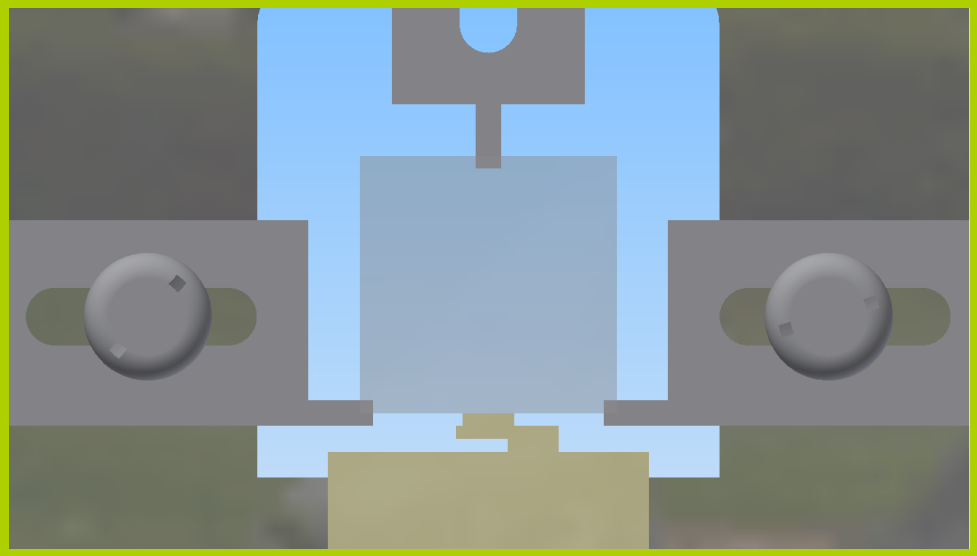
Analysis of scintillator tile scans

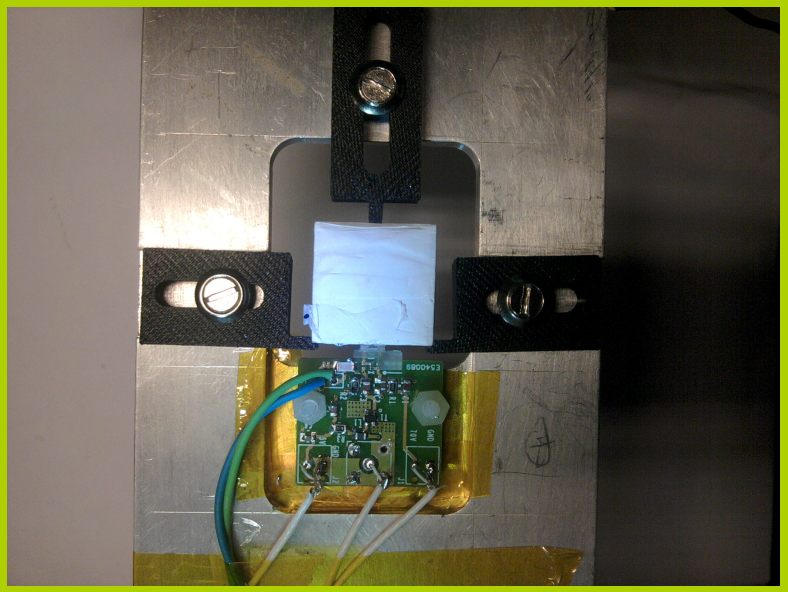
ECAL Lab Meeting
2015.03.04
Laszlo Varga (CERN, Eotvos Lorand University HU)

