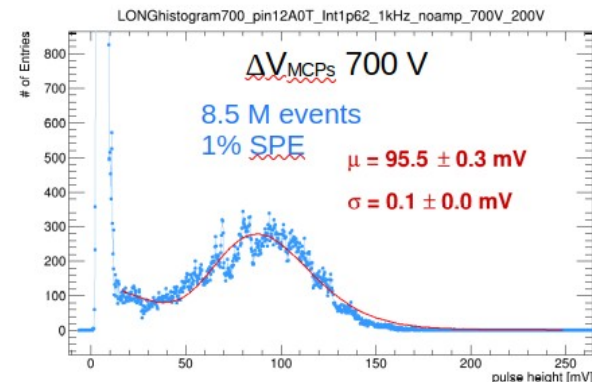
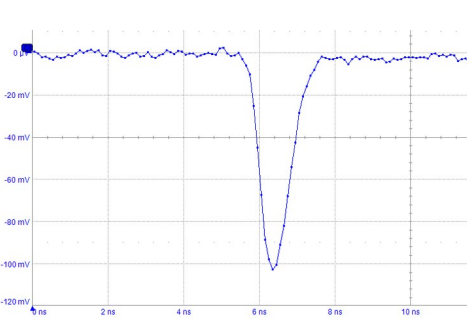
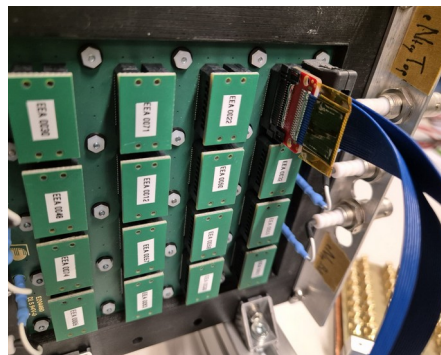
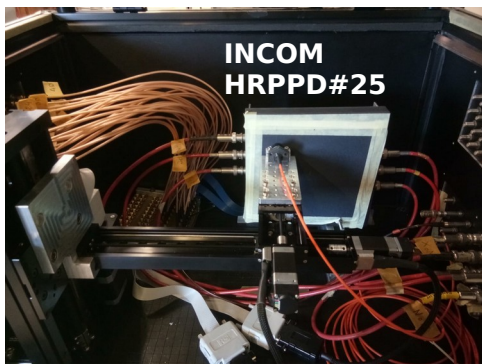
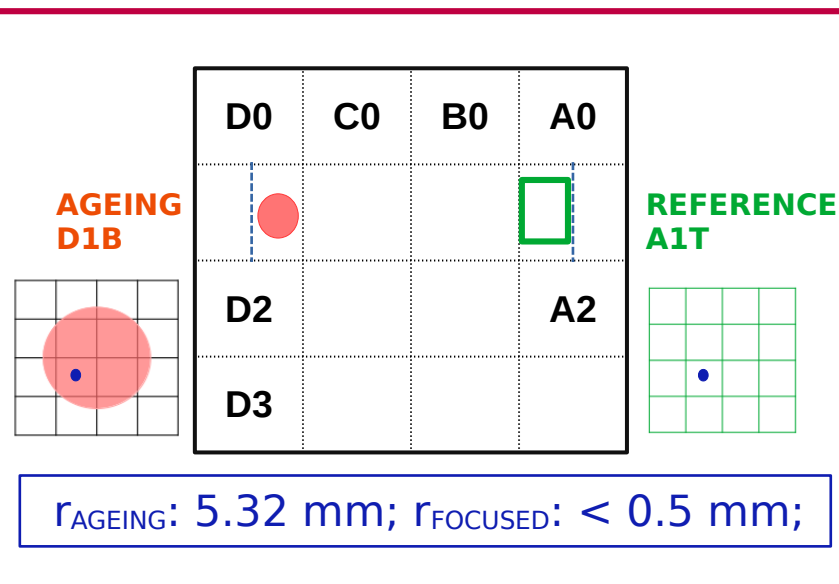
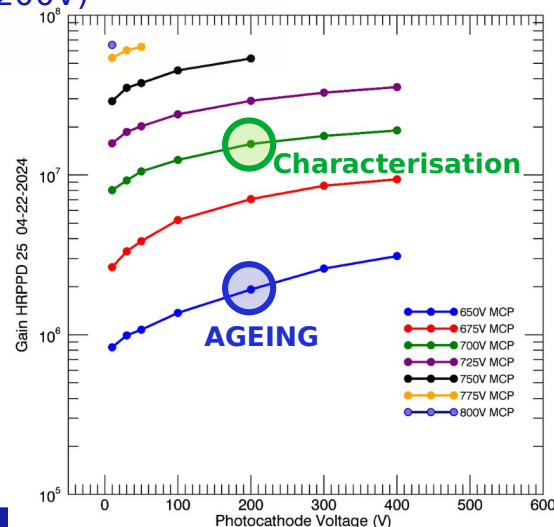
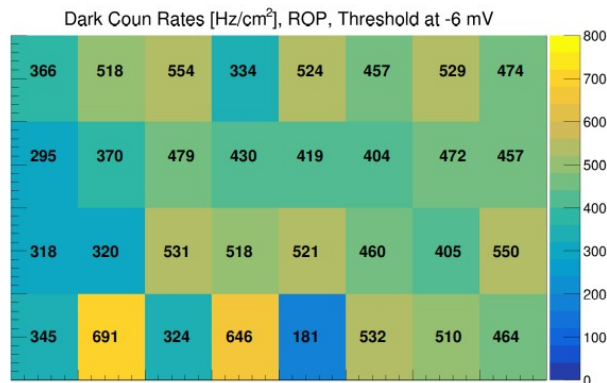


