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# Measurement of the muon rate at the SND Experiment with the Timepix3 radiation monitor

*Tuesday 3 June 2025 16:00 (2 hours)*

Using a Timepix3 radiation monitor, the muon rate at the Scattering and Neutrino Detector (SND) location at the Large Hadron Collider (LHC) was measured during luminosity production at the ATLAS collision point. Filters are applied on the measured data to distinguish between background radiation and the muon signal by analyzing the cluster type, length, and angle. The results were compared to the those reported by SND, revealing a count rate ratio of 1.24 of Timepix3 to SND measurements. Taking advantage of the Timepix3 detector capabilities, further features of the muon flux are studied. First, the bunch-by-bunch spacing (25 ns) of the beam is assessed owing to the time resolution of the Timepix3 detector (1.5265 ns). The spatial distribution of the muon flux in the Timepix3 detector surface has been studied, however the detector size is too small for the measured muon rate to yield any distinct patterns, assuming the muon gradient as measured by the SND detector. Finally, the energy deposition $E_{dep}$ of the muons in the Timepix3 detector has been studied, consistent with FLUKA simulated muons coming from ATLAS collisions, with an energy distribution peaked at 100 GeV.

## Footnotes

## Paper preparation format

LaTeX

## Region represented

Europe

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