

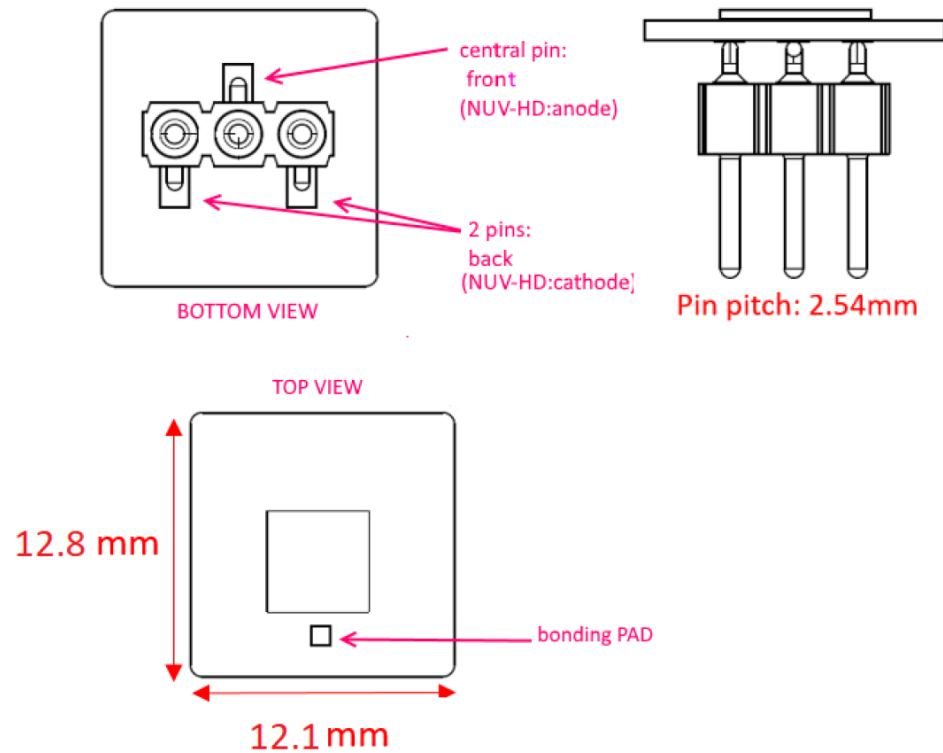
TEST on FBK SiPM

FBK SIPM NUV-HD-RH HERD

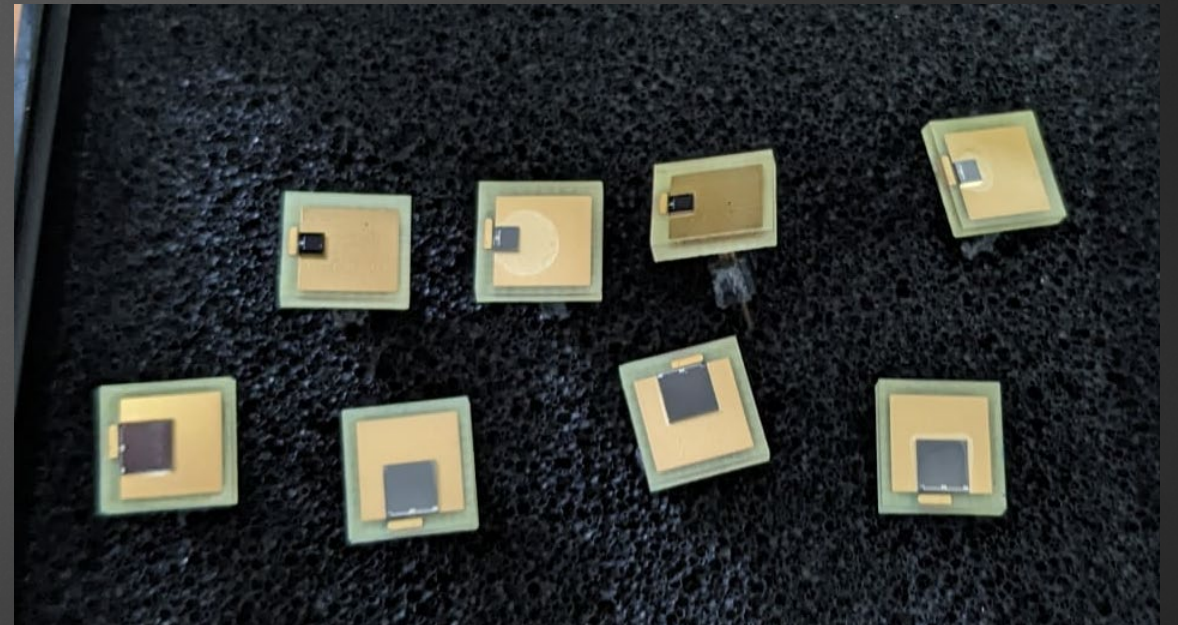
FABIO GARGANO

SiPM parameters:

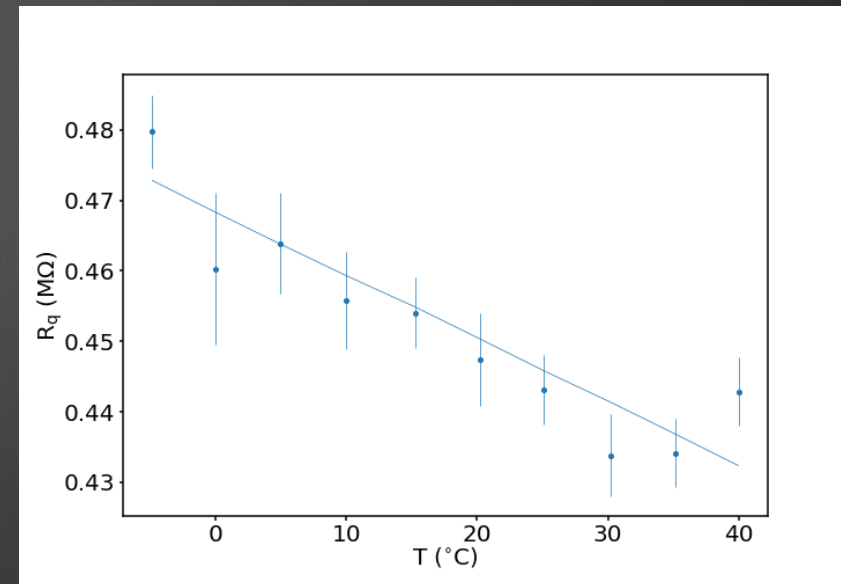
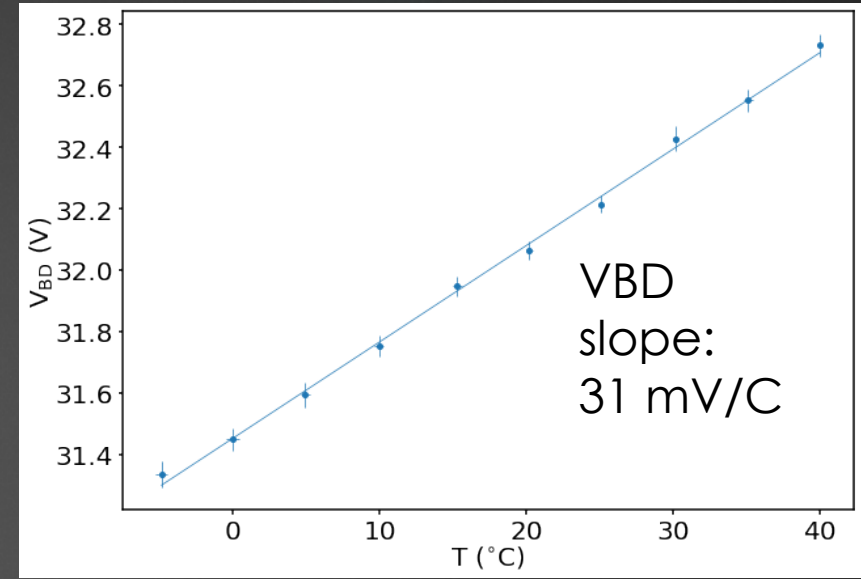
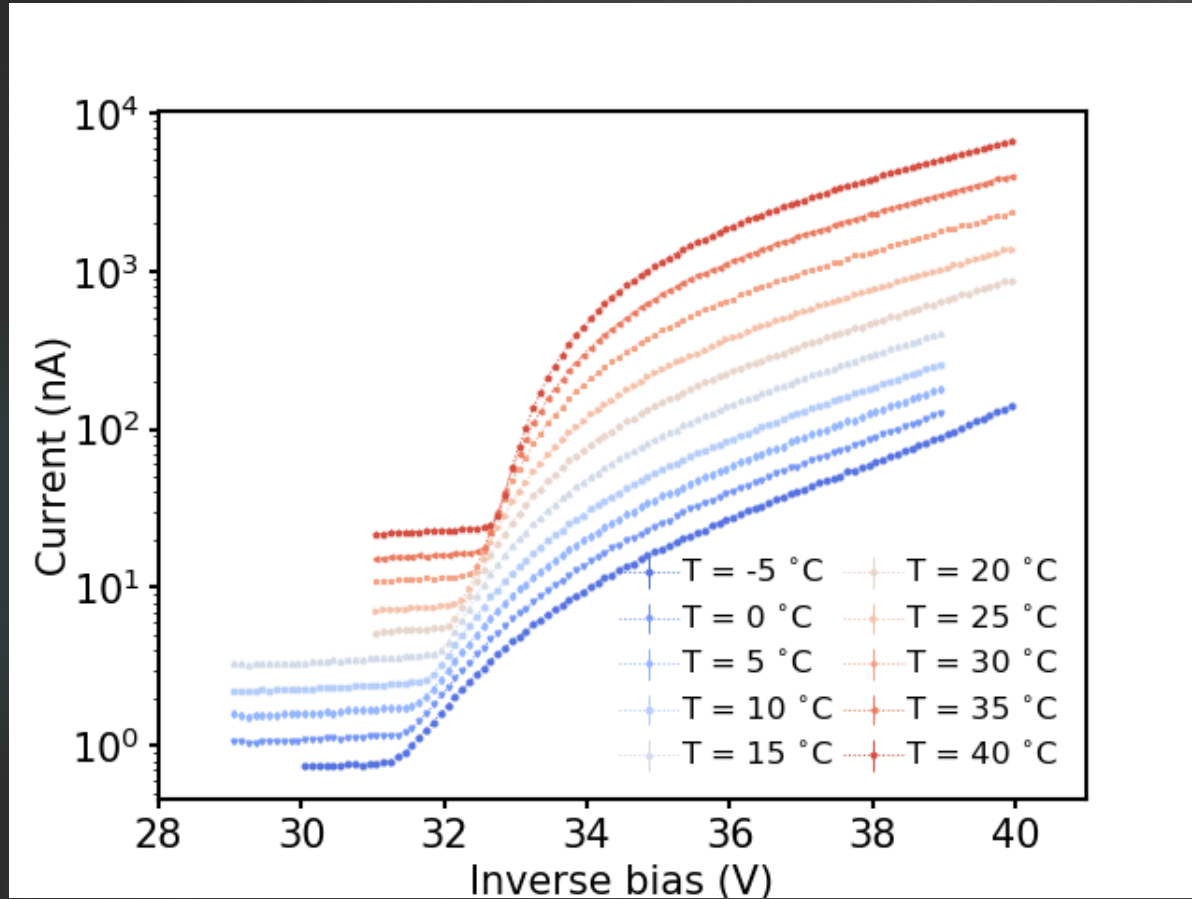
<i>Breakdown Voltage (at RoomT)</i>	~32.5 V		
<i>Active Area (HxW, nominal)</i>	1x1mm ² and 3x3mm ²	<i>Device Type</i>	NUV-HD-RH- HERD
<i>Cell pitch</i>	15, 25, 40 μm	<i>Junction type</i>	p-on-n