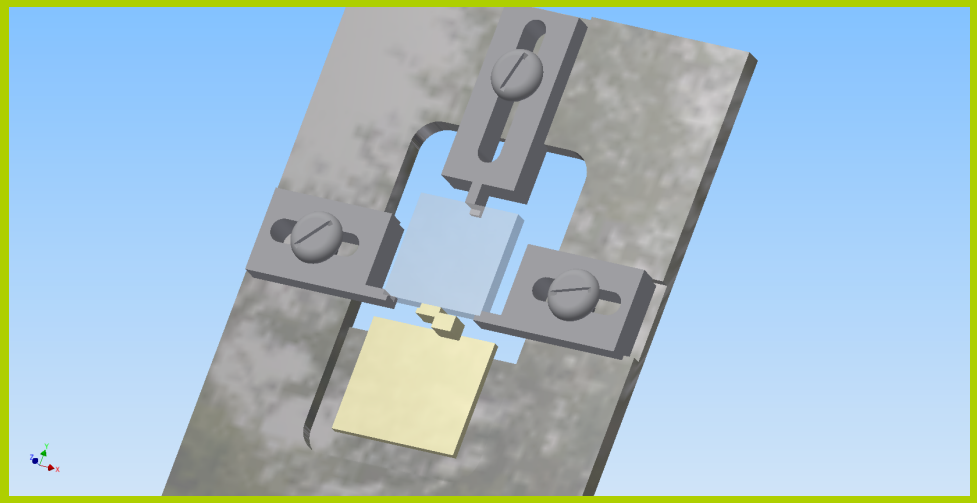
Data sets

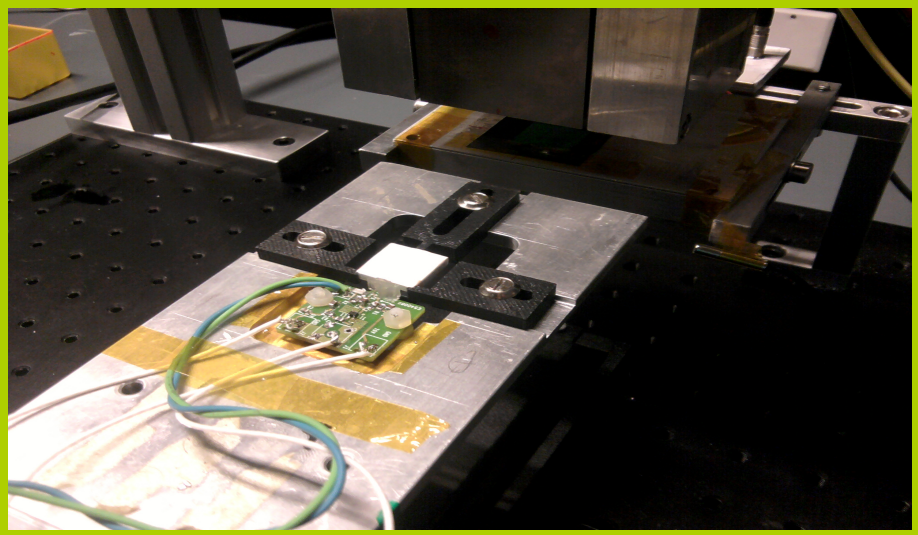
- Date:
  - Wrapped tile (□20mm & □15mm): 2015.02.20 & 2015.02.23
  - Painted tile (□20mm & □15mm): 2015.02.27 & 2015.02.25
- Scanned range [mm]:
  - □20mm tile: x ϵ [-12:17] ; y ϵ [-18:12]
  - □15mm tile: x ϵ [-10:14] ; y ϵ [-11:12]
- Measurement time in each point is 100 s
- All measurements were created with the setup after modifications of the tile holders
- Apply temperature correction (also in the case of the painted tiles) discussed in the first talk

