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The tracking detector of the CMS Precision Proton Spectrometer in LHC Run3

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The CMS Precision Proton Spectrometer (PPS) was designed for measuring protons that escape along the LHC beam line after the interaction in CMS. It has successfully taken data during the LHC Run 2, collecting more than 110 fb⁻¹ of integrated luminosity, and since 2022 is taking data in Run 3. A substantial upgrade of the PPS tracker was designed in preparation for Run 3, concerning the sensors, readout electronics, and detector mechanics. It employs new single-sided 150 um-thick silicon 3D pixel sensors, read out with the PROC600 chip used in the layer 1 of the CMS pixel tracker after the Phase 1 upgrade. An innovative mechanical solution was adopted to mitigate the radiation effects caused by the non-uniform irradiation of the readout chip, which were the main limiting factors in the Run 2 performance: miniaturised stepping-motors have been coupled with the detector mechanics, allowing for vertically moving the installed detectors during beam downtimes. In this contribution we will present the new apparatus installed for Run 3 and the preliminary performance results obtained by analysing the Run 3 data collected up to now.

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