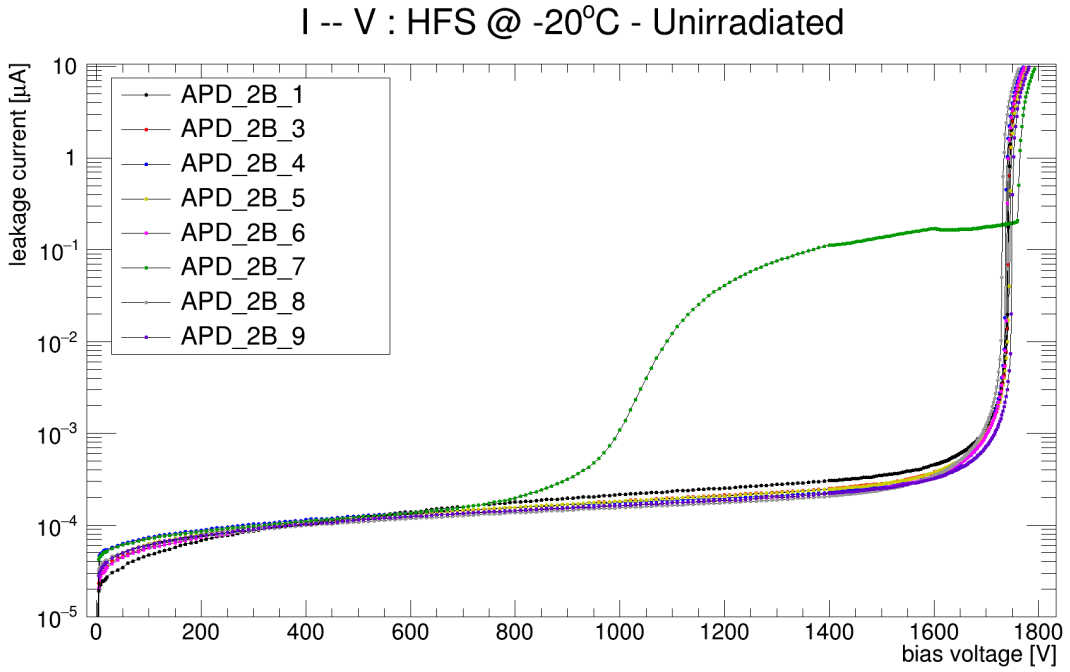
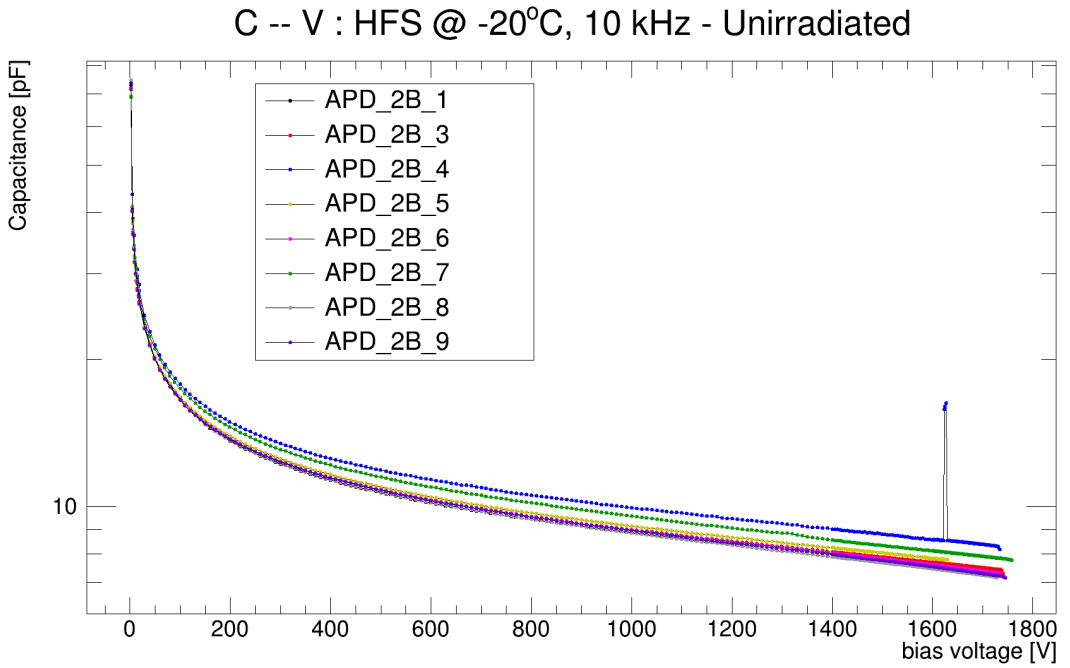
Studies on a new batch of unirradiated 2x2 APDs and on an unirradiated unpackaged 8x8 APD

Sofía Otero Ugobono
Meeting 23/02/2017

New batch of 2x2 APDs
CV/IV

CV/IV curves @ -20ºC





Next steps

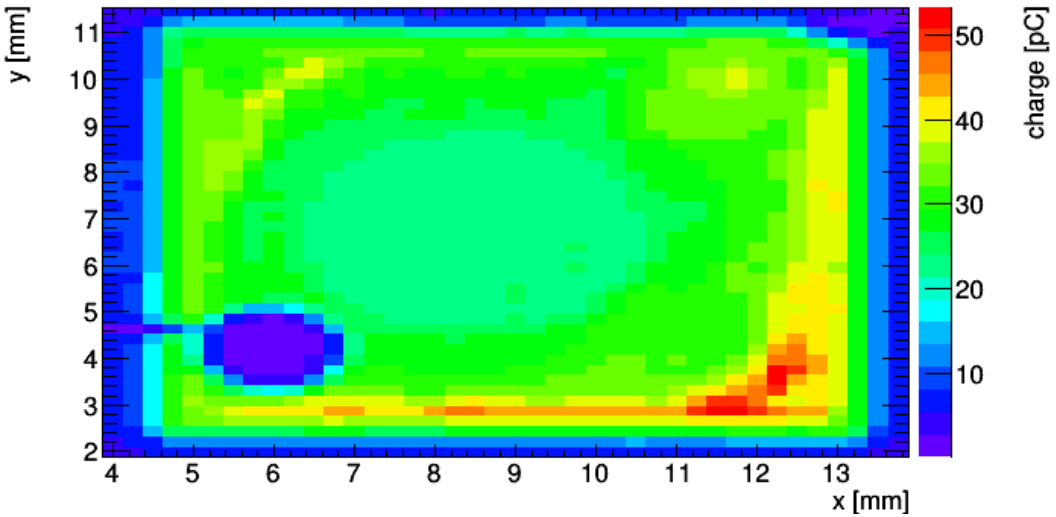
- Performing TCT scans on the all the 2x2 APDs
- Irradiation campaign - Ljubljana.
- Performing TCT and CV/IV measurements after irradiation.
- Comparison of the new results with previous ones (https://indico.cern.ch/event/580875/contributions/2369579/)

Unpackaged 8x8 APD
TCT scans

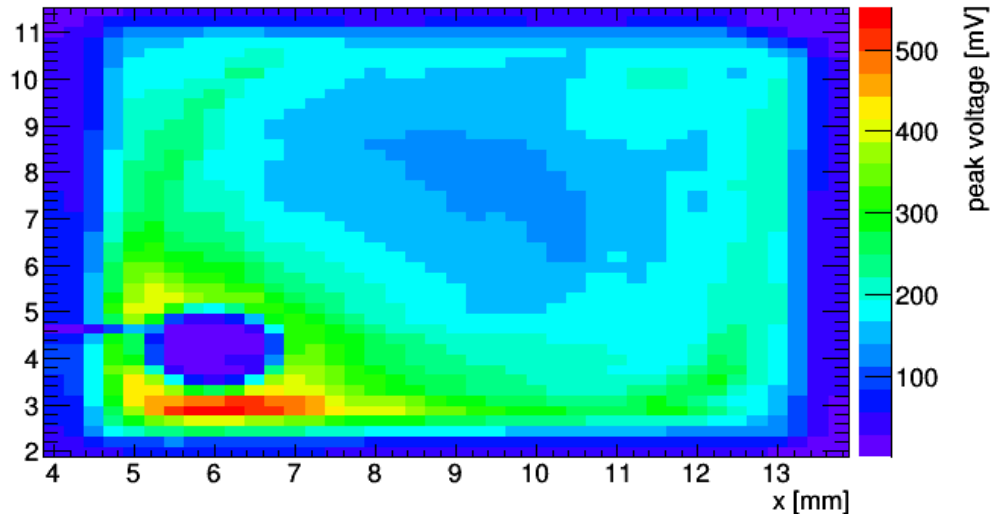
8x8 APD Maps @ -1700V, -20ºC

Front Read-out and Biasing. IR front TCT.

