

Abstract Submitted  
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**Construction of the Phase I Forward Pixel Detector**<sup>1</sup> ASHTON NEYLON, University of Nebraska Lincoln, RACHEL BARTEK<sup>2</sup>, Catholic University of America — The silicon pixel detector is the innermost component of the CMS tracking system, providing high precision space point measurements of charged particle trajectories. The original CMS detector was designed for the nominal instantaneous LHC luminosity of  $1 \times 10^{34} \text{cm}^{-2} \text{s}^{-1}$ . The LHC has already started to exceed this luminosity causing the CMS pixel detector to see a dynamic inefficiency caused by data losses due to buffer overflows. For this reason the CMS Collaboration has been building an upgraded pixel detector which is scheduled for installation during an extended year end technical stop during winter 2016/2017. The phase 1 upgrade includes four barrel layers and three forward disks, providing robust tracking and vertexing for LHC luminosities up to  $2 \times 10^{34} \text{cm}^{-2} \text{s}^{-1}$ . The upgrade incorporates new readout chips, front-end electronics, DC-DC powering, and dual-phase  $\text{CO}_2$  cooling to achieve performance exceeding that of the present detector with a lower material budget. This contribution will review the design and technology choices of the Phase I detector and discuss the status of the detector. The challenges and difficulties encountered during the construction will also be presented, as well as the lessons learned for future upgrades.

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<sup>2</sup>Ashton will be presenting but Rachel is an author of the CMS collaboration

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