

First results on the performance of the upgraded LHCb RICH detectors

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With the start of LHC Run 3 the LHCb experiment is designed to run at an instantaneous luminosity five times larger with respect to previous running periods, aiming to collect $L = 50 \text{ fb}^{-1}$ of pp collisions data by the end of Run 4. In addition, thanks to a trigger-less readout and a full software trigger, the selection efficiency for fully hadronic decay channels of heavy hadrons increases up to a factor two. The LHCb RICH detectors have been completely renewed to address unprecedented occupancy values, ensuring outstanding charged hadron discrimination in the more demanding Run 3 environment and at the maximum LHC interaction rate. This process is detailed, outlining the automated calibration procedures of the RICH system to achieve optimal signal efficiency and background rejection during the initial stages of the Run 3 data-taking. The early performance of the newly installed detectors is presented, including the determination of figures of merit such as the Cherenkov angle resolution. It is also reported that unprecedented particle identification capabilities at a hadron collider are obtained, already approaching the design level and outperforming those of Run 1 and 2.

Collaboration

LHCb RICH

Role of Submitter

I am the presenter

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