The setup







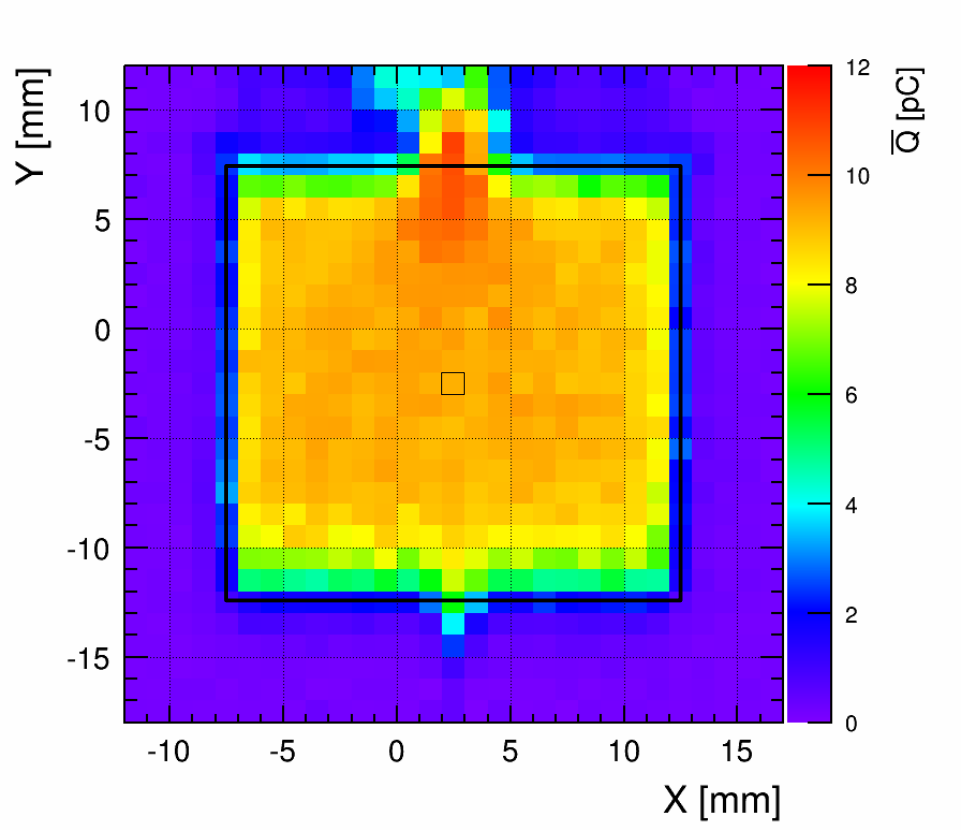


1, The □20mm tiles

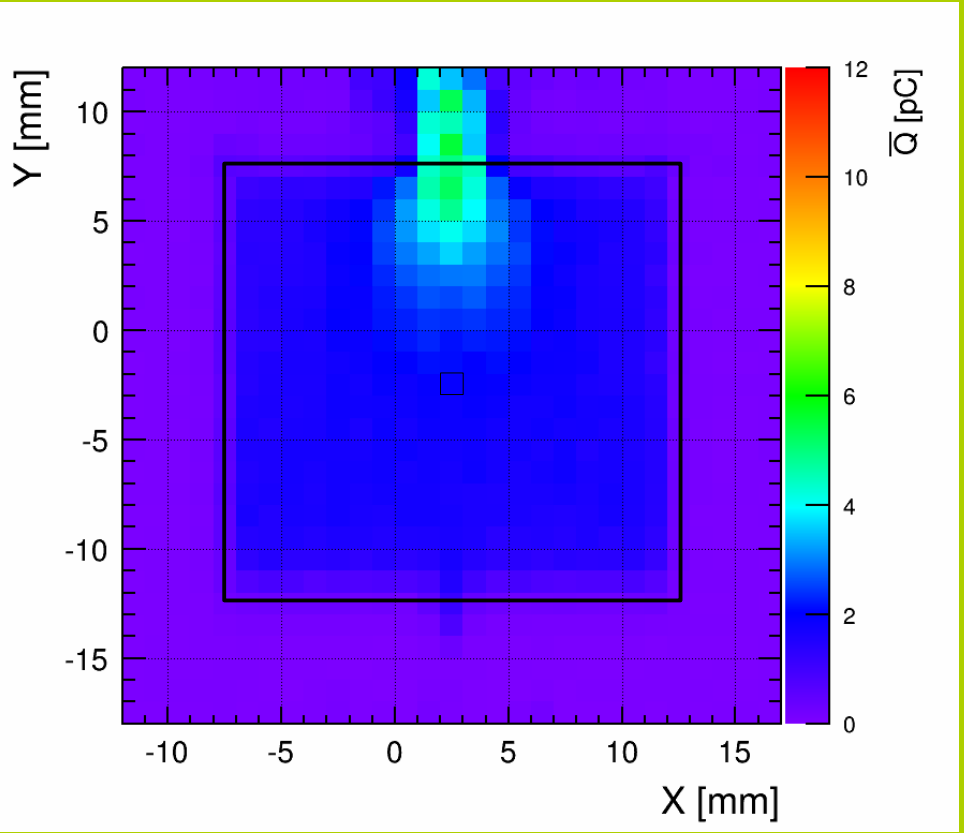
The □20mm tiles

• Mean of Charge

Wrapped



Painted



- The wrapped tile's light yield is larger
- For example:

