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Near Future Upgrades for the CMS Pixel Detector

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The silicon pixel detector is the innermost component of the CMS tracking system, providing high precision space point measurements of charged particle trajectories. The performance of the current pixel detector has been excellent during Run 1 of the LHC. However, the foreseen significant increases of the instantaneous and integrated luminosities at the LHC necessitate an upgrade of the pixel detector in order to maintain the excellent tracking and physics performance of the CMS detector. The new pixel detector is planned to be installed during an extended LHC winter shutdown in 2016-17. The main new features of the upgraded pixel detector would be ultra-light mechanical design, an additional 4th layer in the barrel and two additional endcap disks, and a new digital readout chip with increased buffers to minimize data-loss. The other important features are a new two-phase CO₂ cooling system and a new powering scheme via DC-DC converters. Each of these aspects will be summarized and the resulting improvements in physics performance will be discussed. Current status on module assembly and testing will also be reported.

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