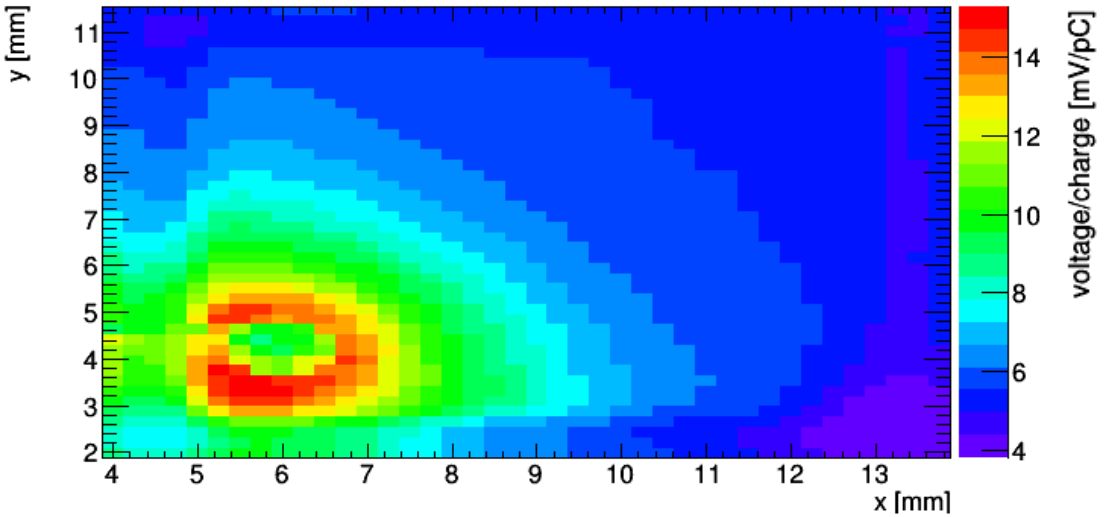
Charge collection map (25ns integration)



Signal peak voltage map



Ratio between signal peak voltage and charge collection

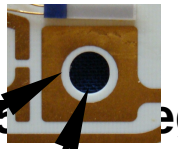


Laser power ~107.7 µW

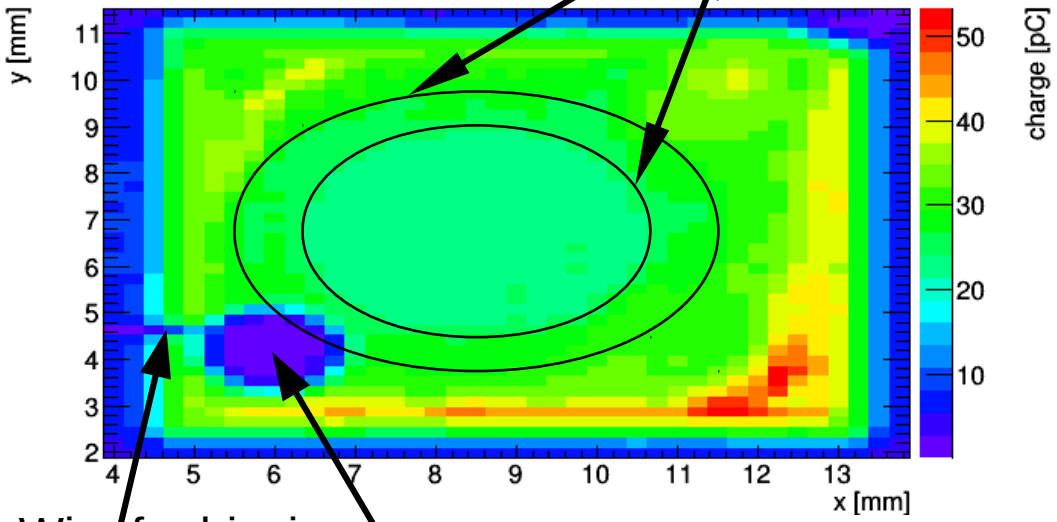
Sample: APD_8x8_465_7_2

8x8 APD Maps @ -1700V, -20ºC

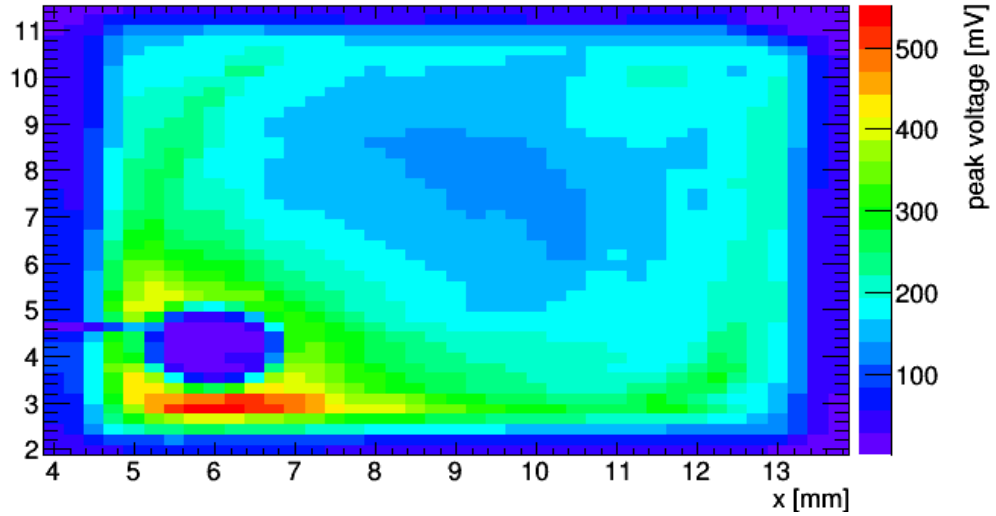
Front Read-out and Biasing. IR front TCT.