Package details:

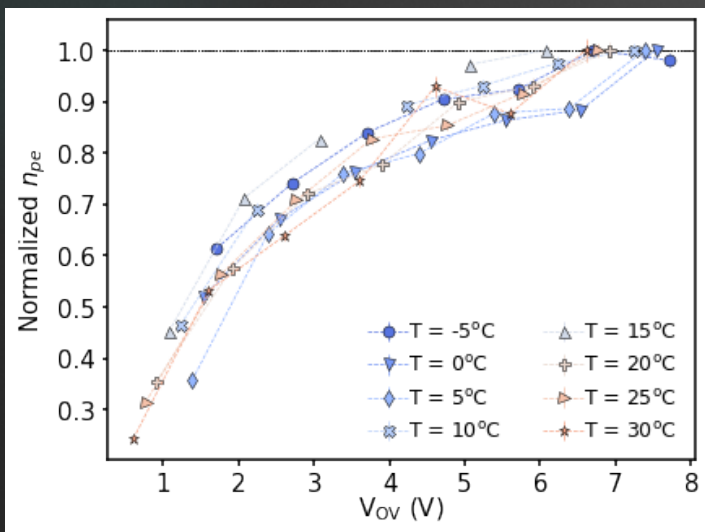
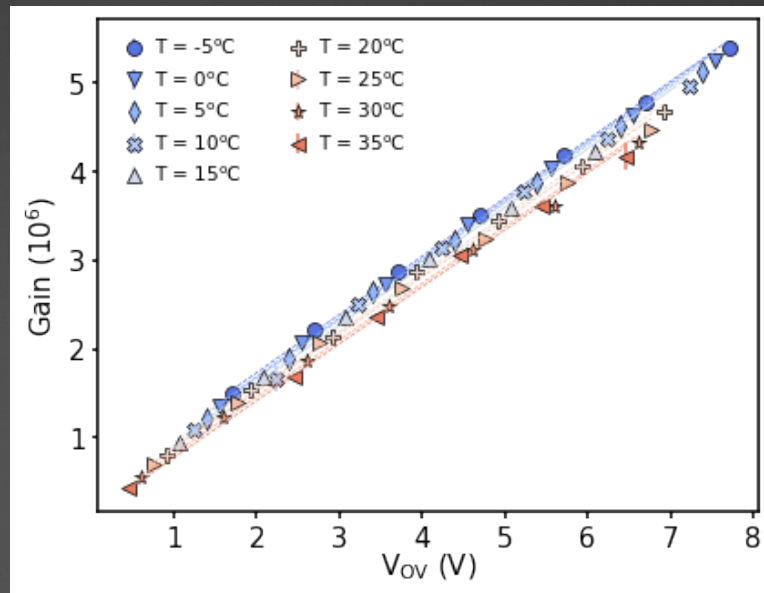
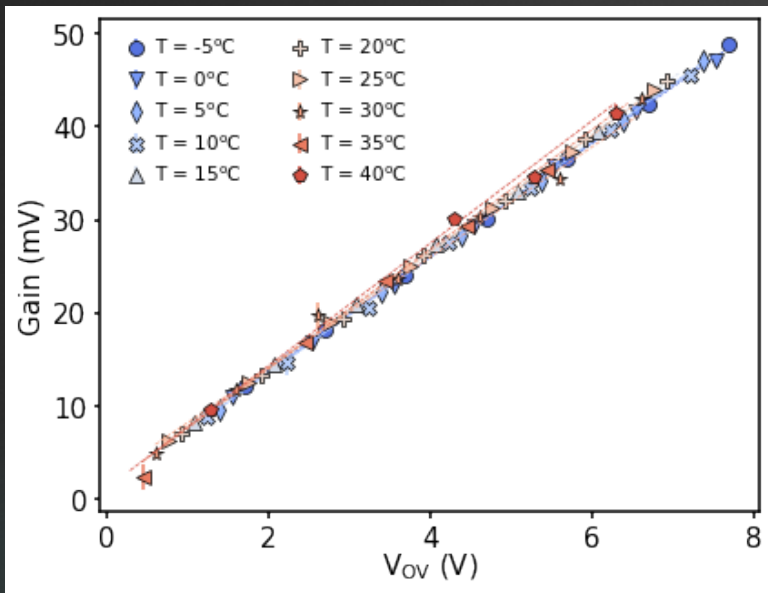
No protective coating on the SiPM surface



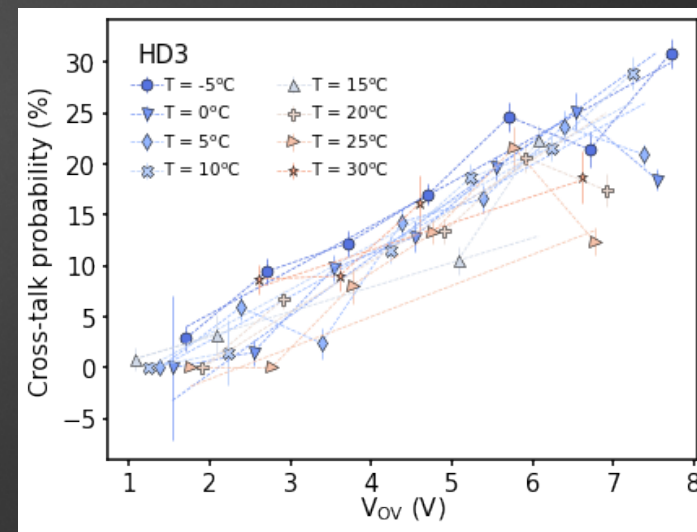
- ▶ 3 samples tested
 - ▶ 3x3mm², 40 μm
 - ▶ 1x1mm², 15 μm
 - ▶ 3x3mm², 25 μm
- ▶ IV
 - ▶ Forward & reverse, T ranging (-5°C, 40°C)
- ▶ Dynamic measurements
 - ▶ OV from ~ 1V to ~8V , T ranging (-5°C, 40°C)
 - ▶ 380 nm laser



