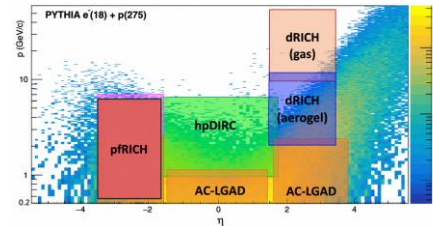
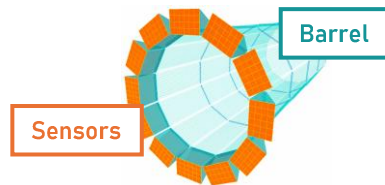


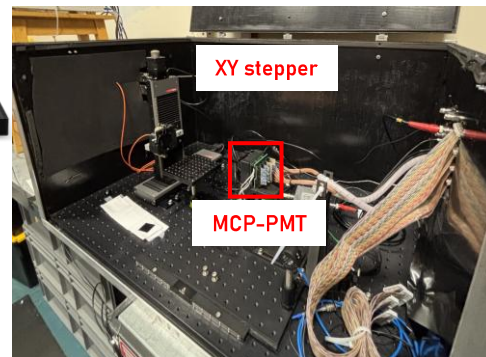
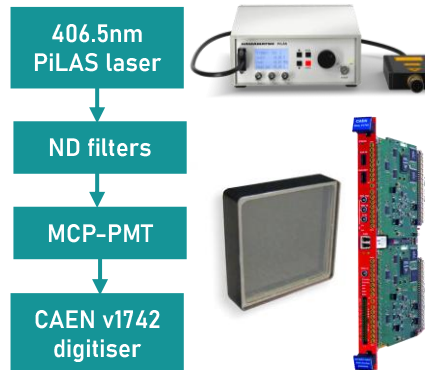
1 Motivation

- Particle identification over broad momentum and pseudorapidity range
- hpDIRC reconstructs Cherenkov cone from **internally reflected light**



- Silica radiator ($n = 1.46$) with **fast photon** sensors on exit – MCP-PMTs
- Reconstruction from sensor **positional** ($<1\text{mm}$) and **timing** ($<60\text{ps}$) information

2 Experimental Setup

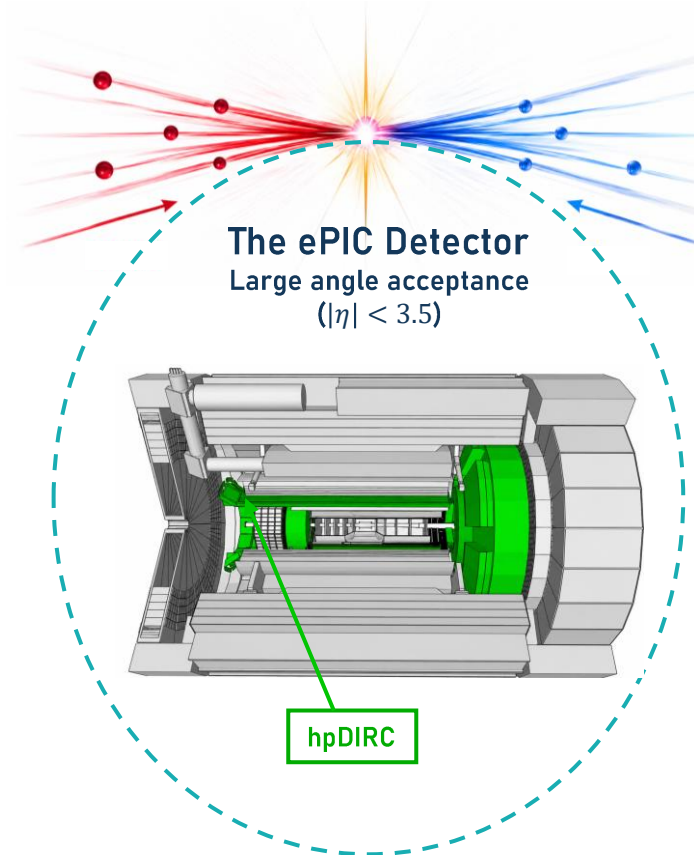


Test bench in light-tight box

6 Conclusion and Future Work

Photek MAPMT240 MCP-PMT is a strong candidate for hpDIRC so far!

