

## **DC-coupled HRPPDs and their application in a proximity focusing RICH of the EIC ePIC detector**

Recently introduced High Rate Picosecond Photodetectors (HRPPDs) by Incom are Micro-Channel Plate (MCP) based photosensors with an active area of 104 mm by 104 mm, pixel pitch 3.25 mm and timing resolution on the order of 50 ps for a single photon detection. As such, these photosensors are perfectly suited for Ring Imaging CHerenkov (RICH) detectors with a built in high resolution timing capability.

One of the emerging detector applications of this type is a proximity focusing RICH (pfRICH) in the backward endcap of the Electron-Ion Collider (EIC) ePIC detector at the Brookhaven National Laboratory (BNL). The pfRICH will cover angular acceptance  $-3.5 < \eta < -1.5$ , provide a positive kaon identification on a  $3\sigma$  level up to  $\sim 7$  GeV/c, as well as a timing reference  $\sim 20$  ps for the ePIC barrel and forward endcap Time of Flight subsystems.

Recently, the HRPPDs were re-designed substantially for EIC purposes, and a first batch of five "EIC HRPPDs" was ordered in 2023. Results of the systematic evaluation of these first EIC HRPPD tiles on a test stand at BNL, such as gain and quantum efficiency (QE) non-uniformity, timing resolution, crosstalk, dark count rates (DCR) will be presented. Modeling results, illustrating the expected pfRICH performance in ePIC detector, will be shown as well.