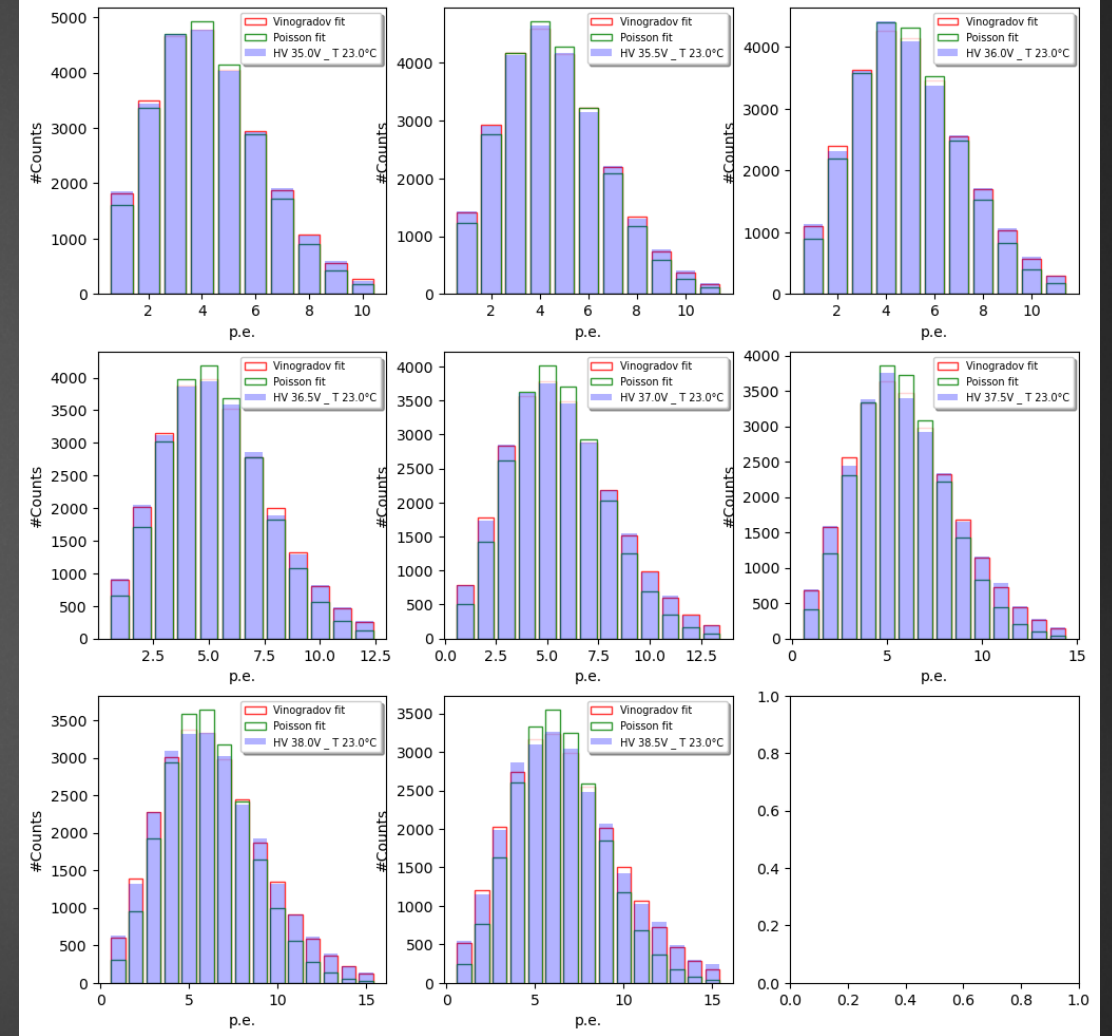
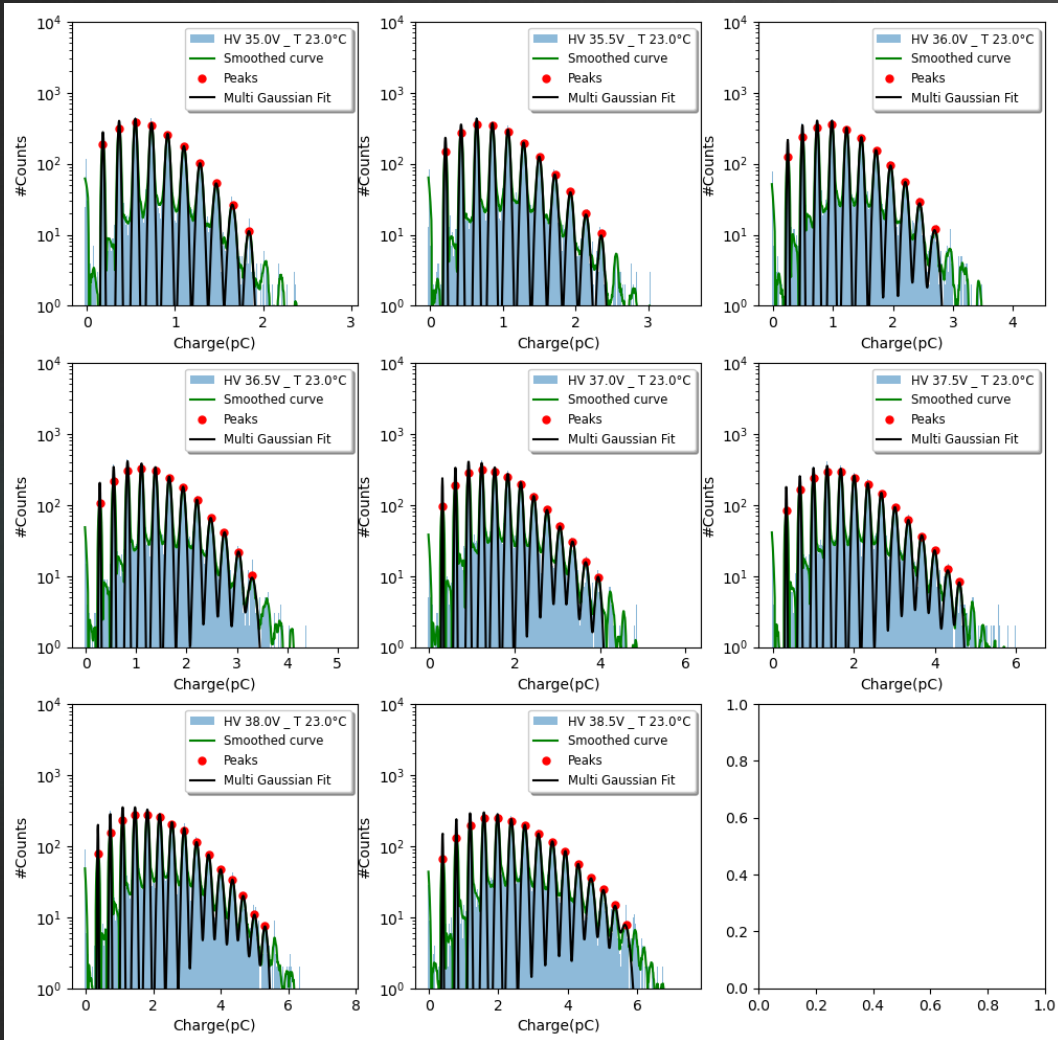
Signal integration in a 200-300 ns window



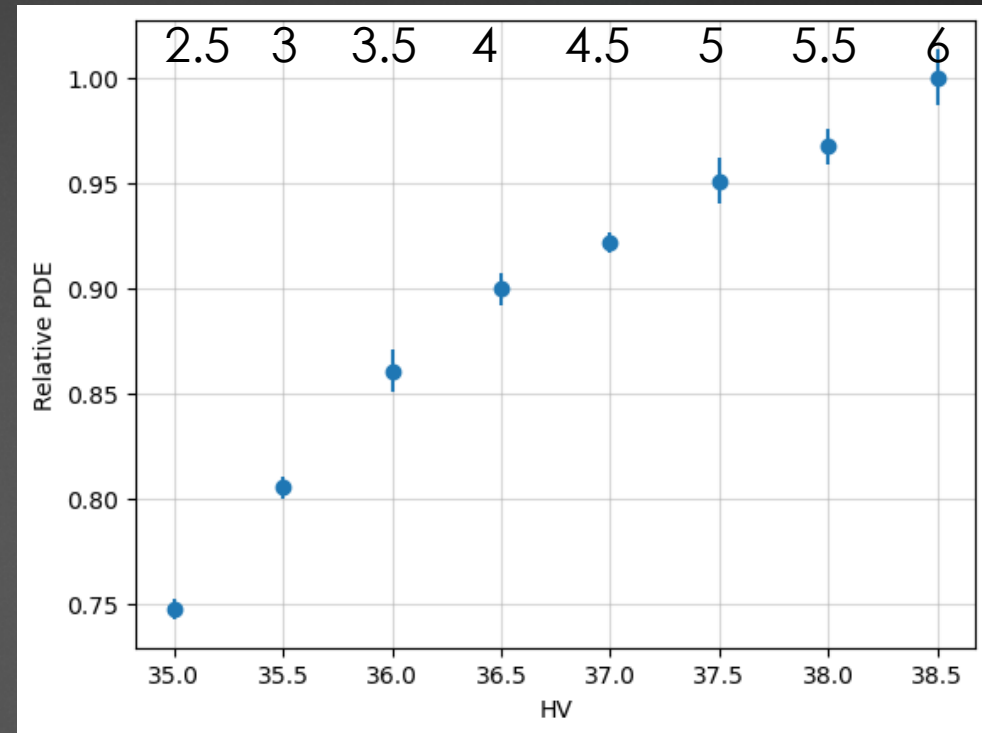
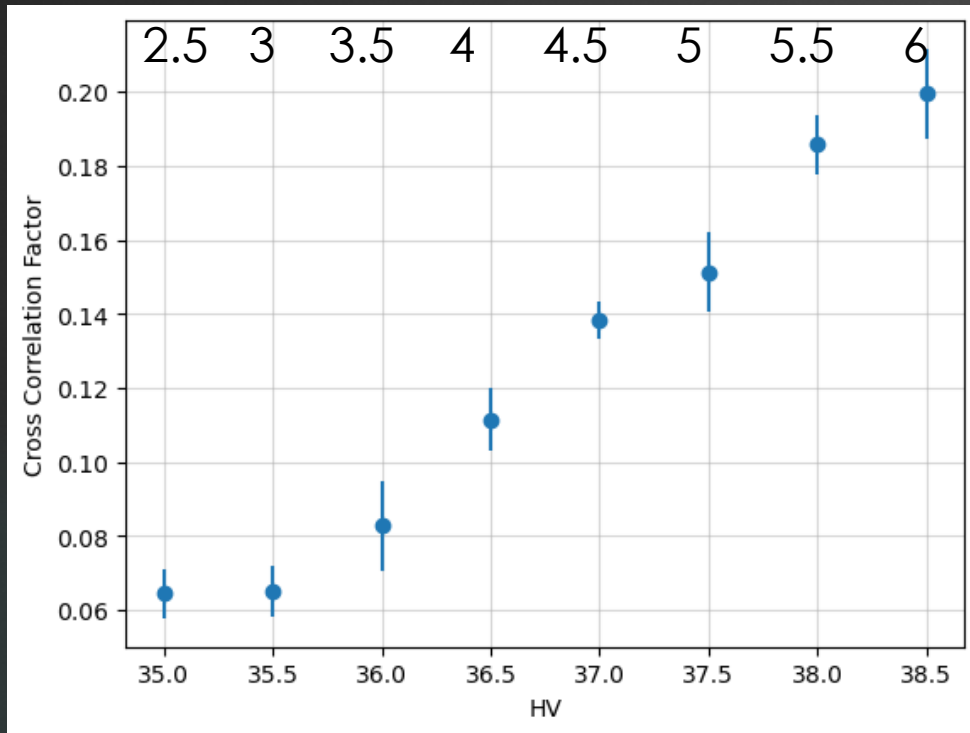
n_{pe} and CrossTalk probability are evaluated from charge distribution fitted with Vinogradov