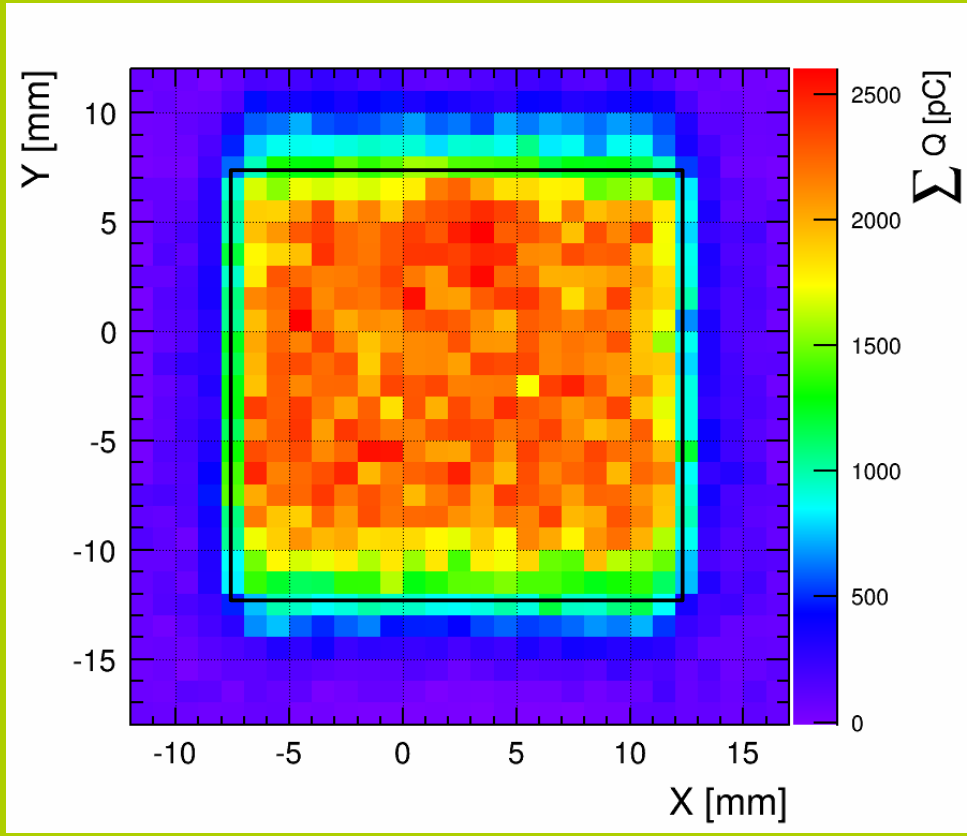
  $\overline{Q}_{20,wrapped}$(x=2.5mm;y=-2.5mm) ≈ 9 pC