Characteristics, measurement strategy

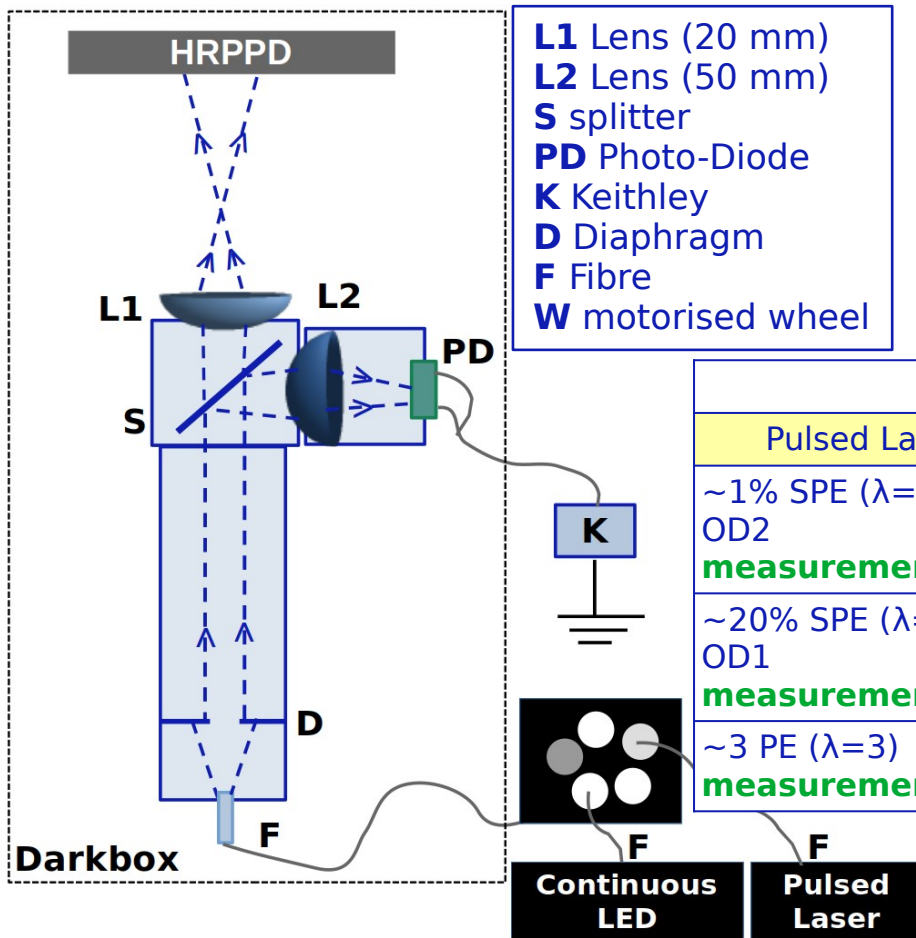
Ageing studies with HRPPD#25



- 10 x 10 cm², Two MCPs in a Chevron Pair, 10 μm pores
- Direct coupled 1024 Anode pads, 3 x 3 mm²
- Gain: 1.5 x 10⁷ (@ 200_700_200_700_200V)
- DCR few kHz @ ROP (TH 4mV)

