



Contribution ID: 784

Type: **Parallel**

The LHCb RICH Upgrade: Operations and Performance

The LHCb experiment is designed for precision measurements of CP violation and rare decays of beauty and charm hadrons. A key component enabling these studies is the Ring Imaging Cherenkov (RICH) system, which provides robust particle identification (PID) over a wide momentum range. With the start of Run 3 and the transition to a triggerless readout at 40 MHz, the RICH detectors have undergone a major upgrade to meet the new data-taking and performance demands. This contribution presents the design, implementation, and commissioning of the upgraded RICH system. Key features include the replacement of the Hybrid Photon Detectors with new multi-anode photomultiplier tubes (MaPMTs), the development of custom readout electronics capable of handling the increased data rate, and the re-optimization of the optical layout to maintain PID performance despite a reduced material budget. The challenging construction and installation, as well as first results from commissioning with collisions will be described. Performance metrics such as PID efficiency and stability under high occupancy conditions will be presented, demonstrating that the upgraded RICH system is fully equipped to support the LHCb physics program throughout Run 3.

Secondary track

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Session Classification: T11

Track Classification: T11 - Detectors