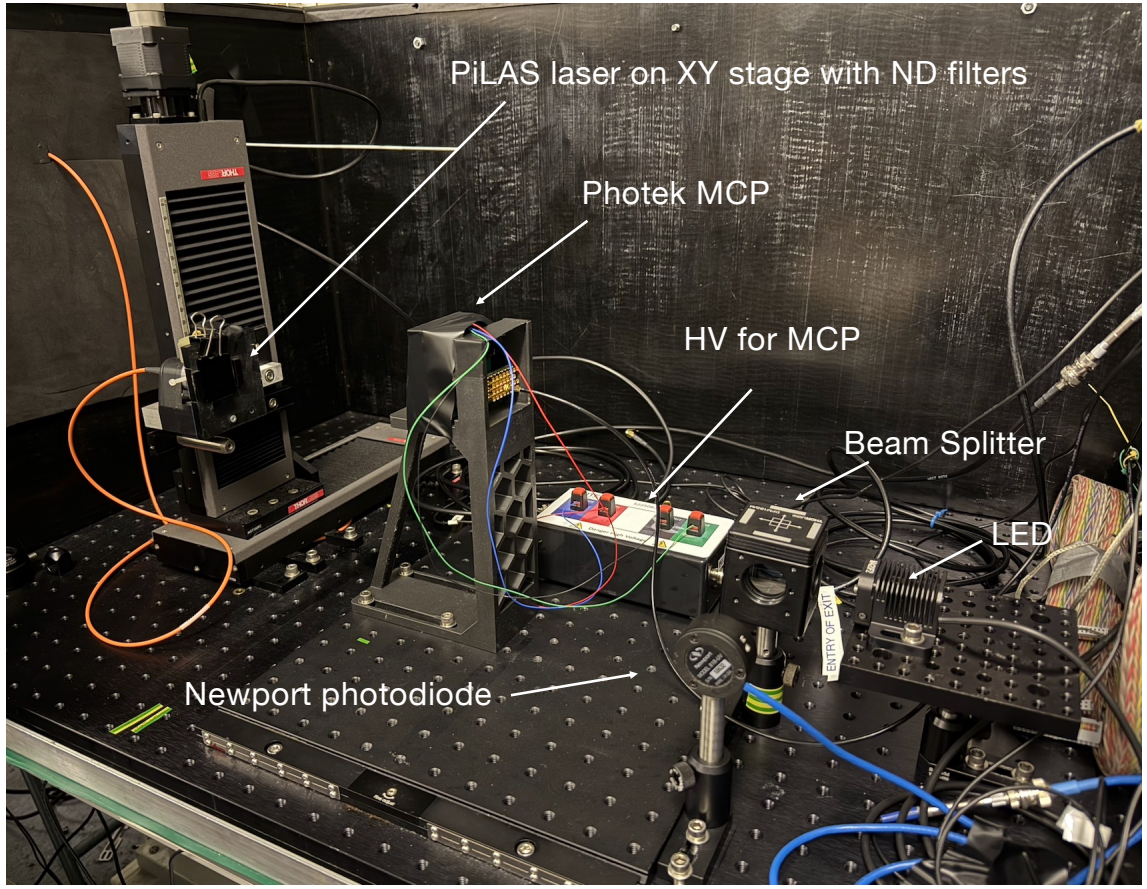
MCP Status at UoG

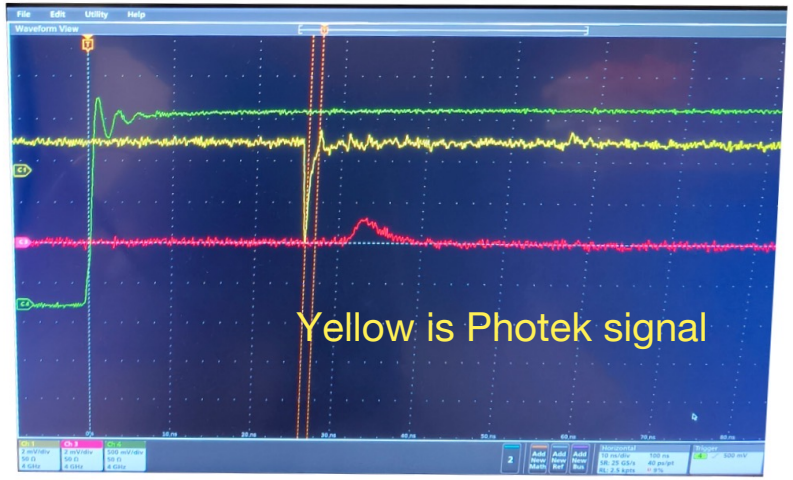
TIC Meeting 20/10/25

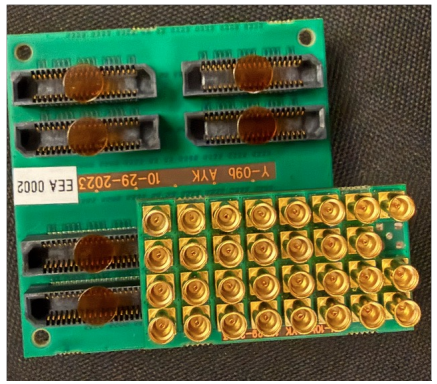
Rachel Montgomery for team UoG 17/10/25

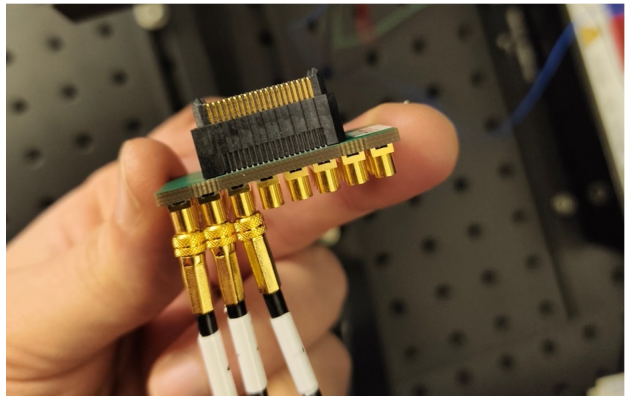
Photek MCP-PMT

- Photek MCP-PMT was delivered to UoG
- Sensor has a small vacuum leak, Photek plan to send a replacement tube later in year at no extra cost
- Started testing with individual channels and see good signal, while moving to multi-channel readout with digitizer we identified needed modification for cables to adapter card - working on new cables