Charge collection map (25 ns integration)

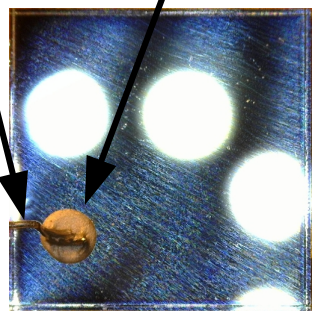


Signal peak voltage map

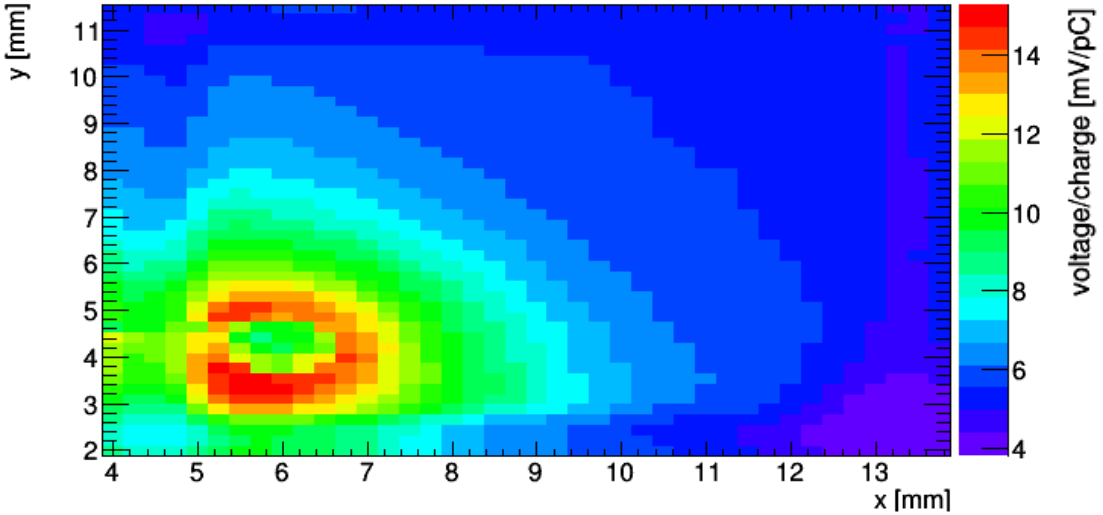


Wire for biasing and read-out

Silver paint blob



Ratio between signal peak voltage and charge collection

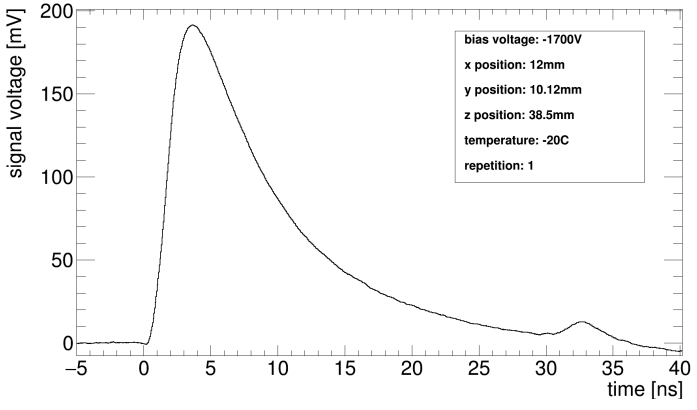


Laser power ~107.7 µW

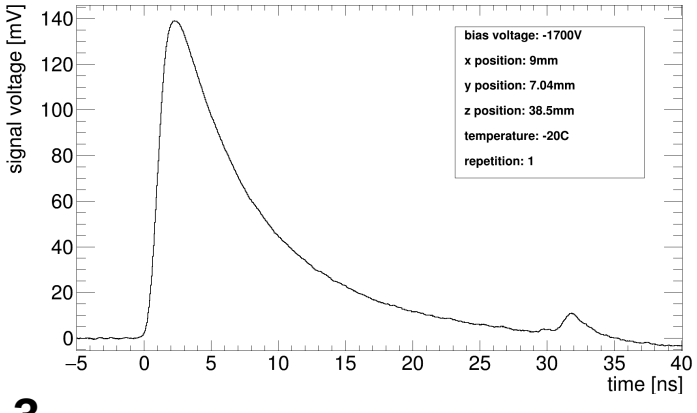
Sample: APD_8x8_465_7_2

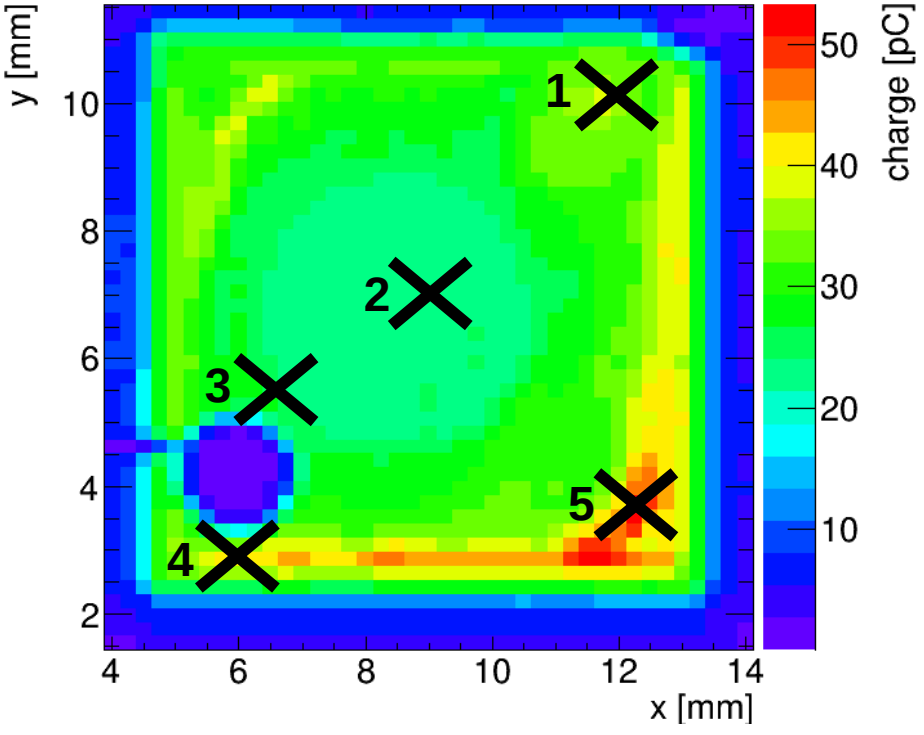
Waveforms IR front @ different points

1



2





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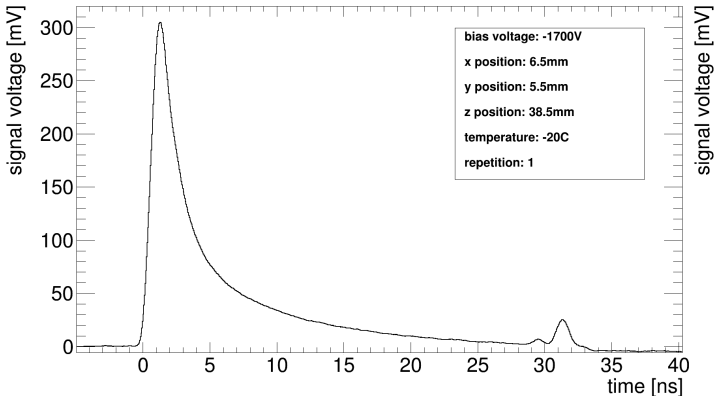