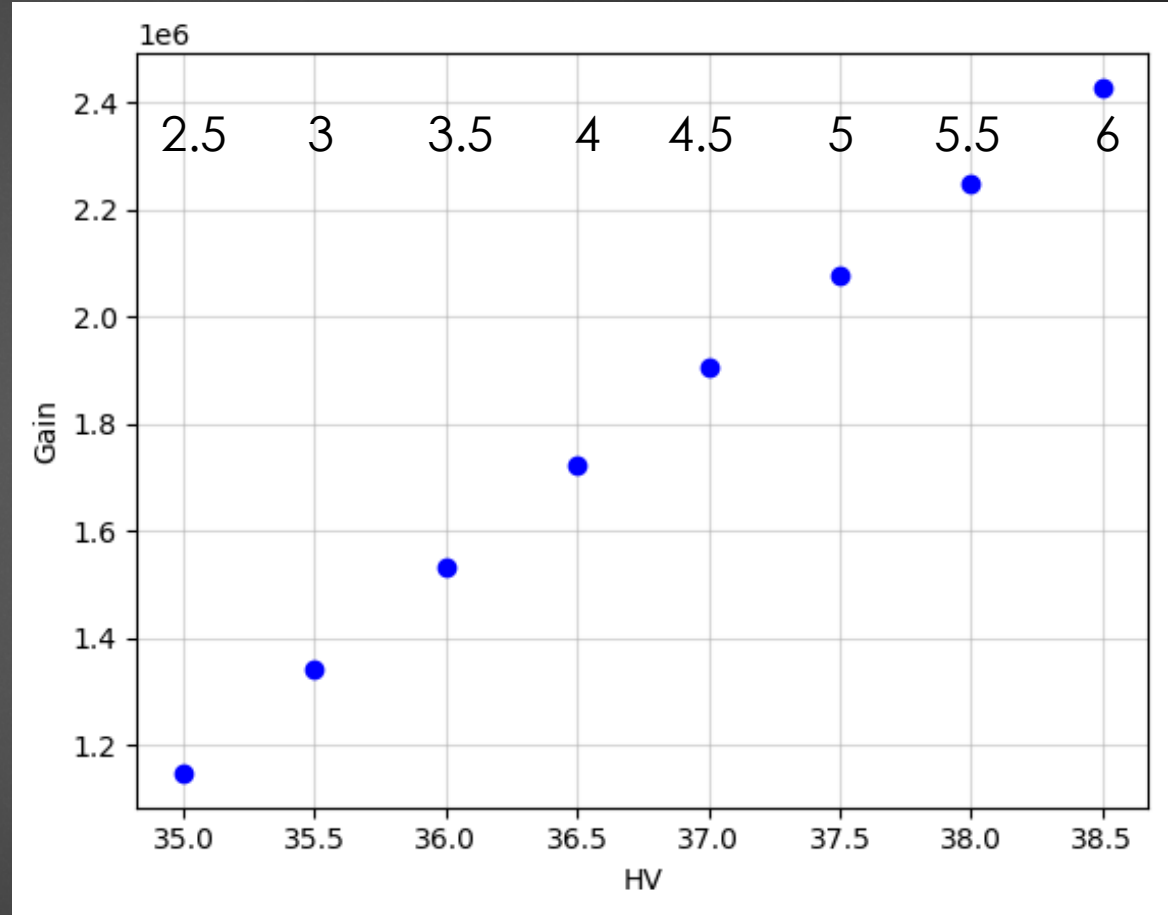
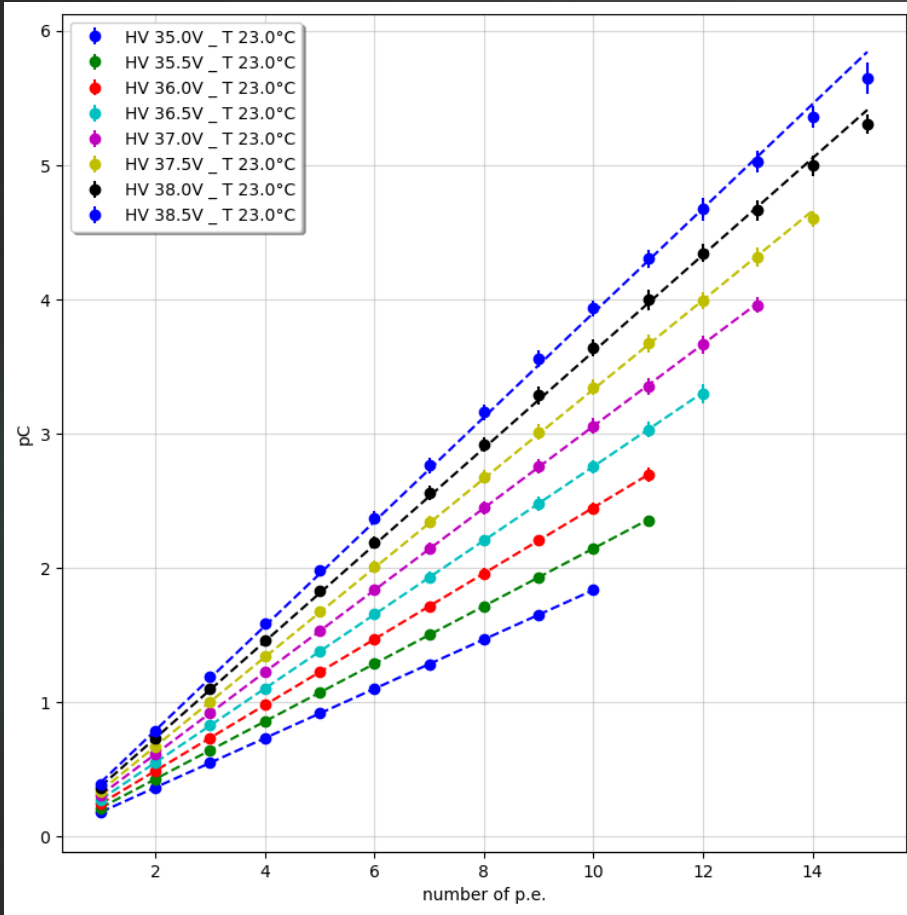
Measure done acquiring the signal area with the oscilloscope @ different OV with a fixed laser source - From 2.5 to 6.0 V at step of 0.5V

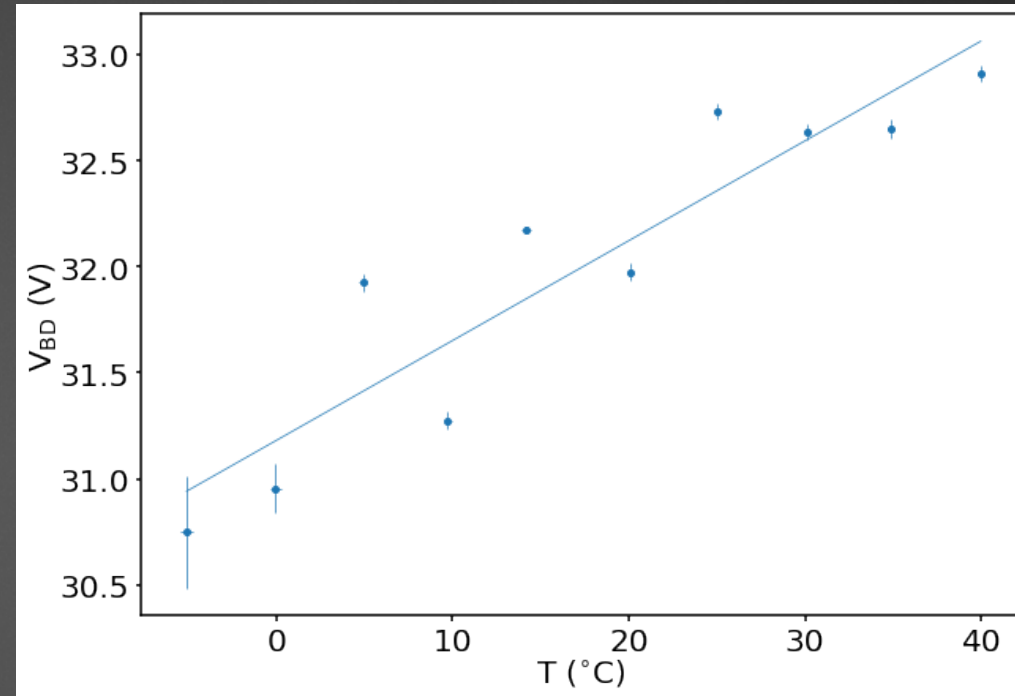
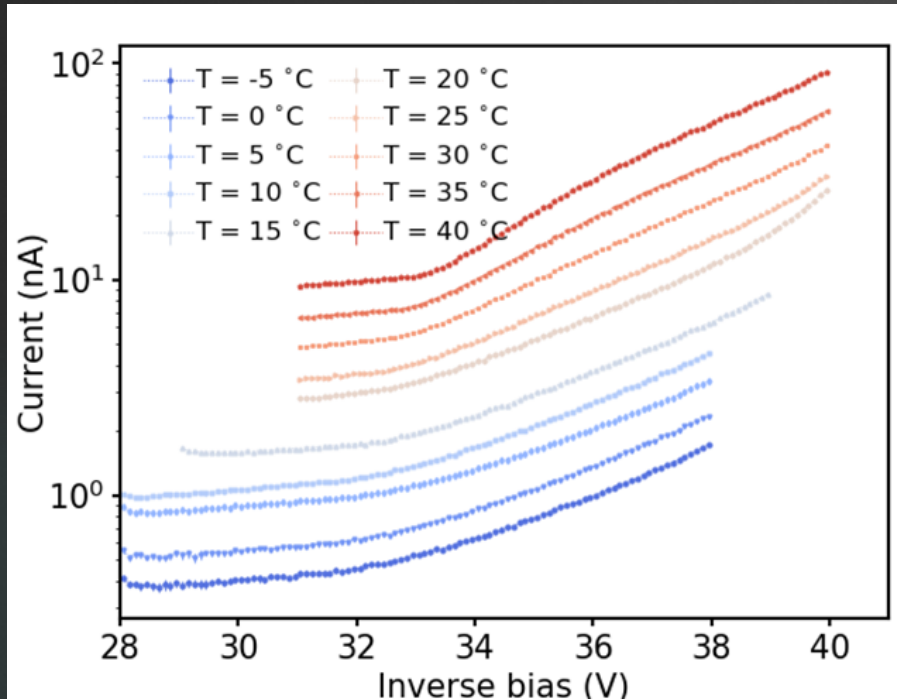


