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## The LHCb RICH Upgrade

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The LHCb experiment was upgraded during the Long Shutdown 2 of the LHC (2019-2021) to collect data at five times the instantaneous luminosity of Runs 1 and 2 ( $2 \times 10^{33} \text{ cm}^{-2} \text{ s}^{-1}$ ) using a triggerless data acquisition system. Upgrade I for the RICH system consists of new photon detectors and readout electronics together a new optical system for RICH1, with the purpose to continue to provide excellent particle identification at the new operating luminosity. The front-end readout system features an FPGA based programmable time-gate for allowing the suppression of backgrounds like scintillation, signal induced noise and out-of-time photons. The gate is currently operated at 6.25 ns, suppressing the backgrounds by a factor of four. After a vacuum incident affecting the operation of LHCb in 2023, this has been a productive year with the collection of over  $9 \text{ fb}^{-1}$  in 2024. The key performance indicators of the LHCb RICH system will be presented together with the performance in particle identification.

### Primary experiment

LHCb

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