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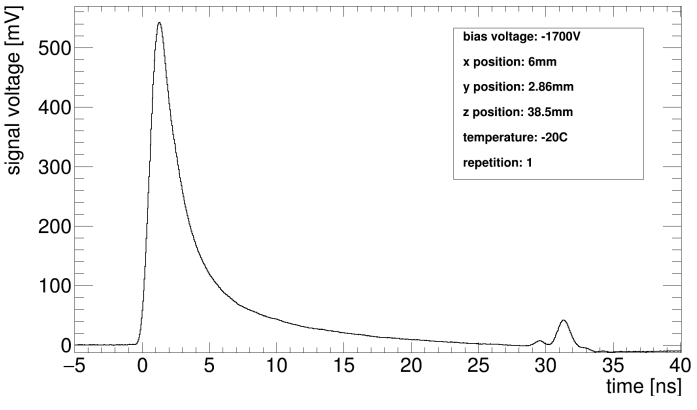
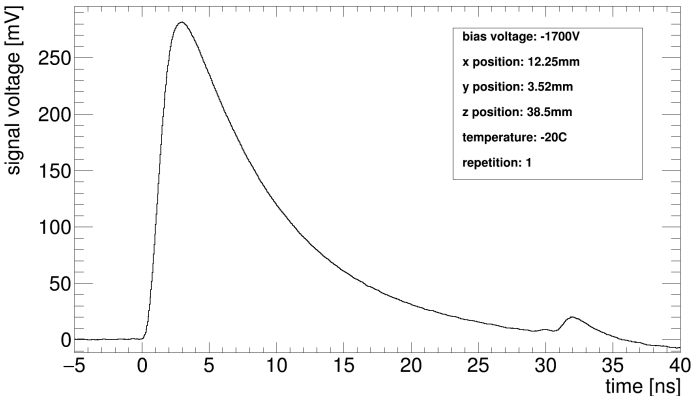
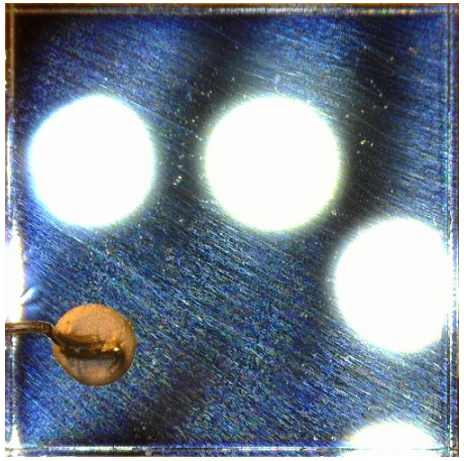


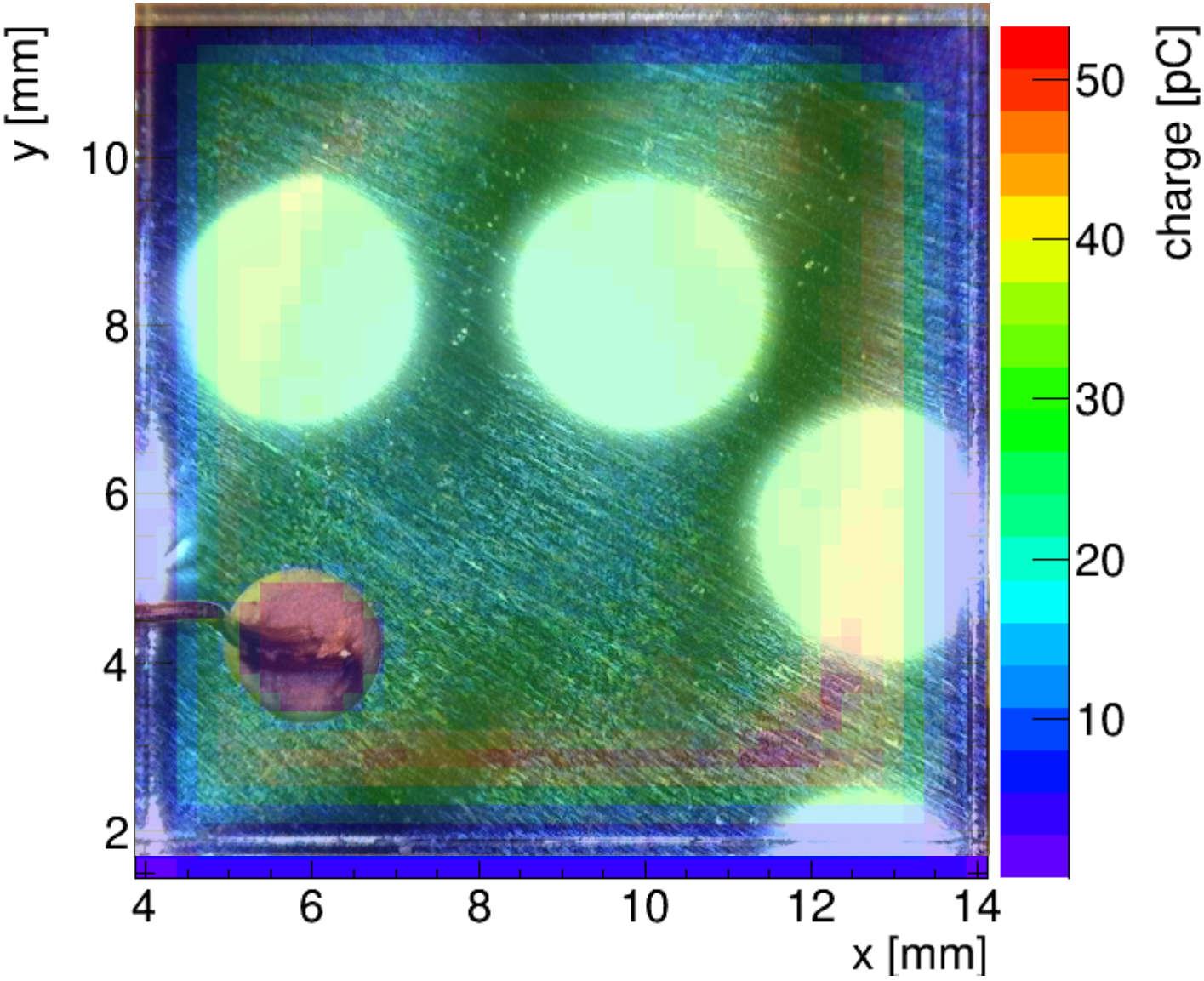
5



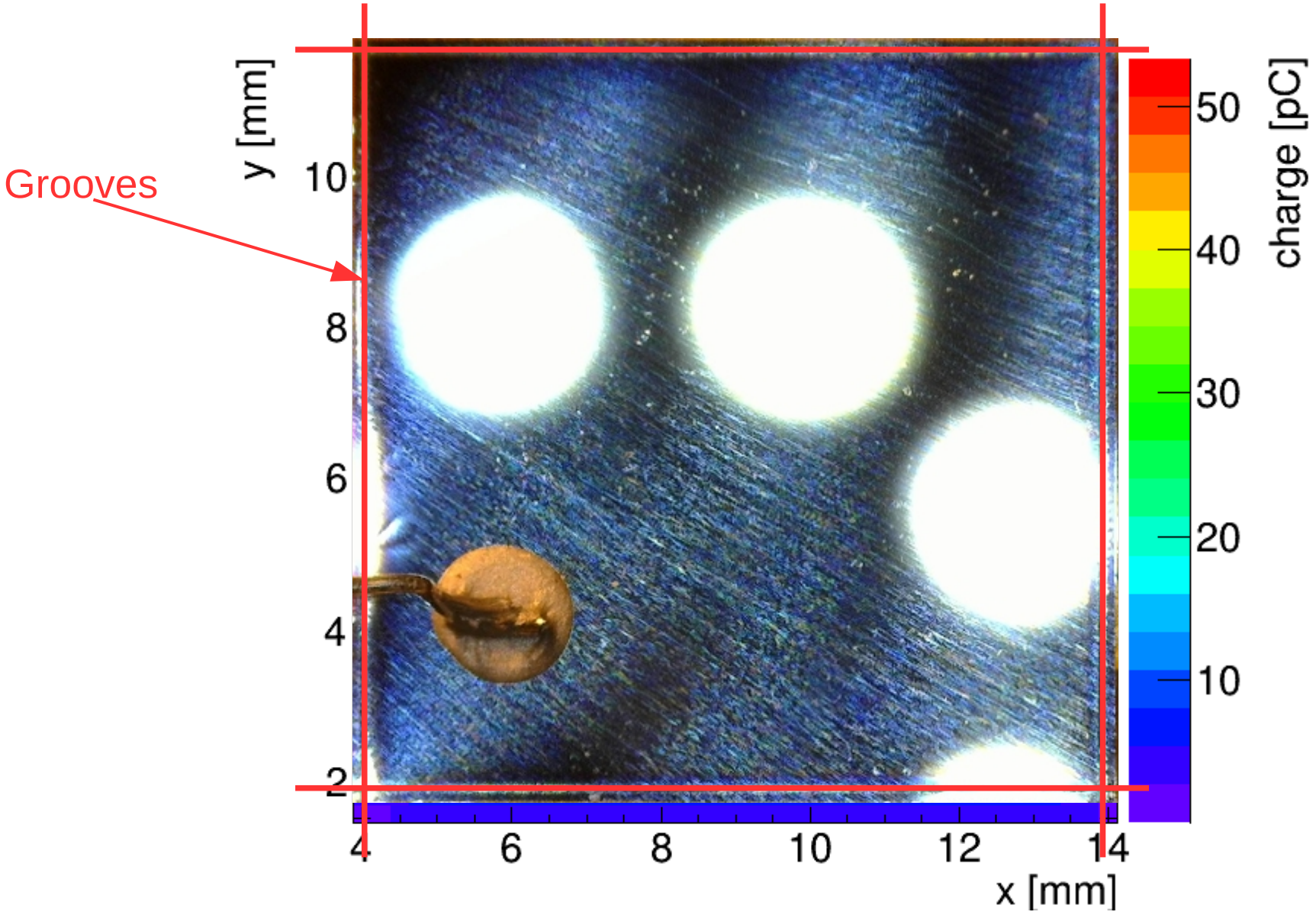
Superposition of the charge map and a picture of the sensor