  $\overline{Q}_{20,painted}$(x=2.5mm;y=-2.5mm) ≈ 2 pC

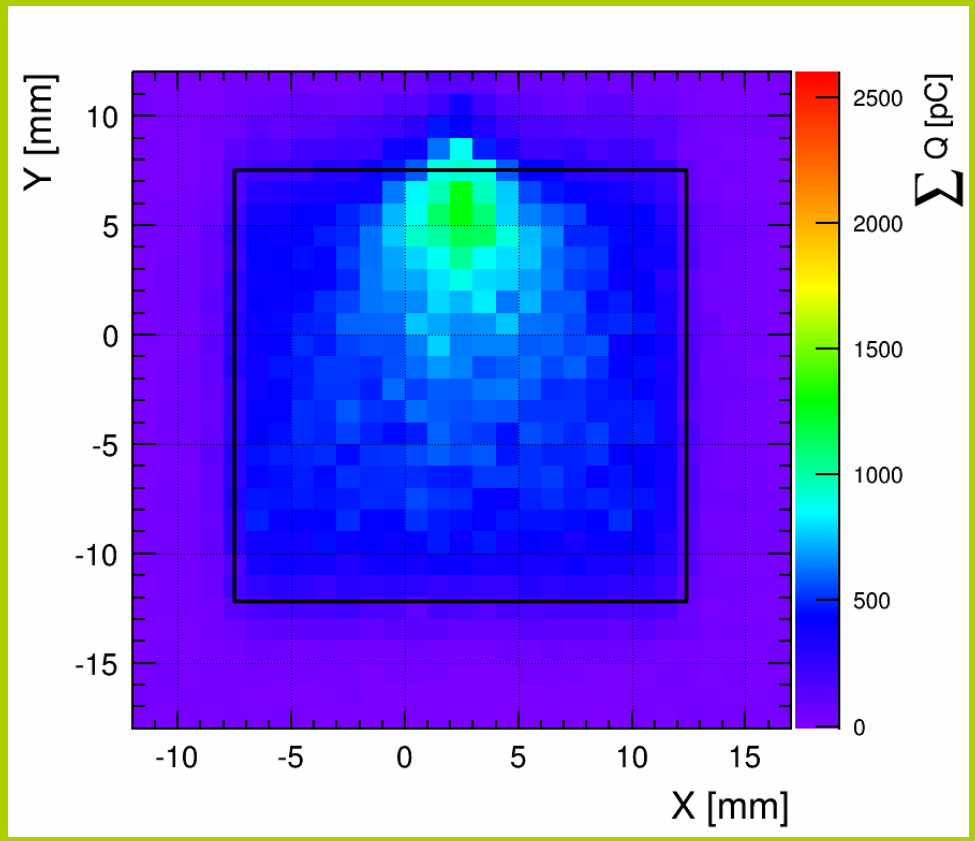
The □20mm tiles

- **Sum of the charge**

Wrapped



Painted



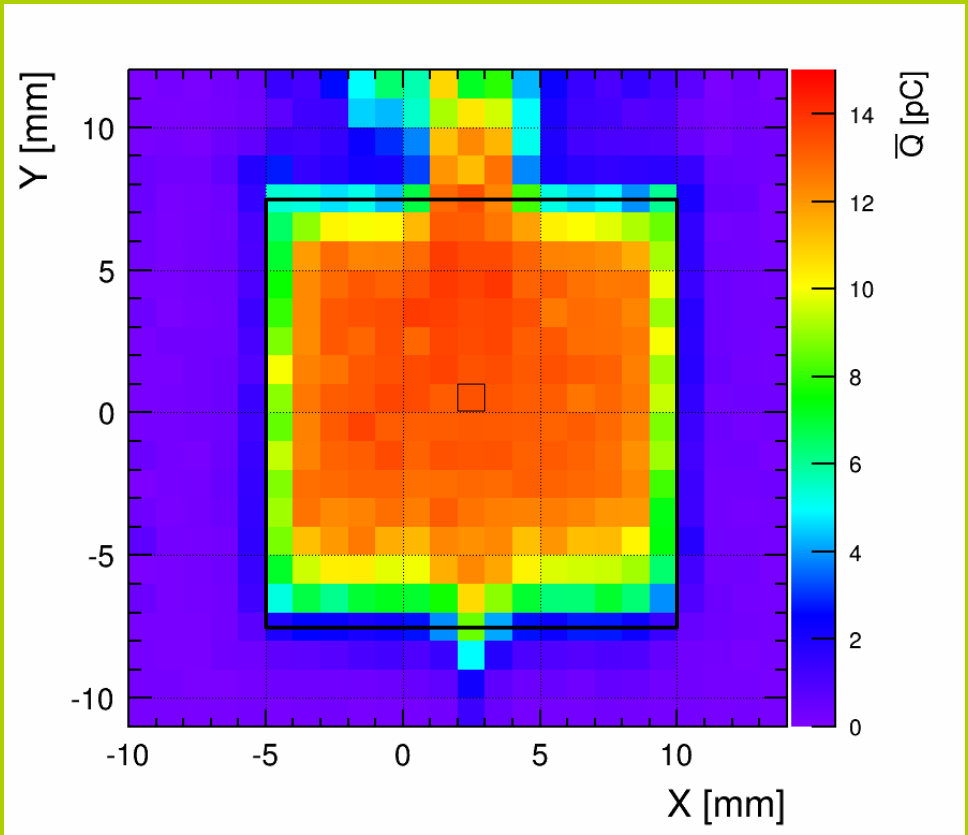
This effect is also visible on the sum of the charge diagrams