The fit stats from the 1st PE peak

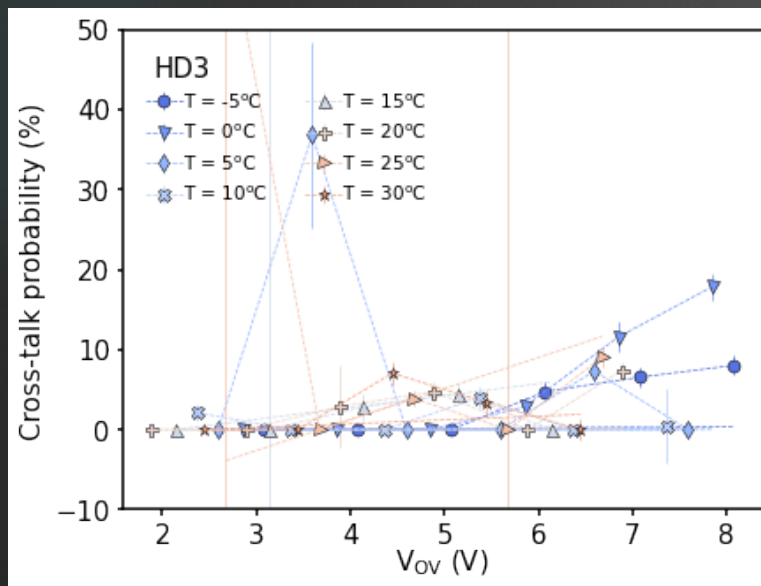
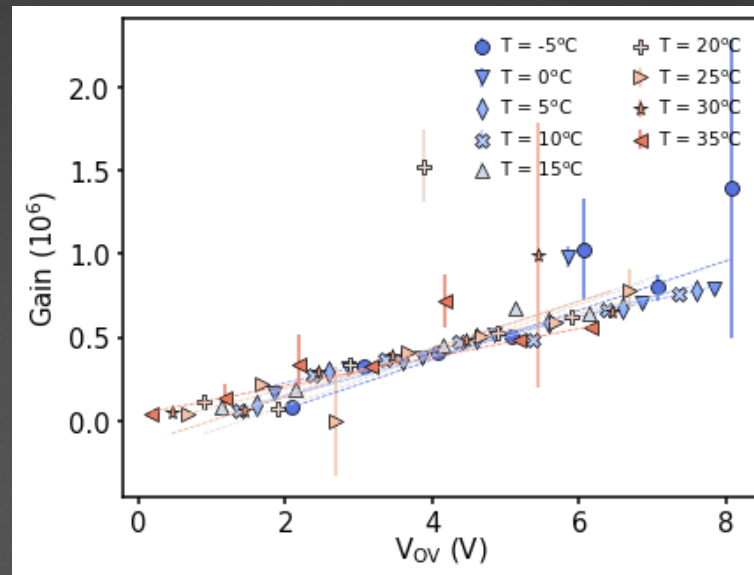
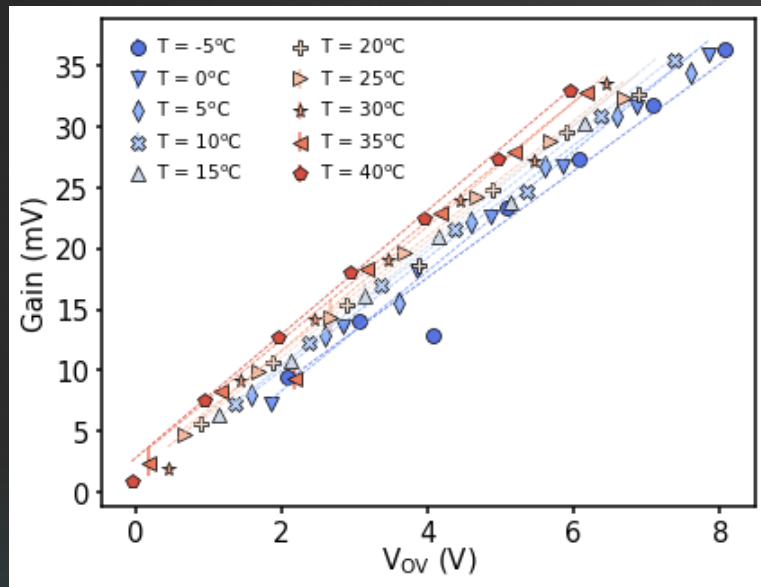


Relative PDE and Cross Correlation Factor are evaluated from charge distribution fitted with Vinogradov



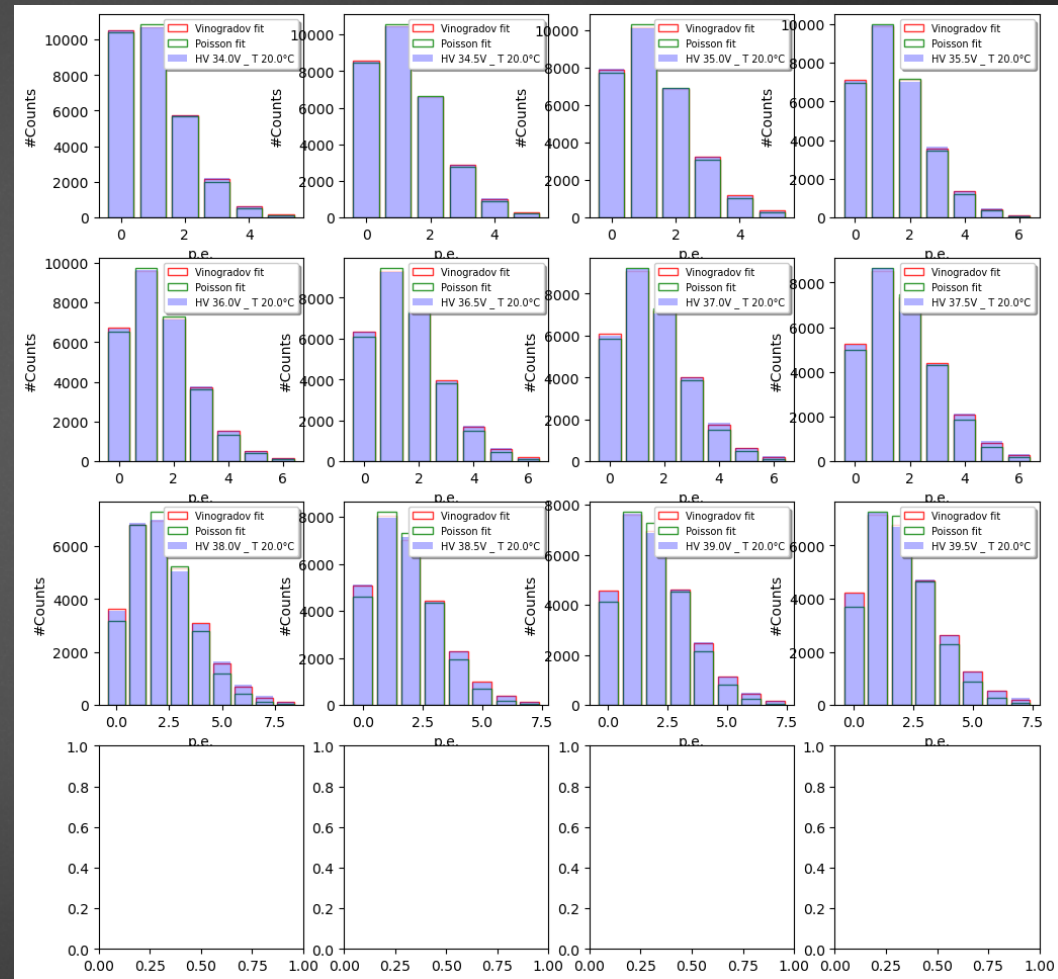
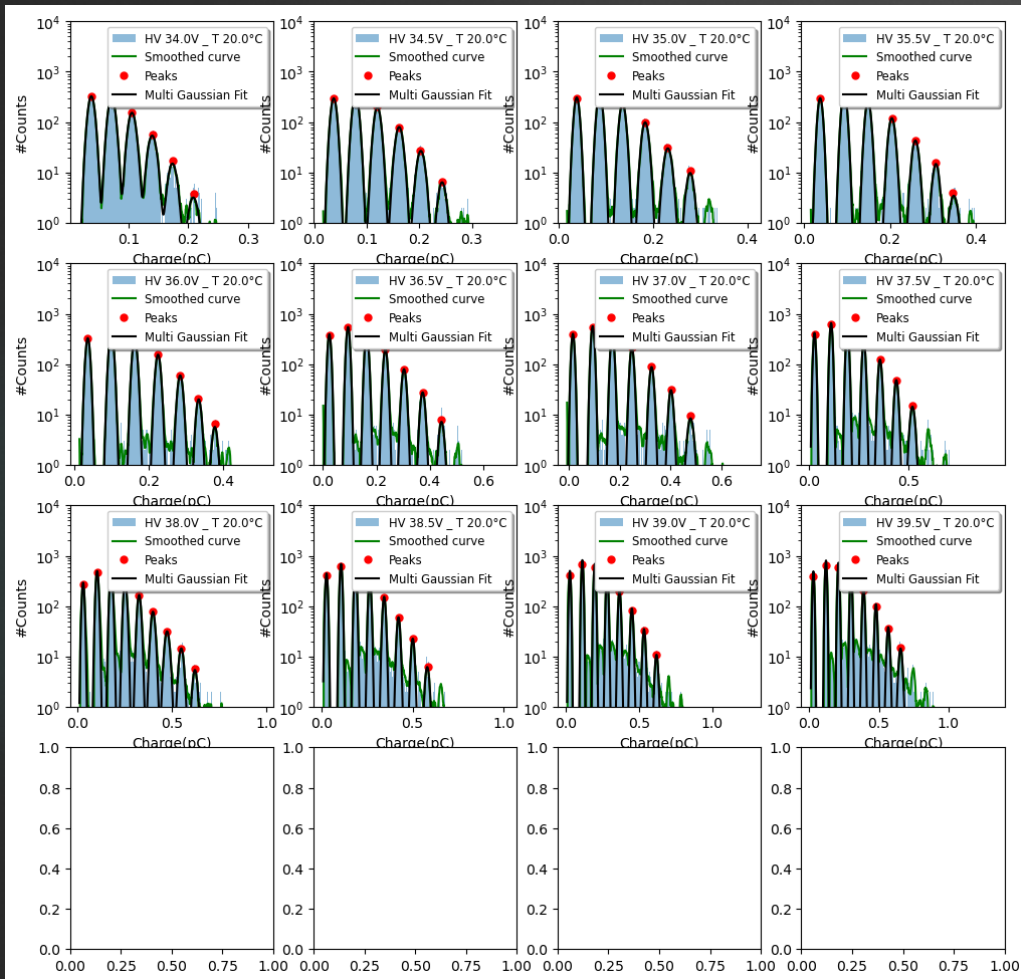


The IV curve for the 1x1mm² SiPM are not very clean and so the data points are scattered.
New measurements ongoing