- The silver paint blob + the wire were used as a spatial reference.
- The white circles are reflections of the light coming from the microscope (a new and nicer picture will be taken with a better microscope).

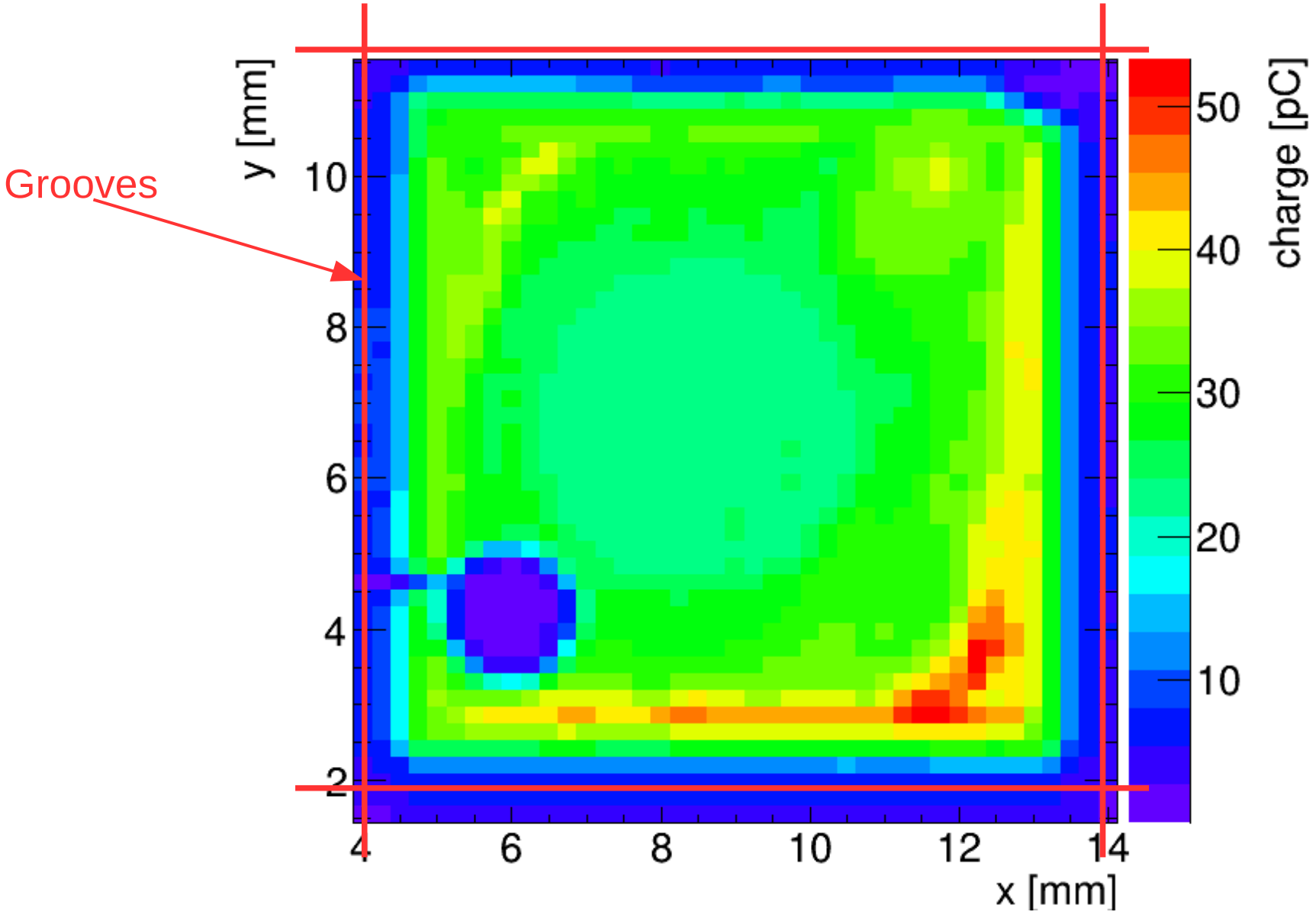




Superposition of the charge map and a picture of the sensor



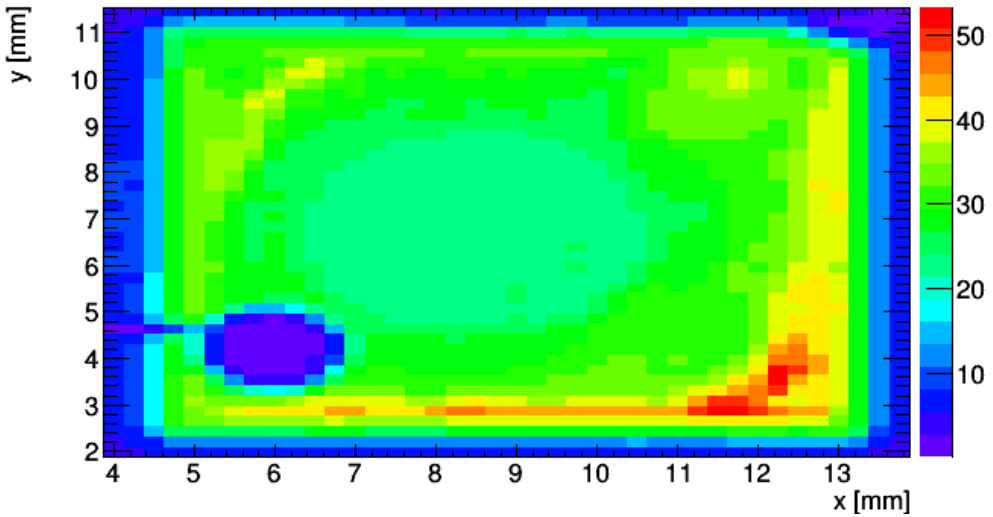
Superposition of the charge map and a picture of the sensor



