

Measuring luminosity with track counting in the ATLAS experiment

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The precise measurement of the luminosity is one of the key requirements for every ATLAS analysis at the Large Hadron Collider (LHC) at CERN. Particularly in high precision experiments, the uncertainty on the luminosity can be one of the main limitations. Therefore, its reduction is the prime goal of the ATLAS luminosity program, requiring a precise understanding of the contributing factors. The two largest individual components are the calibration transfer and the long term stability, both being determined involving the track counting luminosity measurement. The track counting method uses the average number of reconstructed charged particle tracks in the ATLAS Inner Detector as measure for the instantaneous luminosity in proton-proton collisions.

In the track counting luminosity measurement, a number of effects influence the measured number of tracks. These include, for example, the number of simultaneous pp collisions, denoted as μ , and the filling pattern of the individual proton bunches.

The poster discusses the impact of the different components on the uncertainty of the luminosity measurement in general and the track counting luminosity measurement in particular. The primary focus is the dependence on the LHC filling pattern. A better understanding of these effects will help to reduce the uncertainty in the ATLAS luminosity measurement.

I read the instructions

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