

11th International Workshop on Ring Imaging Cherenkov Detectors (RICH2022)



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The LHCb RICH Upgrade

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During the second LHC long shutdown, the LHCb experiment underwent a major upgrade in order to be able to operate at the instantaneous luminosity of $2 \times 10^{33} \text{ cm}^{-2} \text{ s}^{-1}$, reading data at a rate of 40 MHz, with a fully software-based trigger.

The RICH system of LHCb has been completely refurbished installing new photon detectors (Multi-anode Photomultiplier Tubes) equipped with a custom developed read-out chain. In order to reduce the unprecedented peak occupancy, the full optics and mechanics of the RICH1 detector has been re-designed to distribute the Cherenkov photons over a larger surface of the photon detectors planes.

The overview of the RICH upgrade programme is described including the design, installation and commissioning phase. The validation of the newly installed detectors, together with early performance studies is presented.

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