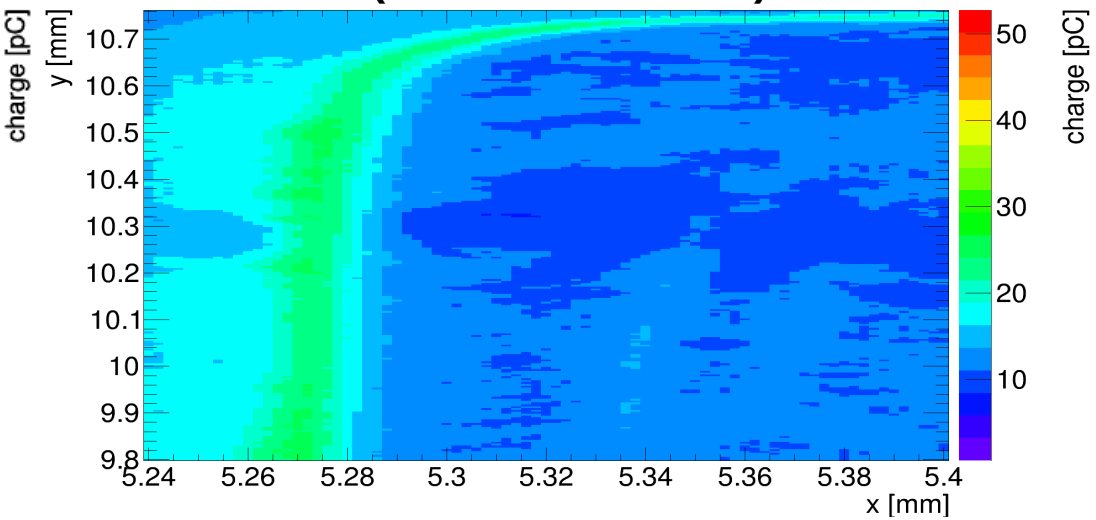
Top left detailed scan @ -1700V, -20ºC

Front Read-out and Biasing. IR front TCT.

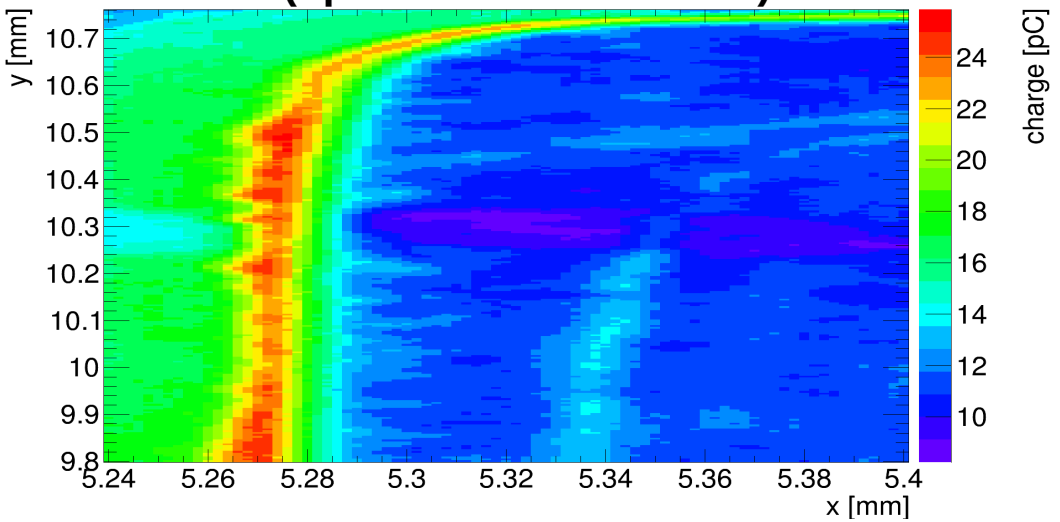
Charge collection map (25ns integration)



Top left area of the charge map (same colour scale)



Top left area of the charge map (optimised colour scale)



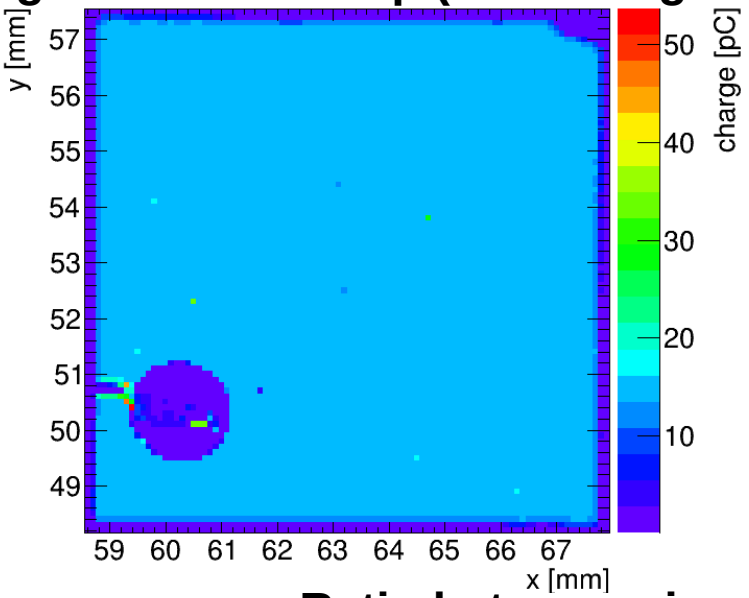
Laser power:
Full map ~107.7 µW
Detailed scan ~107.5 µW

Sample: APD_8x8_465_7_2

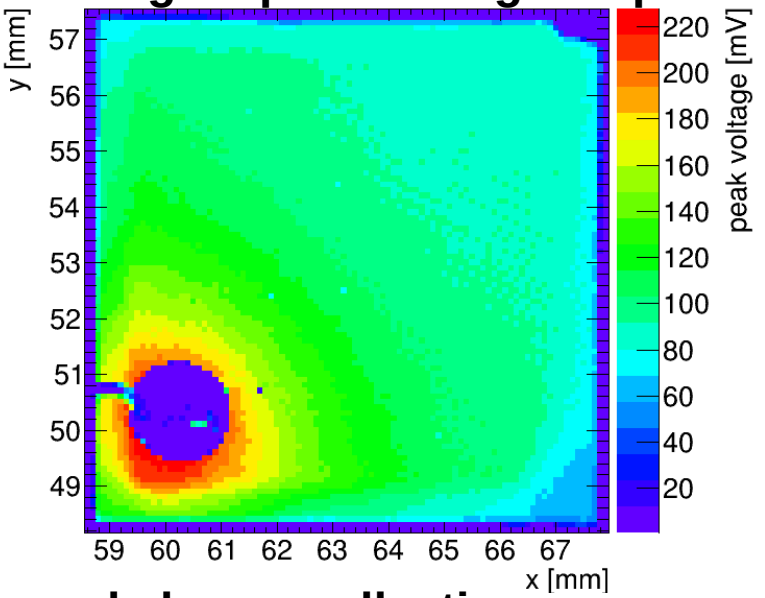
8x8 APD Maps @ -1700V, -20ºC

Front Read-out and Biasing. Red front TCT.