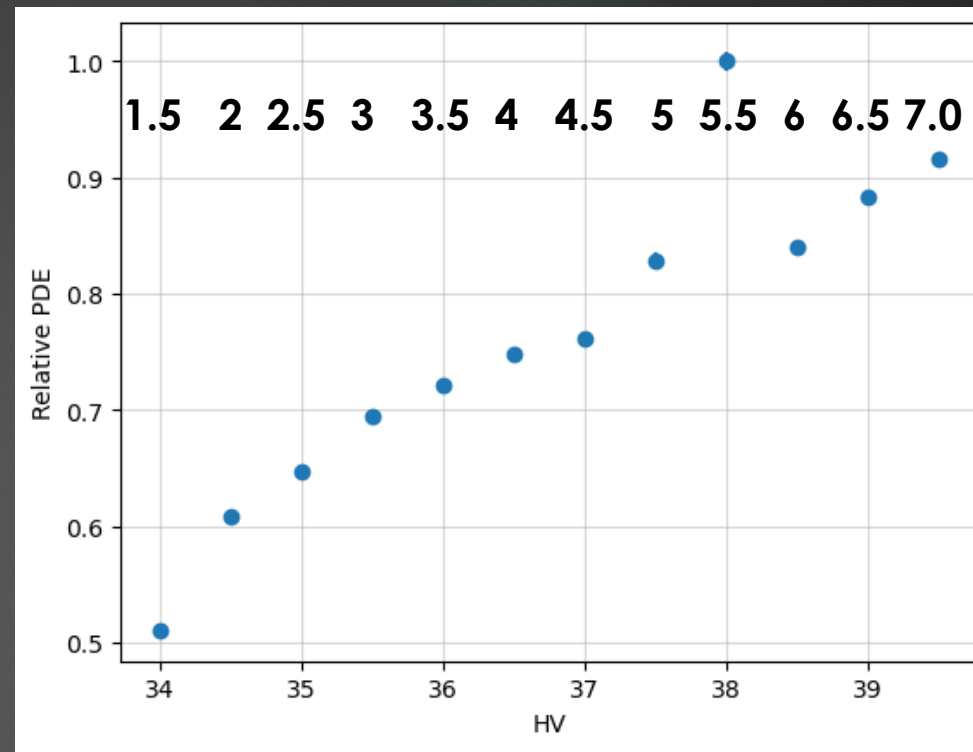
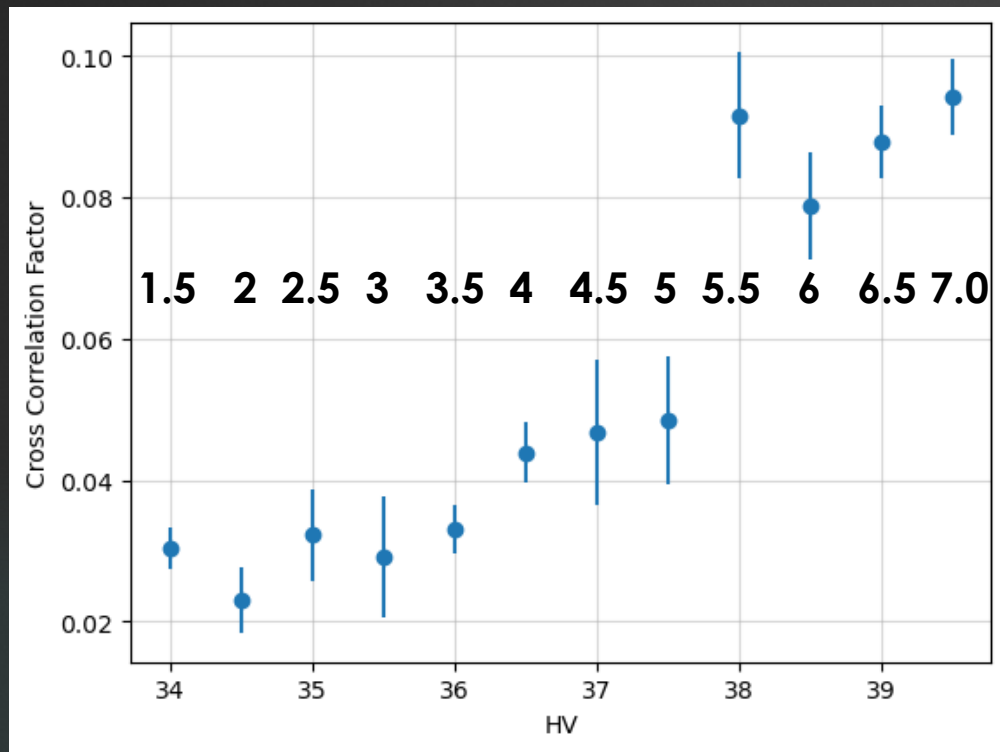


CrossTalk probability are evaluated from charge distribution fitted with Vinogradov

Measure done acquiring the signal area with the oscilloscope @ different OV with a fixed laser source - From 1.5 to 7.0 V at step of 0.5V

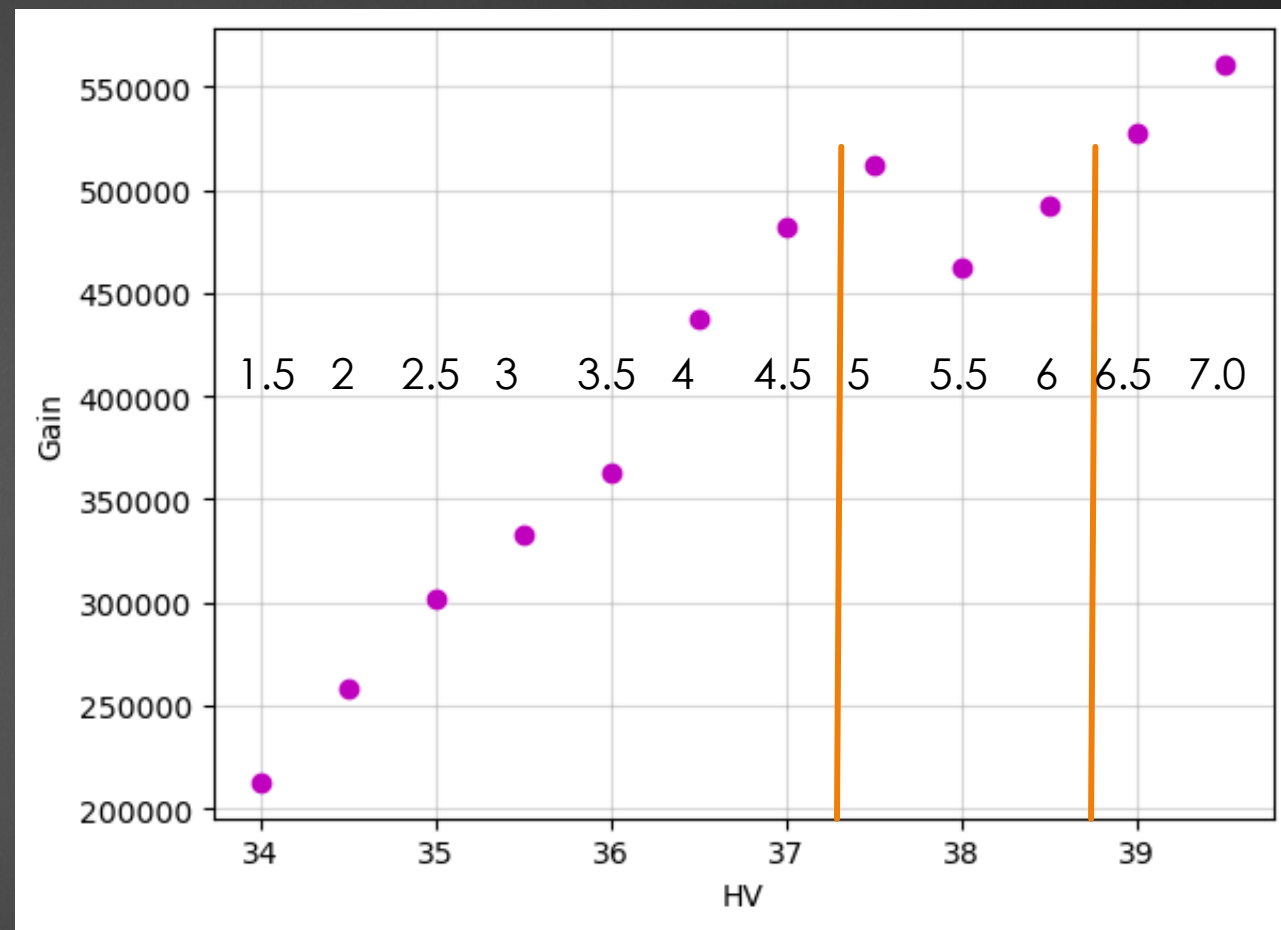
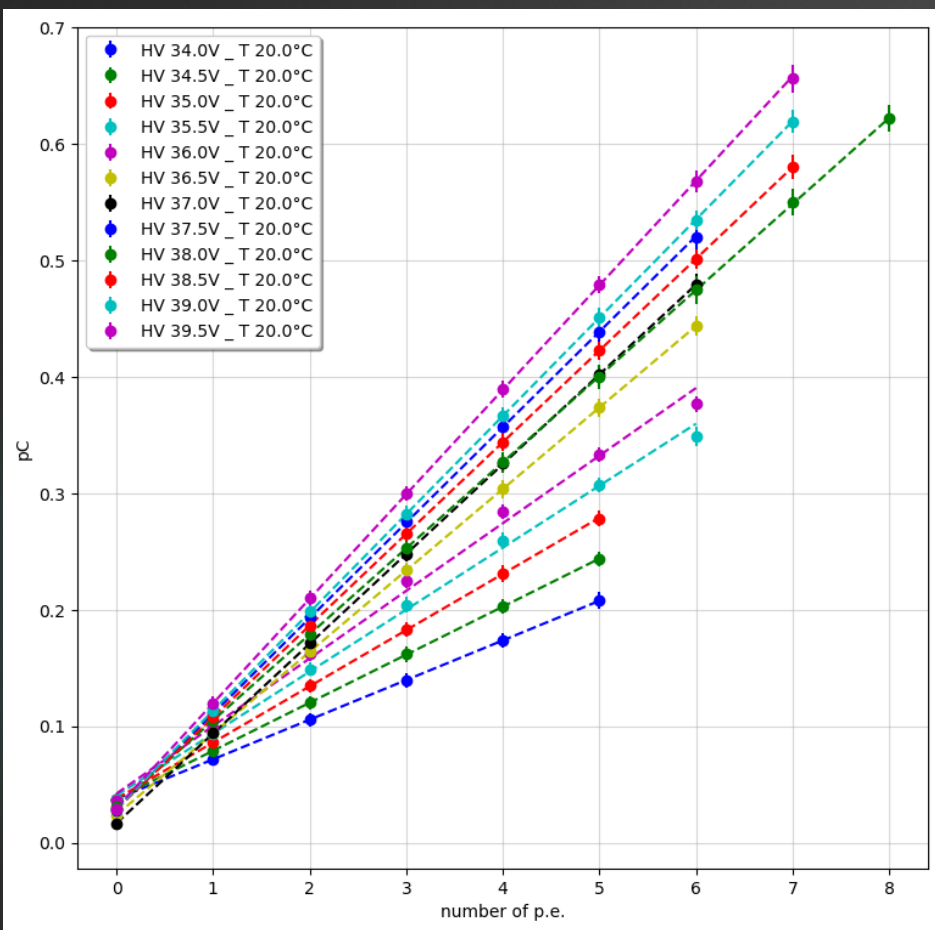