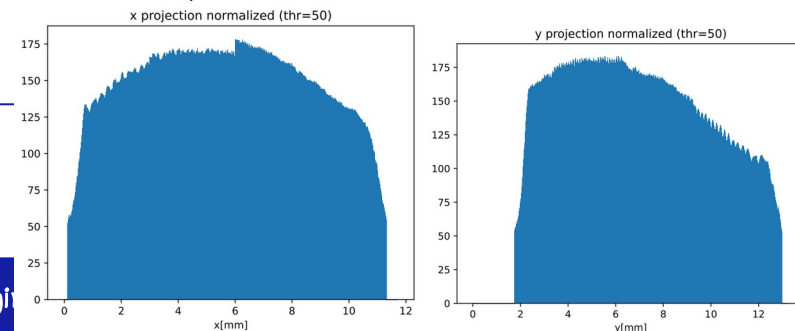
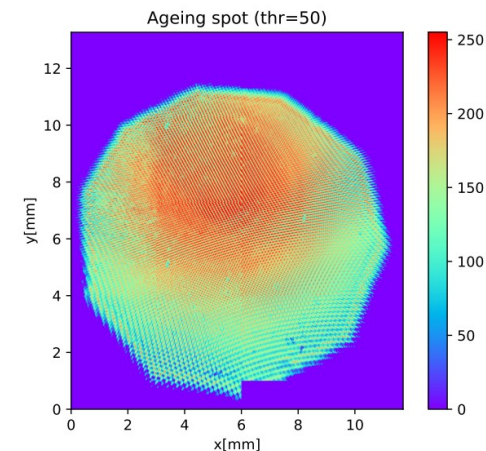


Optics setup

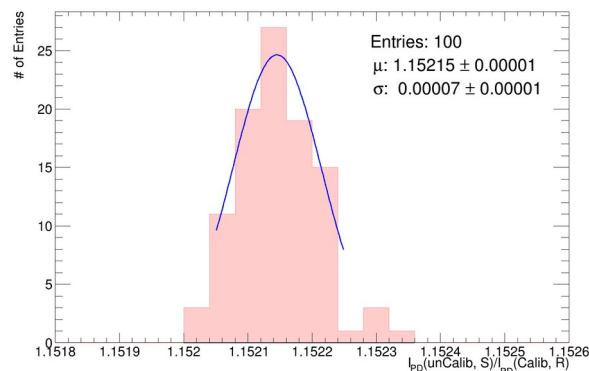
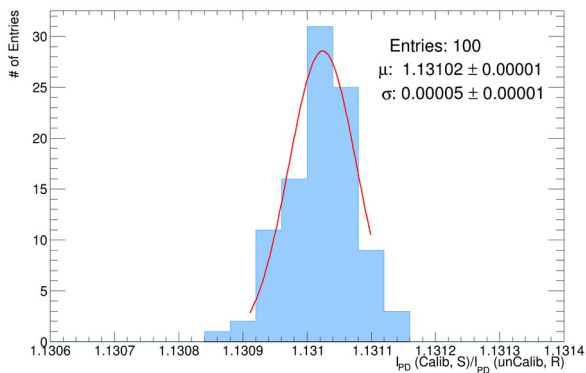
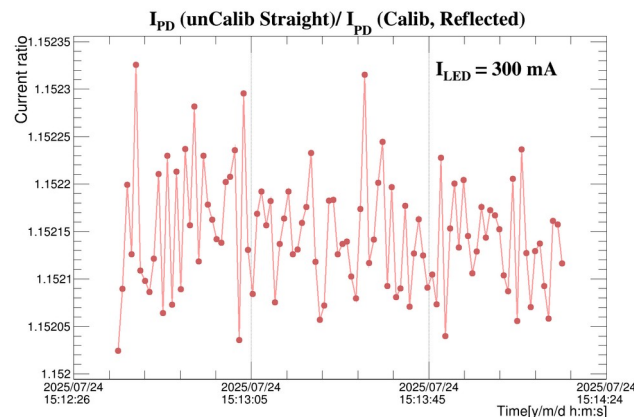
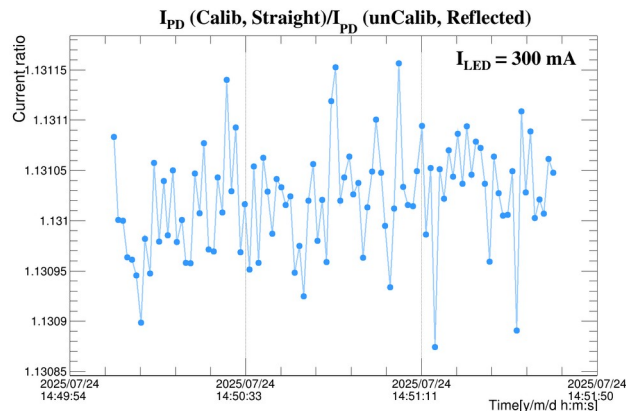


