

Impact of tracker layout on track reconstruction in pp collisions with high pileup at CMS.

Thursday, October 13, 2016 4:30 PM (15 minutes)

High luminosity operations of the LHC are expected to deliver proton-proton collisions to experiments with average number of pp interactions reaching 200 every bunch crossing.

Reconstruction of charged particle tracks in this environment is computationally challenging.

At CMS, charged particle tracking in the outer silicon tracker detector is among the largest contributors to the overall CPU budget of the tracking.

Expected costs of the tracking detector upgrades are comparable to that of the computing costs associated with the track reconstruction.

We explore potential gains that could be achieved for tracking computational costs for a range of realistic changes in the tracker layout.

A layout with grouped layers placed at shorter distance than the traditional equidistant layer separation

shows potential benefits in several aspects:

increase in locality of track reconstruction up to track segments

measured on these layer groups and reduction of combinatorial backgrounds.

A simplified detector layout emulation based on CMS upgrade tracker

detector simulation is used to quantify dependence of tracking

computational performance for different detector layouts.

Primary Keyword (Mandatory)

Reconstruction

Secondary Keyword (Optional)

Tertiary Keyword (Optional)

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Session Classification: Posters B / Break

Track Classification: Track 2: Offline Computing