
Contribution ID: **42** Type: **Talk**

# Test-beam campaign for the characterization of innovative photodetectors for Ring-Imaging Cherenkov applications

*Thursday 22 May 2025 14:30 (20 minutes)*

A novel hybrid photodetector has been developed and produced as part of the 4DPHOTON ERC-funded project. This device is based on a vacuum tube containing a transmission photocathode, a microchannel plate, and a Timepix4 ASIC used as pixelated anode. It is designed to image single-photon at rates of up to 1 billion photons per second over an area of approximately $7cm^2$, achieving excellent spatial (5-10 $\mu$m) and temporal (50-100 ps) resolutions simultaneously.

A test beam has been performed at the CERN SPS H8 beam-line in order to characterize the performance of the first detector prototypes in a Ring-Imaging Cherenkov configuration.
The setup consists of a tracking telescope composed of two Timepix4 ASICs bump-bonded to semiconductor-based pixel detectors, a solid radiator for Cherenkov photon generation, and an optical system that focuses the emitted photons into a ring on the photodetectors under study.

This contribution will present the results obtained from the analysis of the data. In particular, the performance in terms of tracking resolution, Cherenkov angle resolution and the photon timing resolution will be presented, as well as the comparison between the experimental and the Geant4 simulation results.

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**Session Classification:** Testing and evaluation