- Optics installed on movable (XYZ) system
- Same optics at two different Z positions – focused/defocused spots
- Same optics at two different X positions – Ageing/Reference region

Five configurations	
Pulsed Laser	Continuous LED
~1% SPE ($\lambda=0.01$), OD2 measurements	Fibre direct for QE LED $I_{SET} = 300$ mA
~20% SPE ($\lambda=0.2$), OD1 measurements	Fibre via Wheel (empty) AGEING LED $I_{SET} = 85$ mA
~3 PE ($\lambda=3$) measurements	



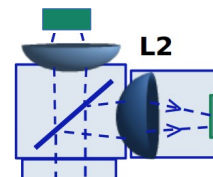
Monitoring incoming photon flux



$$\begin{aligned} SR &= \sqrt{I1/I2 \times I3/I4} \\ &= 1.14154 \pm 0.00001 \end{aligned}$$

$$\begin{aligned} CC &= \sqrt{(I1/I2) / (I3/I4)} \\ &= 0.99079 \pm 0.00001 \end{aligned}$$

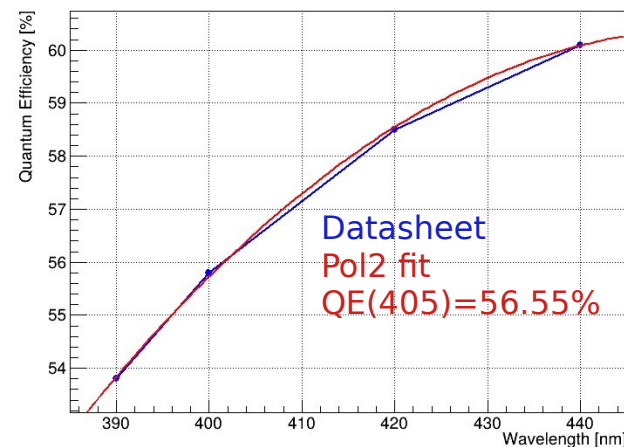
PD (S) In place of HRPPD



PD (R) Monitoring photon flux

Calibrated PD (HAMAMATSU)

Quantum Efficiency vs. Wavelength



$$\begin{aligned} \text{QE of unCalib PD} &= 0.99079 \times 56.55\% \\ &= 56.03\% \end{aligned}$$

