Contribution ID: **37**   Type: **not specified**

Software development for PLUME detector at LHCb experiment

Tuesday, May 28, 2024 4:50 PM (15 minutes)

For luminosity measurement at LHCb, a key component is the luminosity detector, which typically employs silicon sensors or other types of radiation detectors to measure the rate of collisions between particles, such as protons, in the Large Hadron Collider (LHC) beams. These detectors are often placed around the interaction region to capture particles produced in the collisions.

A new luminosity counter called PLUME (Probe for LUminosity MEasurement) was installed during LS2 to perform this task. It consists of 48 PMTs with quartz windows, that are triggered by a Cherenkov light generated by a passing charged particle.

The team from Taras Shevchenko National University of Kyiv was involved in this project since the early stages of the development. Several students performed critical tasks such as the development of the Monte-Carlo simulations to assess the detector performance and general concept, integration of the simulation to the LHCb software stack, development of the encoding and decoding algorithms for the DAQ, proposal, and creation of novel techniques for timing measurement.

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Session Classification: Session III

Track Classification: Detectors for LHC and future colliders