor. In order to cope with the higher particle rate and to extend the overall lifetime of the detector until the end of Run 3, a replacement of the innermost layer was scheduled to be performed during the second long shutdown period (LS2) of the LHC, between 2019 and 2021. This planned operation enabled to make improvements in the readout chips and front-end ASICs of the innermost layer, to update the powering system in order to stabilize its operation, to solidify the cooling distribution system and to review the high-voltage power distribution scheme, all based on operational experience gathered during Run 2. The presentation will describe the outcome of the successful refurbishment process during LS2, give details on the commissioning and future operation of the detector, and show projections for the expected performance in Run 3.

### **Primary experiment**

CMS Experiment at CERN

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