- QE and dark count measurements
- HRPPD – priority detector**
- Ringing study – Andrew BNL

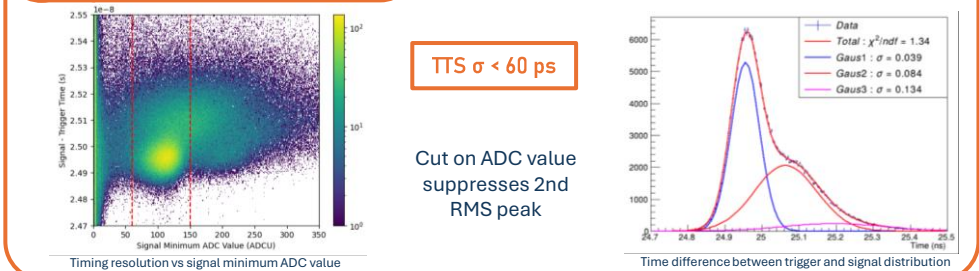


MCP-PMT Performance Comparison

Metric	Essential	Photonis	Photek
TTS	$>60\text{ ps}$	34.9 ps	32.8 ps
Gain	$>5 \times 10^6$	5×10^6	4×10^6*
Gain uniformity	$<20\%$ RMS	TBC	TBC
QE	27% (350nm)	TBC	TBC
QE uniformity	$<10\%$ RMS	TBC	TBC

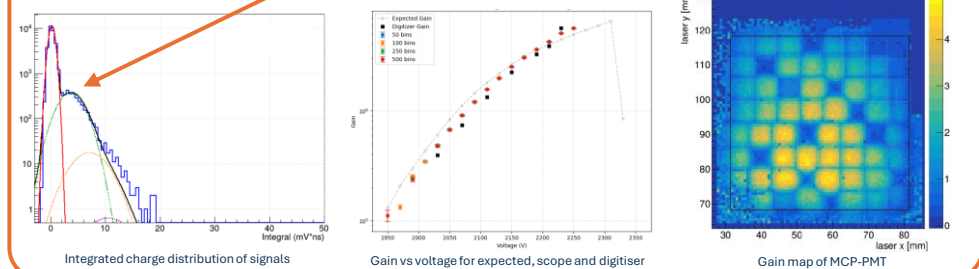
3 Timing Resolution

Between **trigger** and **signal** using 50% CFD



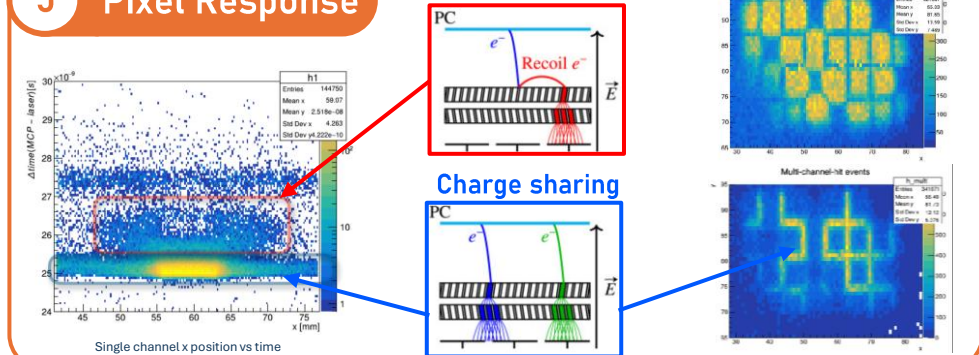
4 Gain

From the integrated **single photoelectron** pulse charge



5 Pixel Response

Recoil electrons



References

- [1] A. Lehmann *et al.*, Nucl. Inst. Methods A **1065** (2024) 169536
- [2] G. Kalicy, EIC DAC Meeting, June (2025)

* Photek gain capped at their recommended voltage