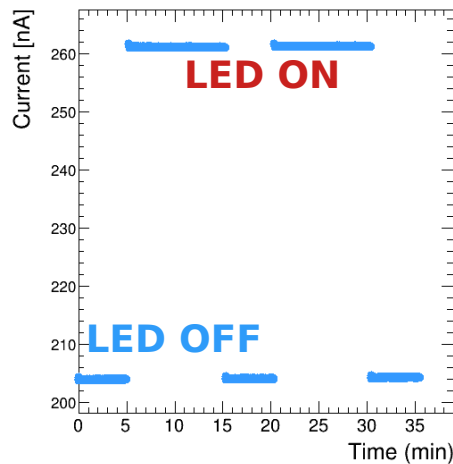


Protocol

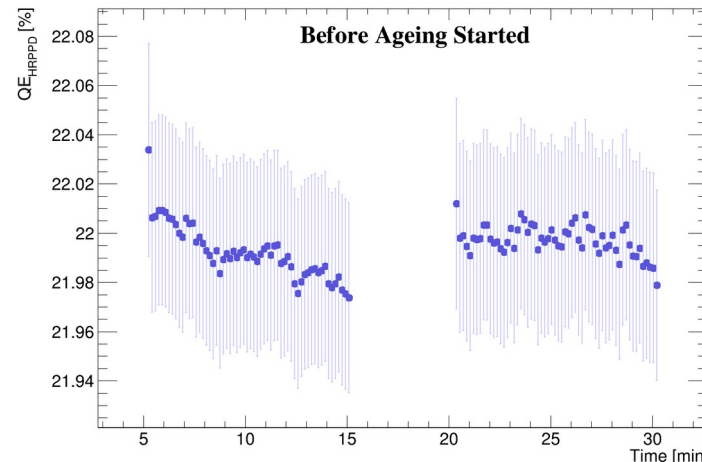
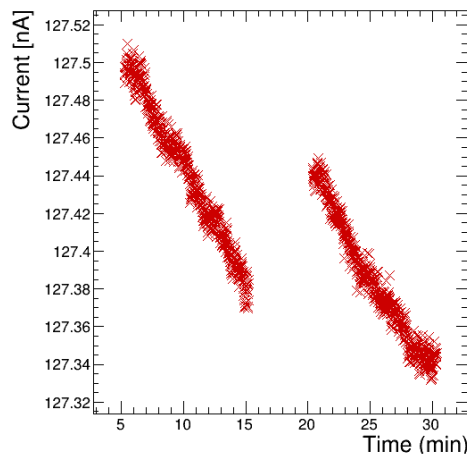
Intermediate Measurement	HV bias	Light source	Light spot
PDE SCAN	ROP	pulsed Laser $\lambda=0.15$ W.P.4, OD2	focused
QE SCAN	-50 V at PC EntryMCP at G	Continuous LED Direct $I_{SET}=300$ mA	focused
Average QE	-50 V at PC EntryMCP at G	Continuous LED Direct $I_{SET}=300$ mA	defocused
Gain	ROP	pulsed Laser $\lambda=0.01$ W.P.5, OD3	focused
DCR	ROP	X	X
APR	ROP	pulsed Laser $\lambda=3$ W.P.3, OD1	focused



