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Construction and Operation of the CMS Phase-1 Silicon Pixel Detector at the LHC

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The CMS Phase-1 Pixel Detector was designed to cope with an instantaneous luminosity 2 x 10ˆ34 cm-2 s-1 and 25 ns bunch spacing with very small efficiency loss. The upgraded detector has 124M channels that features a 4-hit coverage in the tracking volume. DC-DC converters were used to deliver more power to the detector without the need of replacing the cable plant. CO2 based cooling was implemented and carbon based structures were used to reduce material in the tracking volume. The data acquisition system was upgraded to accept higher event rates and a digital data format from the detector front-ends. The detector was installed in early 2017 and has been successfully operated since then. In this presentation, the construction and assembly, operational experience and the performance of the pixel detector at the LHC will be discussed.

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