# HRPPD part of the eRD110 R&D FY24 proposal

- (1) “Basic” evaluation of the first five “EIC HRPPD” tiles
  - 5x [3D printed enclosure + Samtec interposers + passive board with 16x 64-channel connectors] sets
  - Lab evaluation by 4+1 groups (Argonne, BNL, Glasgow, INFN Trieste / Genova, Yale)
    - Single photon timing resolution
    - HV setting tuning, etc
    - Ageing studies
  - Magnetic field resilience verification
  - Beam test at Fermilab in early 2024
    - Verification as a timing reference (multi-photon mode)

eRD110 (photosensors)

- Establish production readiness of a LAPPD/HRPPD-based photon-sensor readout for a Ring-Imaging Cherenkov Detector on the electron-side end cap of the EIC detector, including validation by prototype beam tests. [September 2024]

- (2) Full surface scan of all five sensors (QE, gain uniformity)
  - Design of a 16x HGCROC ASIC backplane (-> eRD109 ?)
  - A single pilot set for Argonne

A negligible investment budget-wise

eRD109 (ASICs/FEEs)

- Develop a streaming readout solution specific to particle identification detectors with LAPPDs and/or MCPMTs. This requires a novel ASIC in 130 nm CMOS technology that meets the requirements set by EIC providing a precise time measurement with a TDC combined with an Analog Digital Converter (ADC) for the amplitude measurement. [December 2026]

- (3) Evaluation of a Photonis and a Photek MCP-PMTs
  - Photek Auratek MCP-PMT
  - Passive board kits sufficient for a “basic” evaluation