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CMS Pixel Upgrade: Robustness Studies of the CMS Tracker Inner Barrel[1] JUAN CUEVAS, University Of Puerto Rico-Mayaguez, CMS COLLABORATION — An upgrade of the Compact Muon Solenoid (CMS) pixel detector is proposed to maintain the excellent tracking and physics performance of the detector when running at the highest luminosities expected towards the end of the Phase 1 run of the CERN Large Hadron Collider. The ability of the pixel upgrade to ameliorate inefficiencies in the CMS Tracker Inner Barrel (TIB) detector is presented in this study. The TIB could degrade during its lifetime through a number of possible effects such as radiation damage, or failure of the detector components. In the first scenario we present a degradation study of the TIB by simulating a homogeneous inefficiency of the strip detector due to data loss in the first two layers of the TIB. In the second scenario we simulate specific dead modules which may be caused by a failure of some cooling loops in the TIB, or by radiation damage. This generates zones where particles are not detected in the TIB. The impact of these degradations on tracking efficiency and fake rate are studied with the current and with the proposed upgrade pixel detector. These studies were done for luminosities of up to 2×10^{34} $\mathrm{cm}^{-2}\mathrm{s}^{-1}$.

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