We fit starting from the pedestal peak



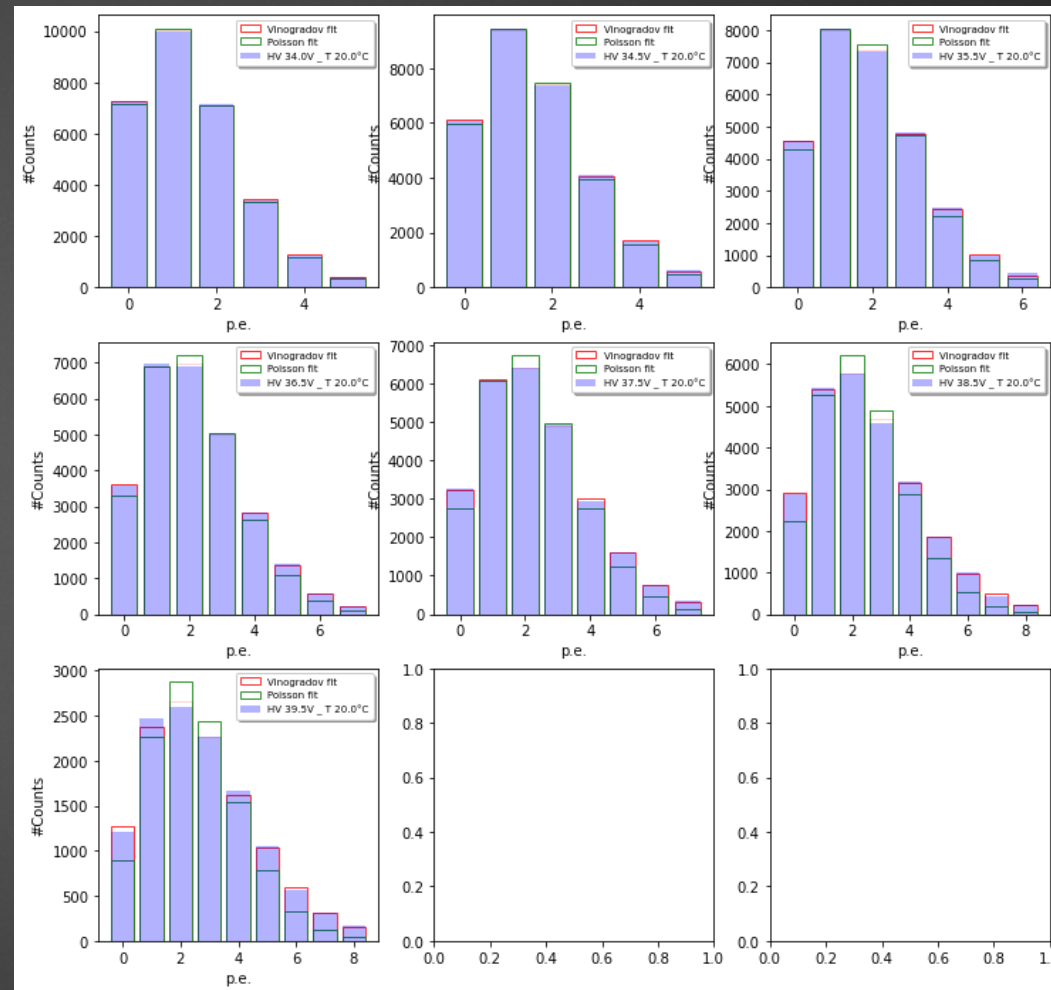
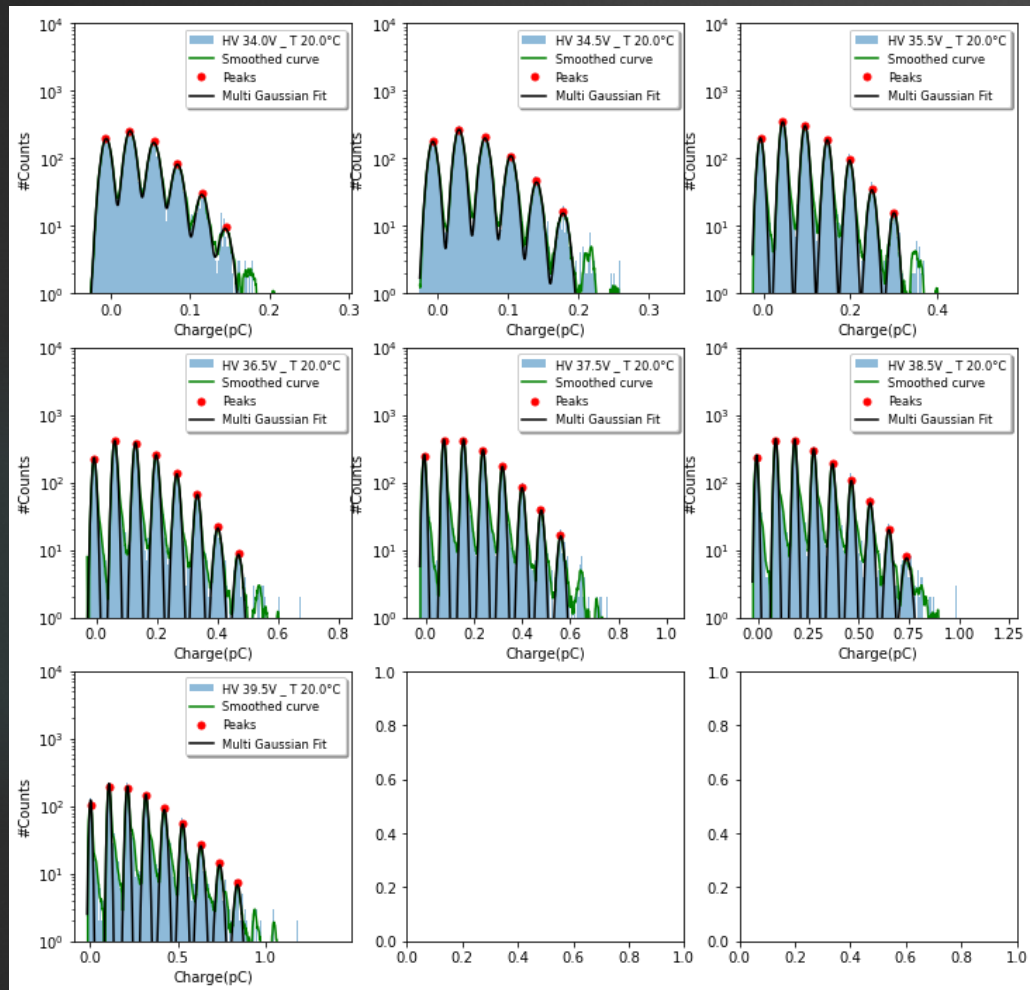
The point at 38V is an out layer but the overall trend of PDE seems to be correct

Relative PDE and Cross Correlation Factor are evaluated from charge distribution fitted with Vinogradov