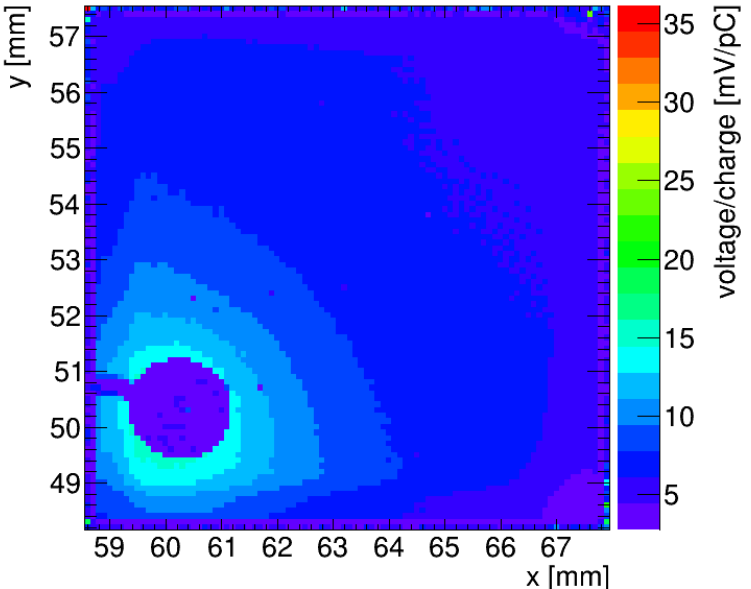
Charge collection map (25ns integration)



Signal peak voltage map



Ratio between signal peak voltage and charge collection



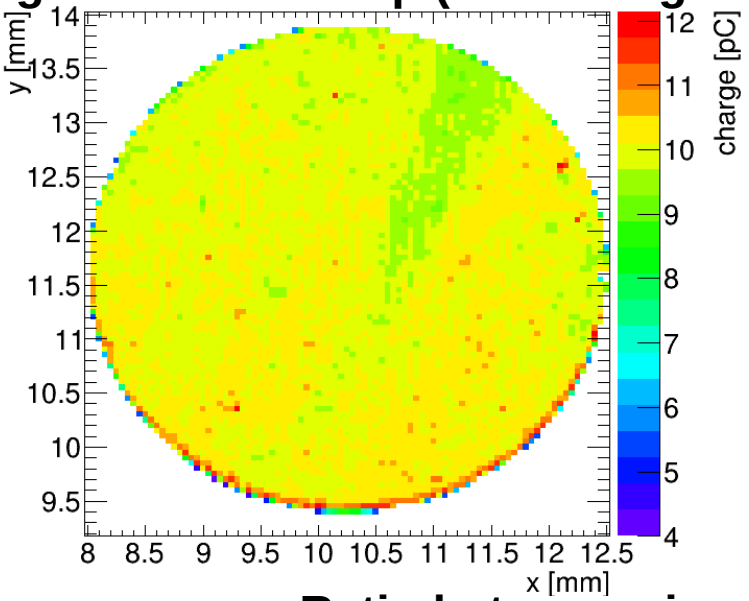
Sample: APD_8x8_465_7_2

Laser power
~79 µW

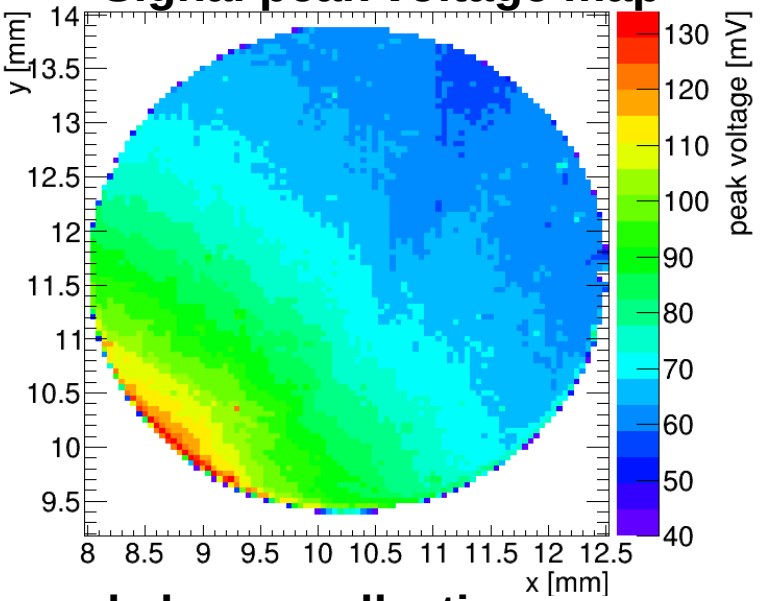
8x8 APD Maps @ -1700V, -20ºC

Front Read-out and Biasing. IR back TCT.

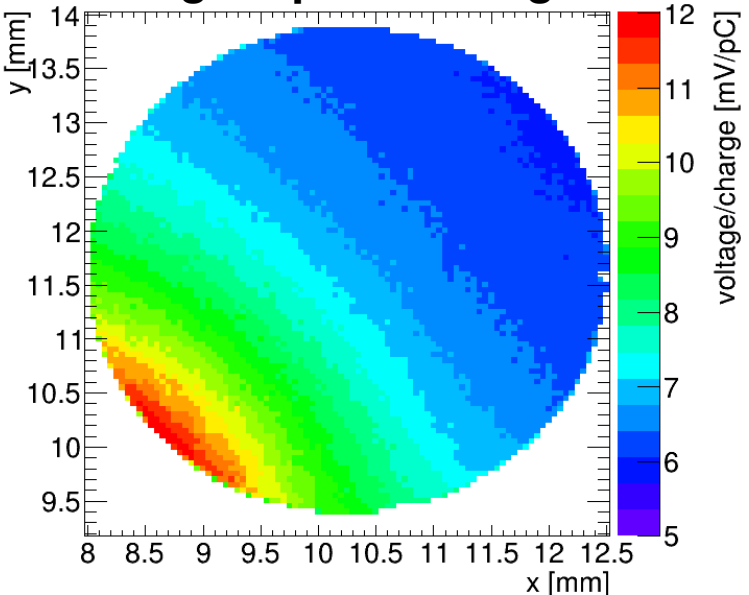
Charge collection map (25ns integration)