2, The □15mm tiles

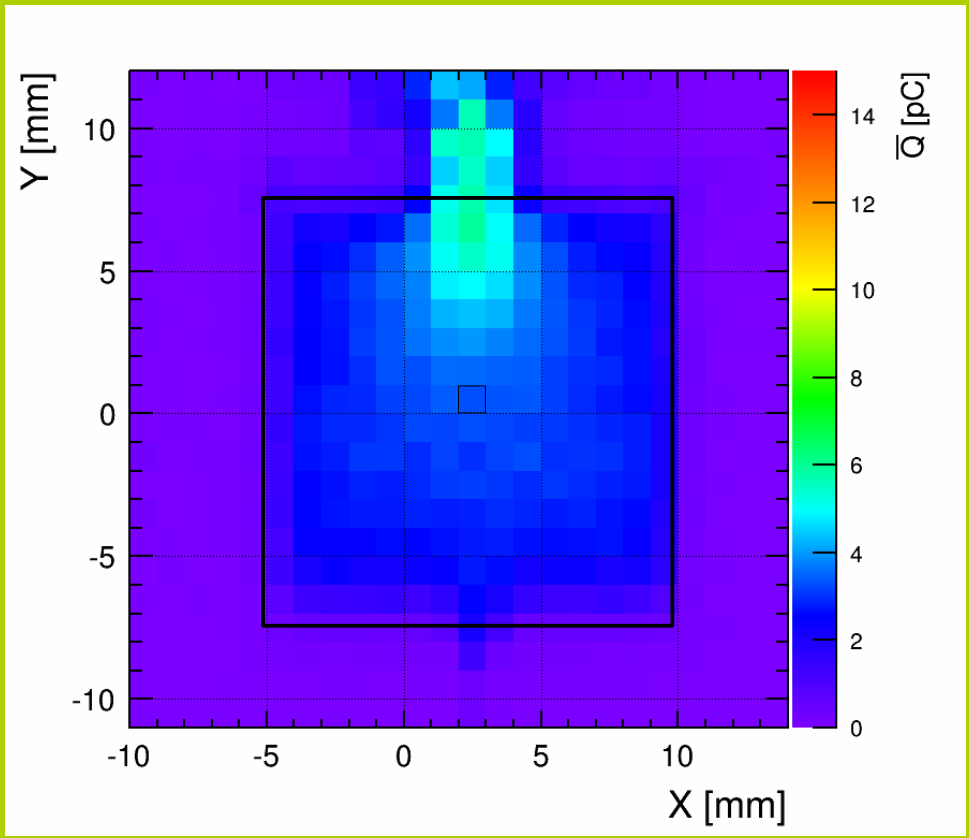
The □15mm tiles

• Mean of Charge

Wrapped



Painted



Similar as the □20mm tile:

- The light yield of the wrapped tile is larger. For example:

