

11th Beam Telescopes and Test Beams Workshop



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Towards a time-resolved LHCb-RICH detector

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Thanks to the properties of the LHCb-RICH optical system, the time of arrival of the Cherenkov photons emitted by the charged particles passing through the detector can be predicted very precisely. This timing information can be

used to significantly improve both the PID performance and the signal to noise ratio for the detector and will ultimately allow the system to withstand luminosities in excess of $10^{34} \text{ cm}^2 \text{ s}^{-1}$, foreseen after the long shutdown 3 phase (2026-2028).

In this talk I will show the preliminary results of a test beam campaign carried out at CERN between 2021 and 2022 where a small detector prototype equipped with a new front-end ASIC and a custom FPGA designed to timestamp the time of arrival of each photon was tested for the first time. Different types of photosensors were coupled to this new electronics and their timing performances evaluated.

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