Signal peak voltage map



Ratio between signal peak voltage and charge collection



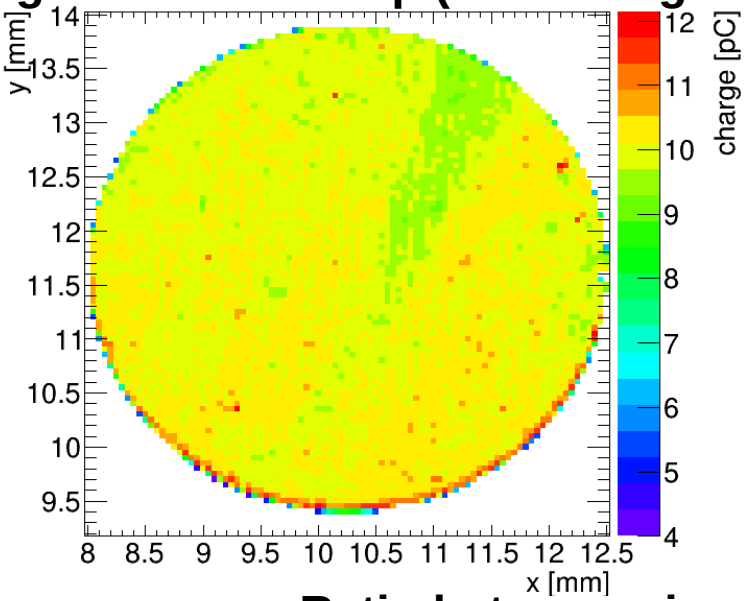
Sample: APD_8x8_465_7_2

Laser power ~107.3 µW

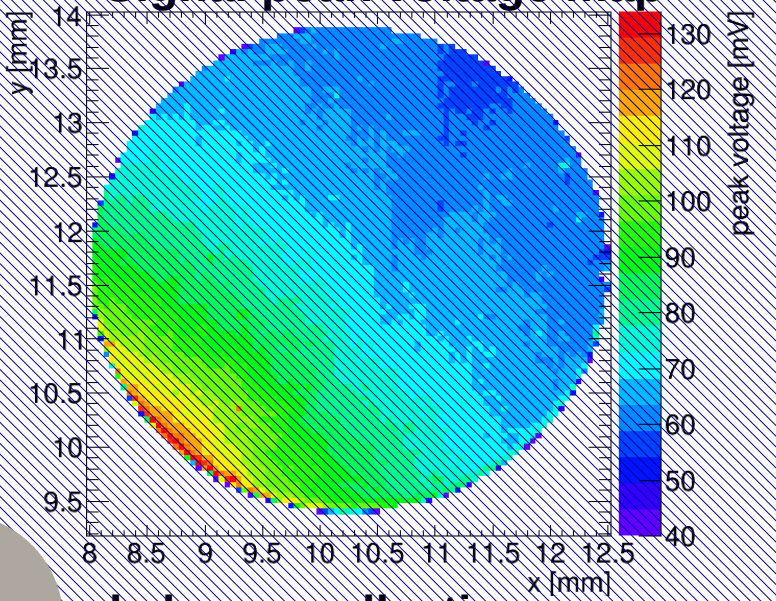
8x8 APD Maps @ -1700V, -20ºC

Front Read-out and Biasing. IR back TCT.

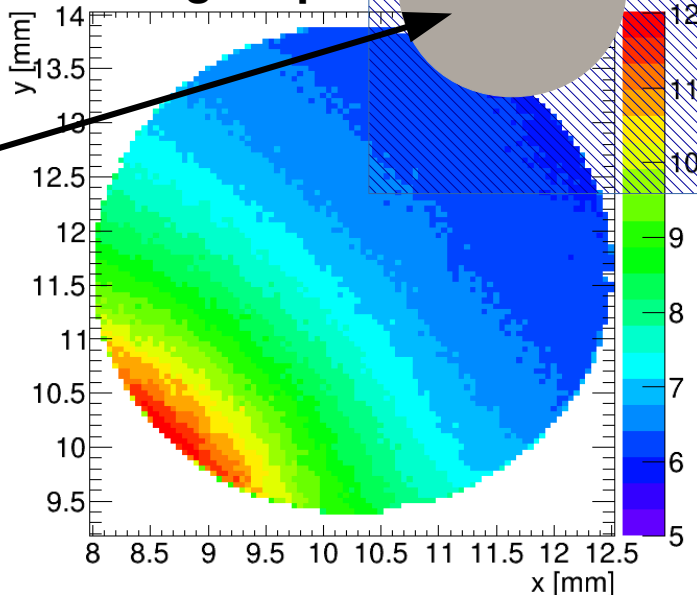
Charge collection map (25ns integration)



Signal peak voltage map



Ratio between signal peak and charge collection



Silver paint blob
In scale

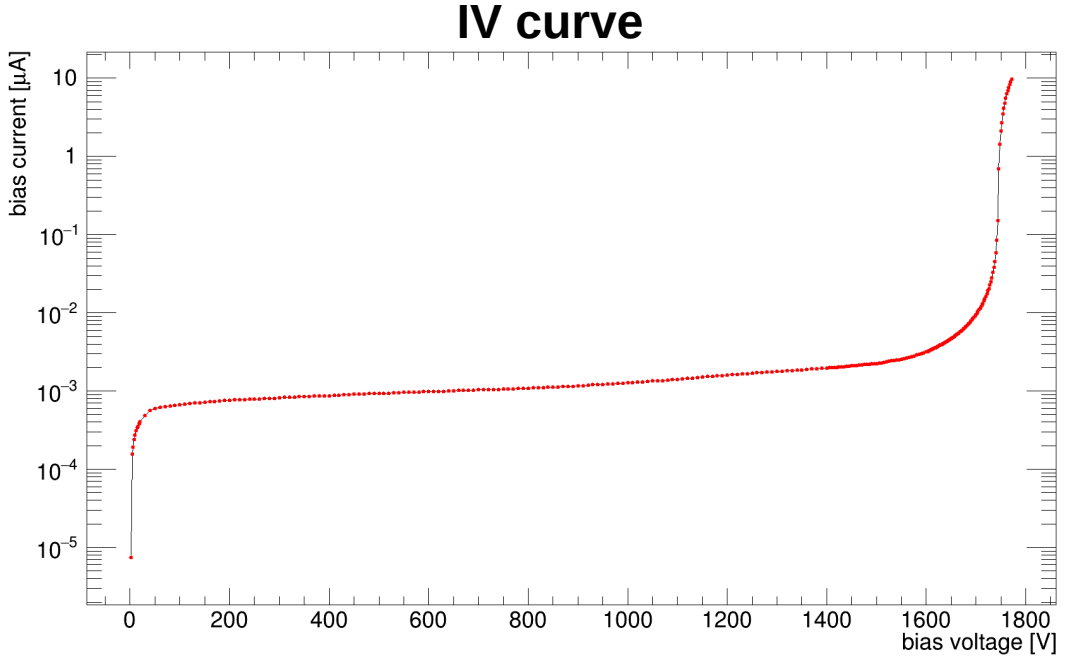
Detector area
In scale

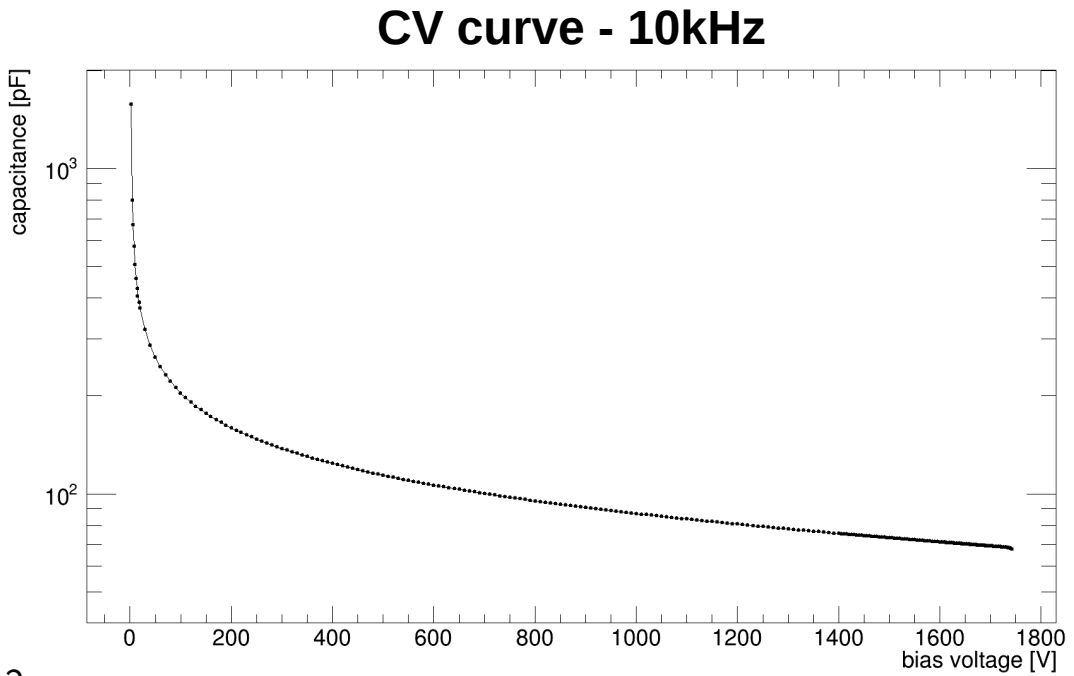
Laser power
~107.3 µW

Sample: APD_8x8_465_7_2

Unpackaged 8x8 APD
CV/IV

CV/IV curves @ -20ºC





Sample: APD_8x8_465_7_2