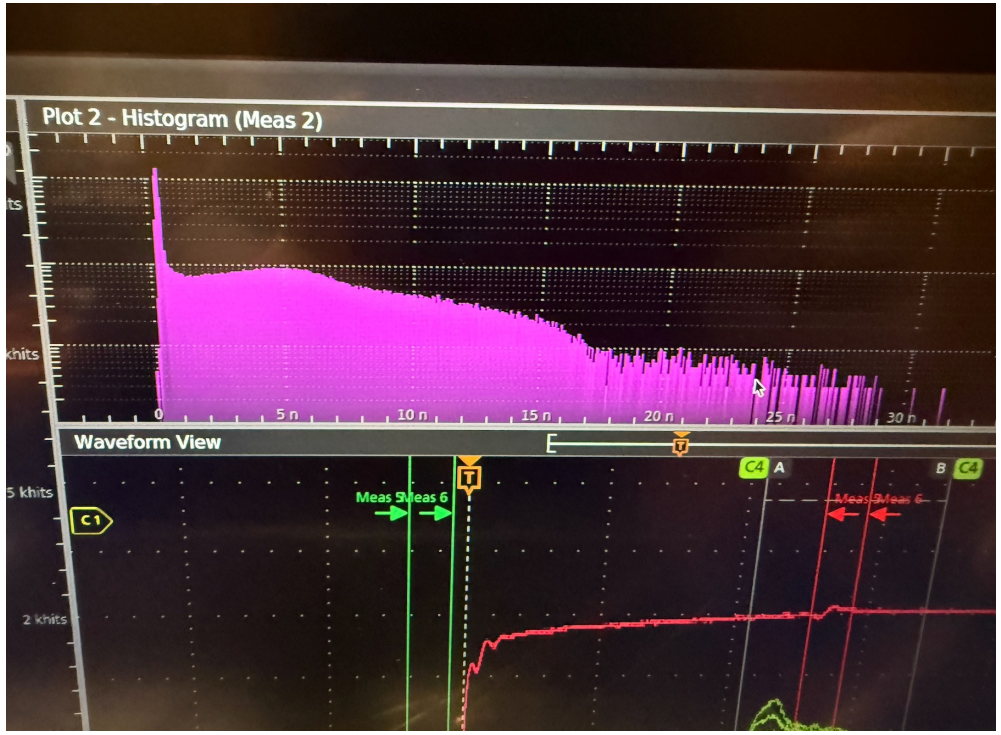




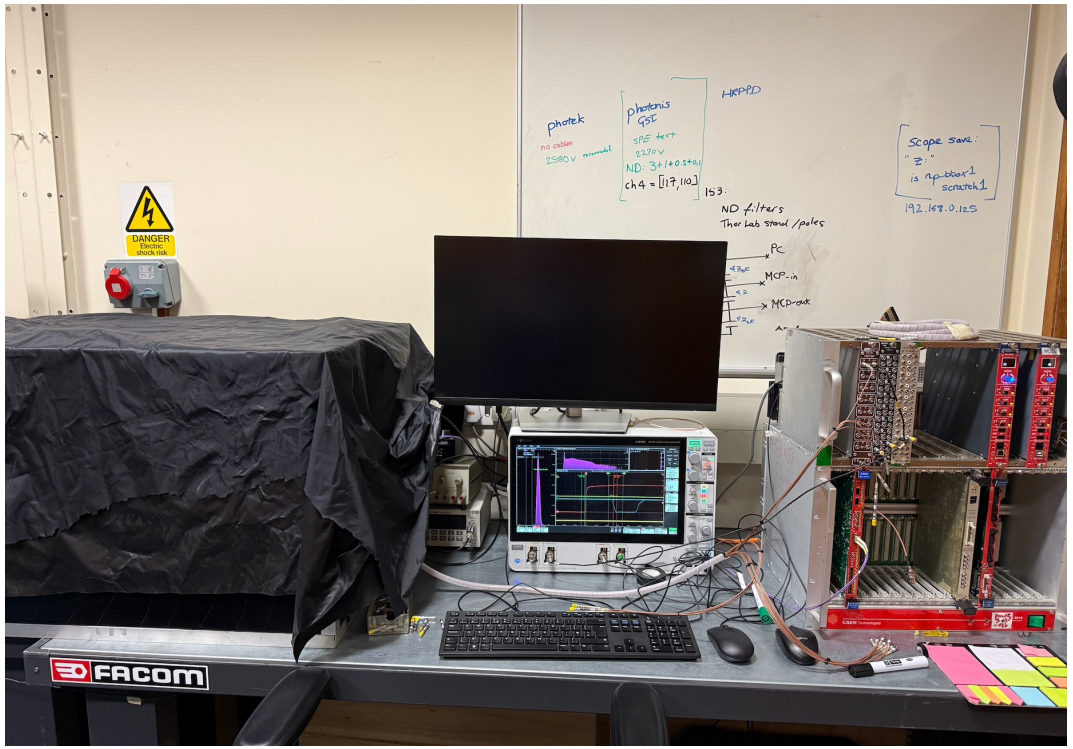


GSI Photonis MCP-PMT

- Reference Photonis MCP-PMT on loan from PANDA is now in UoG (thank you to Stefan Krauss for the help)
- Currently under tests
- Started with oscilloscope, currently have enough cables to read out 16 channels with digitizer, will manufacture 16 more cables to read out 32



Integrated charge spectrum with one pixel at low light level



GSI PMT is currently in the box (couldn't take photo as was under test)

HRPPD

- HRPPD 26 was delivered to Glasgow, with backplane from A. Kisselev
- Need to prepare HV set, including cables, and signal cables

Plans

For the tests we are planning:

- Absolute gain uniformity scan
- Timing Resolution measurement
- Cross-talk study for multi-photon light level

- QE measurements at red and blue wavelengths (trying to investigate if there is a D2 lamp and monochromator available in department to borrow but not convinced that optical coupling will work yet)

Timeline:

- Hard to set a realistic timeline before the current series of GSI tests are completed, the protocols, and the expected time per test are established.
- Original SOW had 7 months planned for photek pmt project
- Each device is a completely new one in the set up and so there is a learning curve but support from other groups and collaborators allows to address them timely

Other Topics

- Yordanka Ilieva (USC) will be in UoG for one week starting 20/10/15 to help with the tests as part of eRD110

- Need to discuss with R. Ent on conditions for spending original eRD money to adjust test stand. Glasgow Lawyers will not prove any purchases until an updated timeline is agreed. That is required to upgrade photodiode for QE measurements (expired calibration).
  Initial PDE tests for an SiPM were in agreement with data sheet values, and A. Kisselev will also send a calibrated photodiode later in the year (ETA unknown yet)

Absolute QE

- Measure power on calibrated photodiode to get $N_{incident\ photons}$
  - *N/t = P/hf*
- Measure current from detector to get $N_{photoelectrons}$
  - N/t = I/e

$$QE = \frac{N_{photoelectron}}{N_{incident\ photons}}$$

- Will repeat for MCP over a number of pixels, then use vs relative QE measurement done over the whole detector.