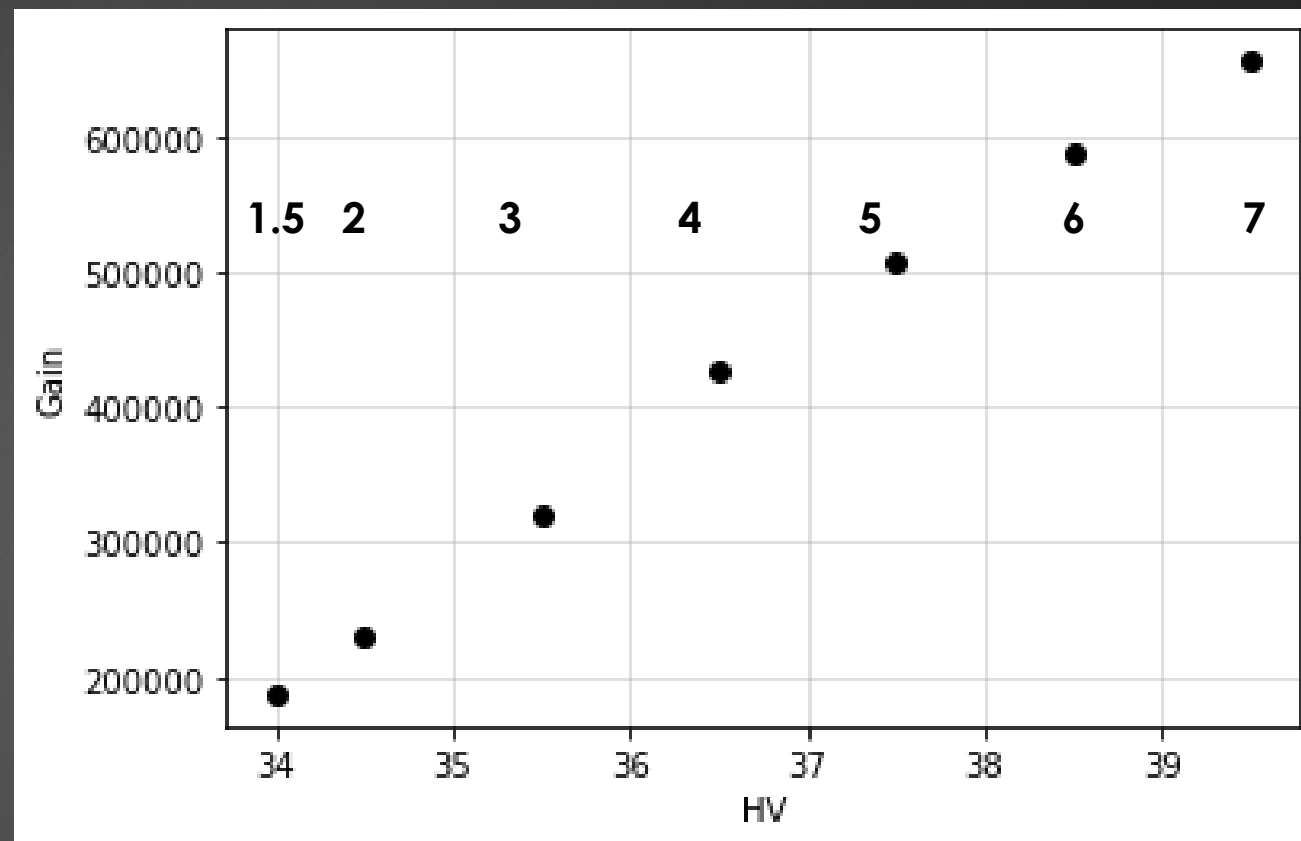
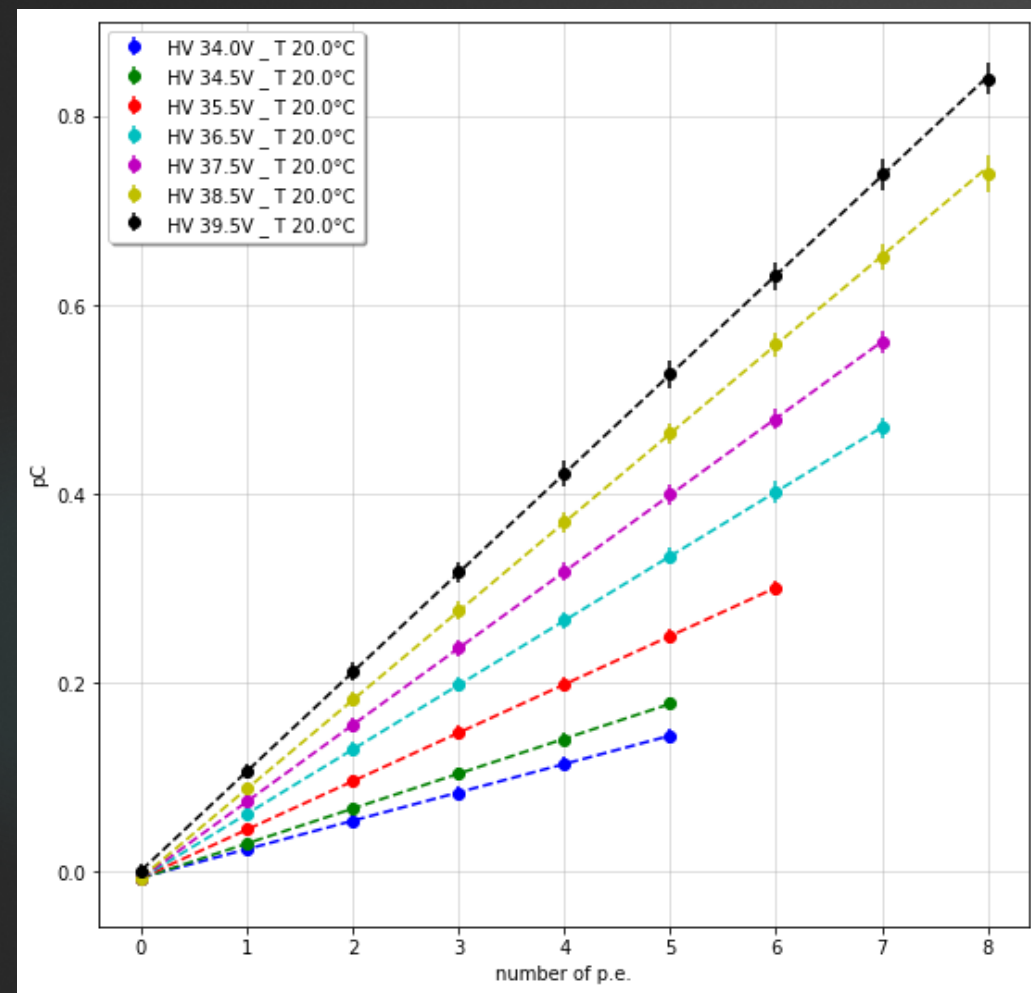


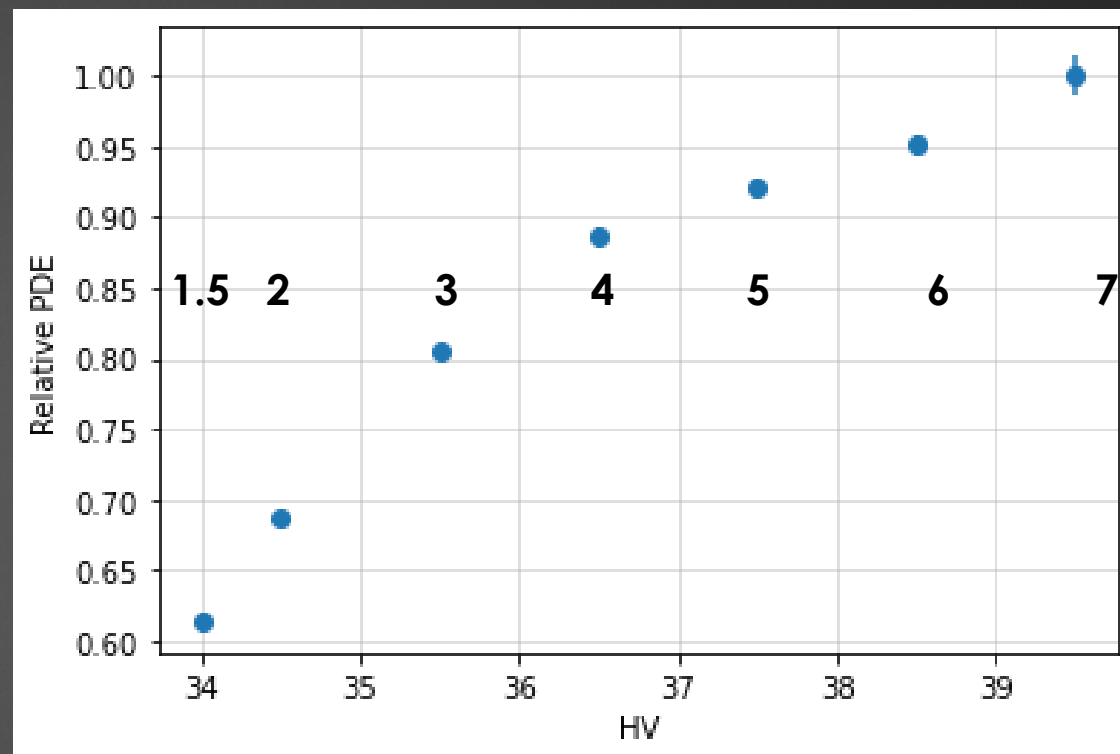
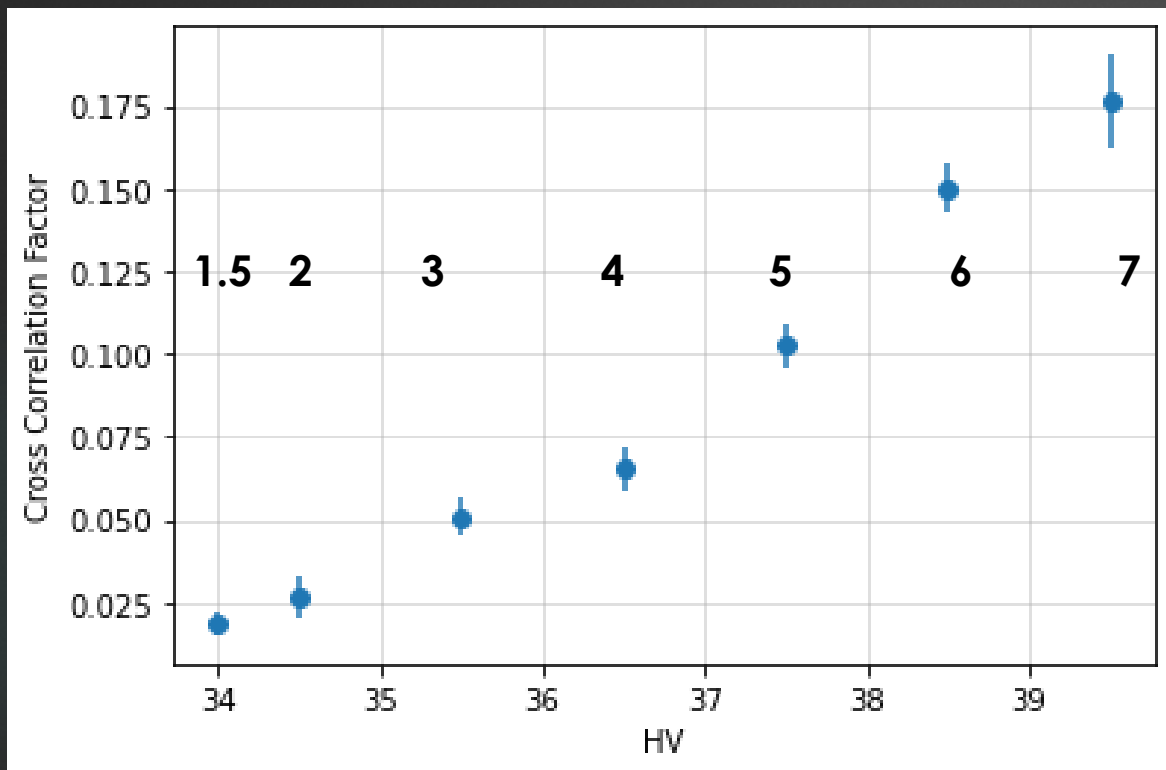
During the long acquisition runs we have changed some parameters that have affected in some way the reproducibility of the measure

Measure done acquiring the signal area with the oscilloscope @ different OV with a fixed laser source - From 1.5 to 7.0 V at different steps



We fit starting from the pedestal peak





Relative PDE and Cross Correlation Factor are evaluated from charge distribution fitted with Vinogradov

- ▶ The FBK samples have characteristics that fulfil our design request
- ▶ As expected, the gain increase with the cell size, but also the Cross Talk
- ▶ The test samples are without any protective coating, but we are testing now samples with the coating. We expect a slight increase in the cross talk.
- ▶ In FBK some of these samples have been test in a Rad Hard environment and we are analysing the data

