

Luminosity measurement using Timepix3 during 2018 pp-collisions at $\sqrt{s}=13$ TeV in the ATLAS experiment

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Precise luminosity determination is of paramount importance for the ATLAS physics program. A set of complementary luminometers is crucial to ensure high stability and precision of the luminosity measurement. In 2018, two Timepix3 detector setups were installed to study their capabilities of measuring luminosity. The detectors benefit from a fine segmentation and a narrow per-pixel time resolution allowing for a high-quality track reconstruction and particle identification. The installed system was used to study luminosity in different time frames: long term (run-by-run), short term (within a single run) and instantaneous (for each bunch crossing). In this presentation, we discuss the methodology to use Timepix3 sensors for luminosity measurement and show first performance, based on data taken at 13 TeV. We demonstrate that different algorithms provide different signal-to-background ratios and indicate the potential to use Timepix3 in the ongoing Run 3 for luminosity measurement.

Alternate track

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