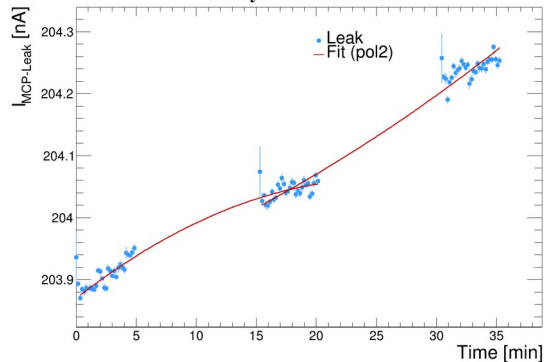
MCP Entry - total and leak



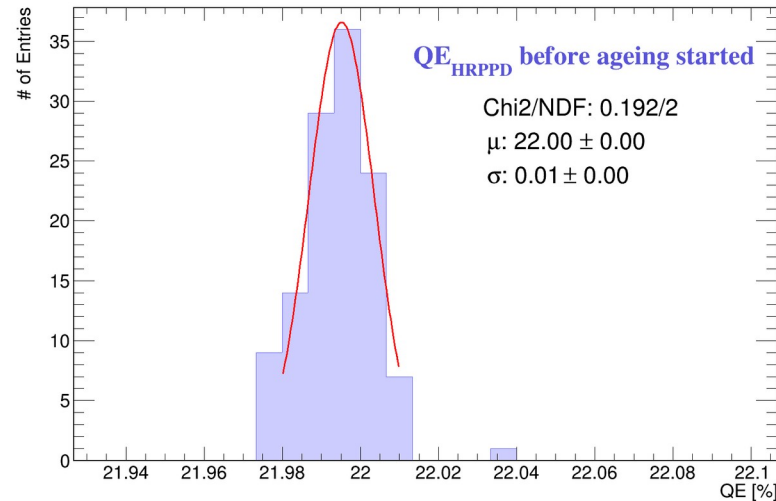
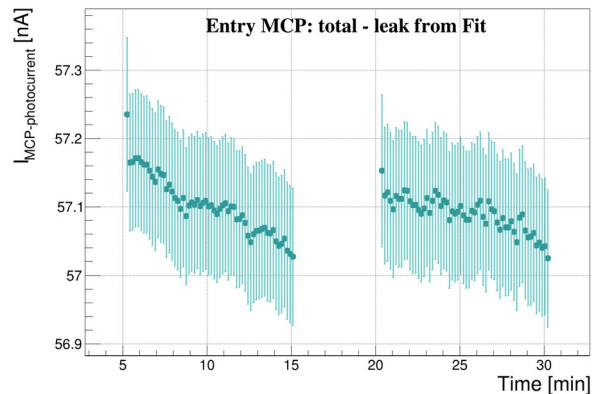
Monitored PD current



Entry MCP leak current

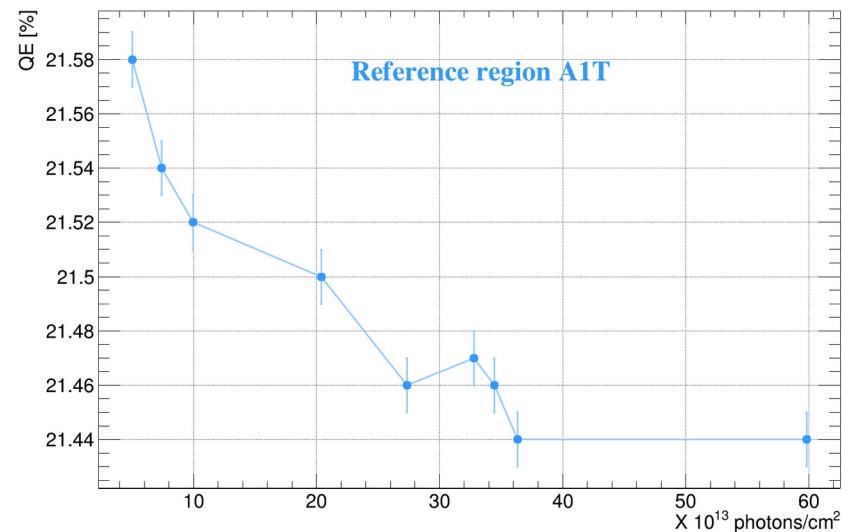
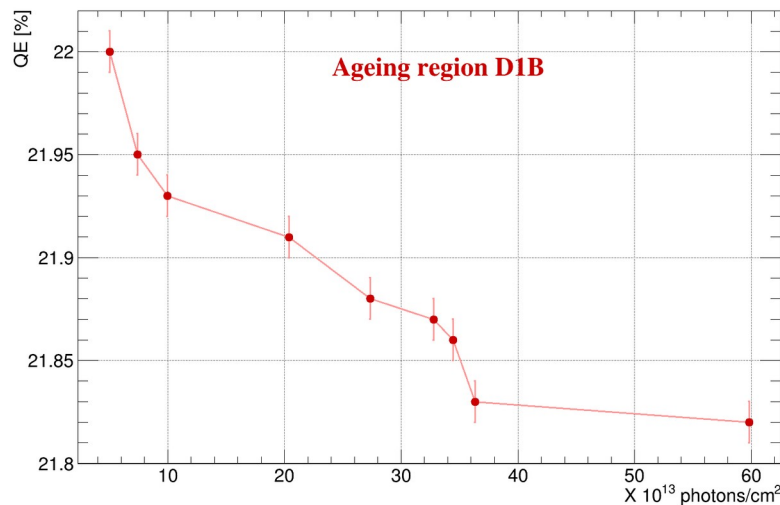


Entry MCP: total - leak from Fit



QE average vs. integrated photon fluence

Preliminary Results



Last three points:
Both MCPs ON

8.5 pA in Photo-Diode
(Reflected position)
for 24 hours \rightarrow 1year equivalent

