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Triggering performance of stacked pixel layers for the SLHC CMS tracker

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We present simulation results for a concept detector designed to provide tracking information to the CMS Level-1 trigger in a new silicon tracker for SLHC. A layer comprising pairs of closely separated pixel sensors (˜1mm spacing, ˜100 um x >2.5 mm strixels) could be used to reduce the on-detector data rate by selection of hits from high transverse momentum tracks. The geometry has been modeled within GEANT for an accurate description of material effects. The performance of one of these triggering layers has been measured from simulations for a range of sensor configurations. We present that a single layer would be capable of reducing the detector data rate by a factor of ~20 while maintaining efficiencies in excess of 95% for tracks with pT>2GeV/c while information from two or more triggering layers could be used to further reduce the amount of tracking information provided to the Level-1 trigger.

Primary authors: Prof. HALL, Geoff (Imperial College London);   PESARESI, Mark (Imperial College London)

Presenter: PESARESI, Mark (Imperial College London)

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