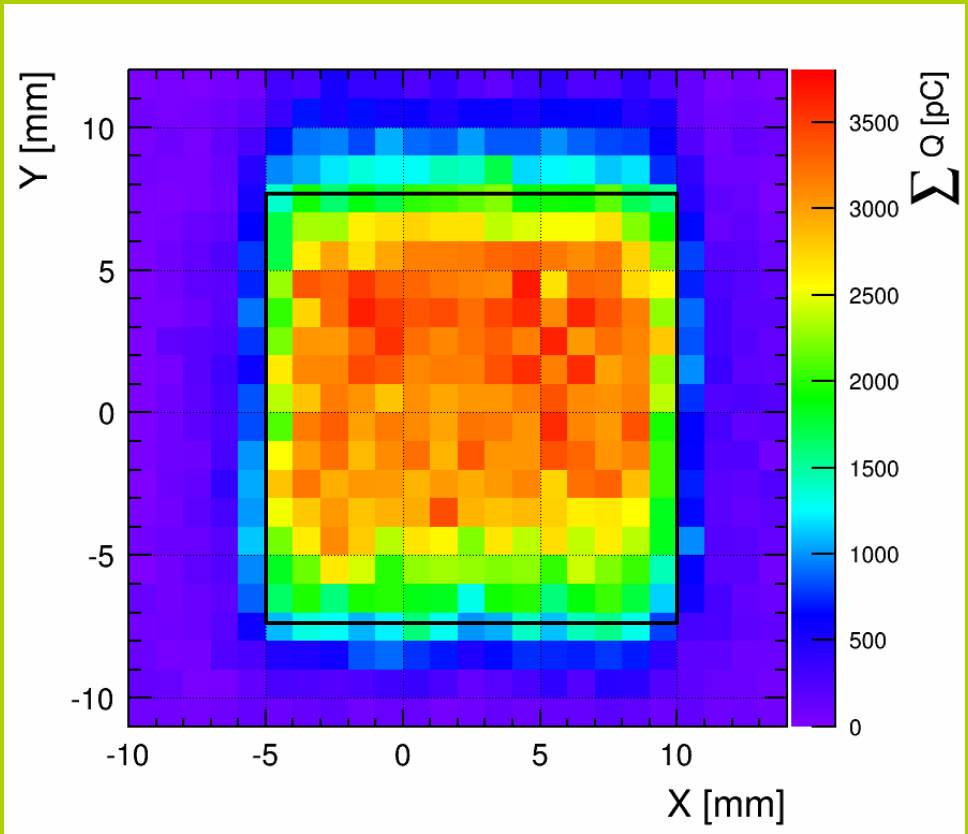
$\overline{Q}_{15,wrapped}$(x=2.5mm;y=0.5mm) ≈ 13 pC

$\overline{Q}_{15,painted}$(x=2.5mm;y=0.5mm) ≈ 3.5 pC

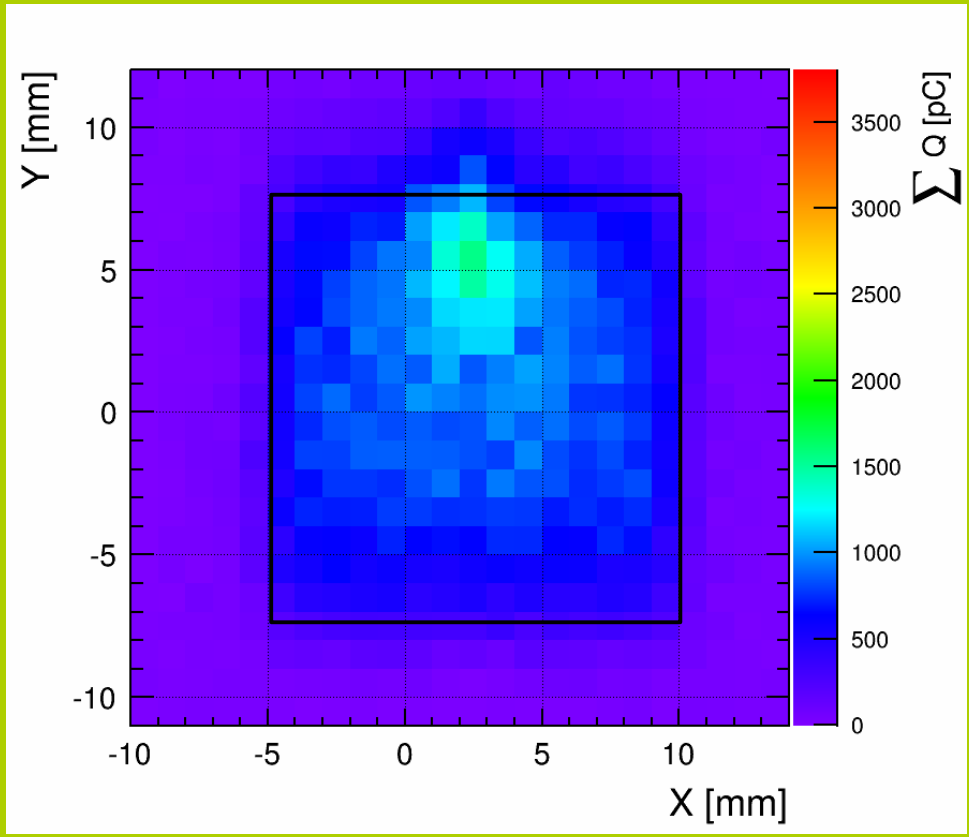
The □15mm tiles

- **Sum of Charge**

Wrapped

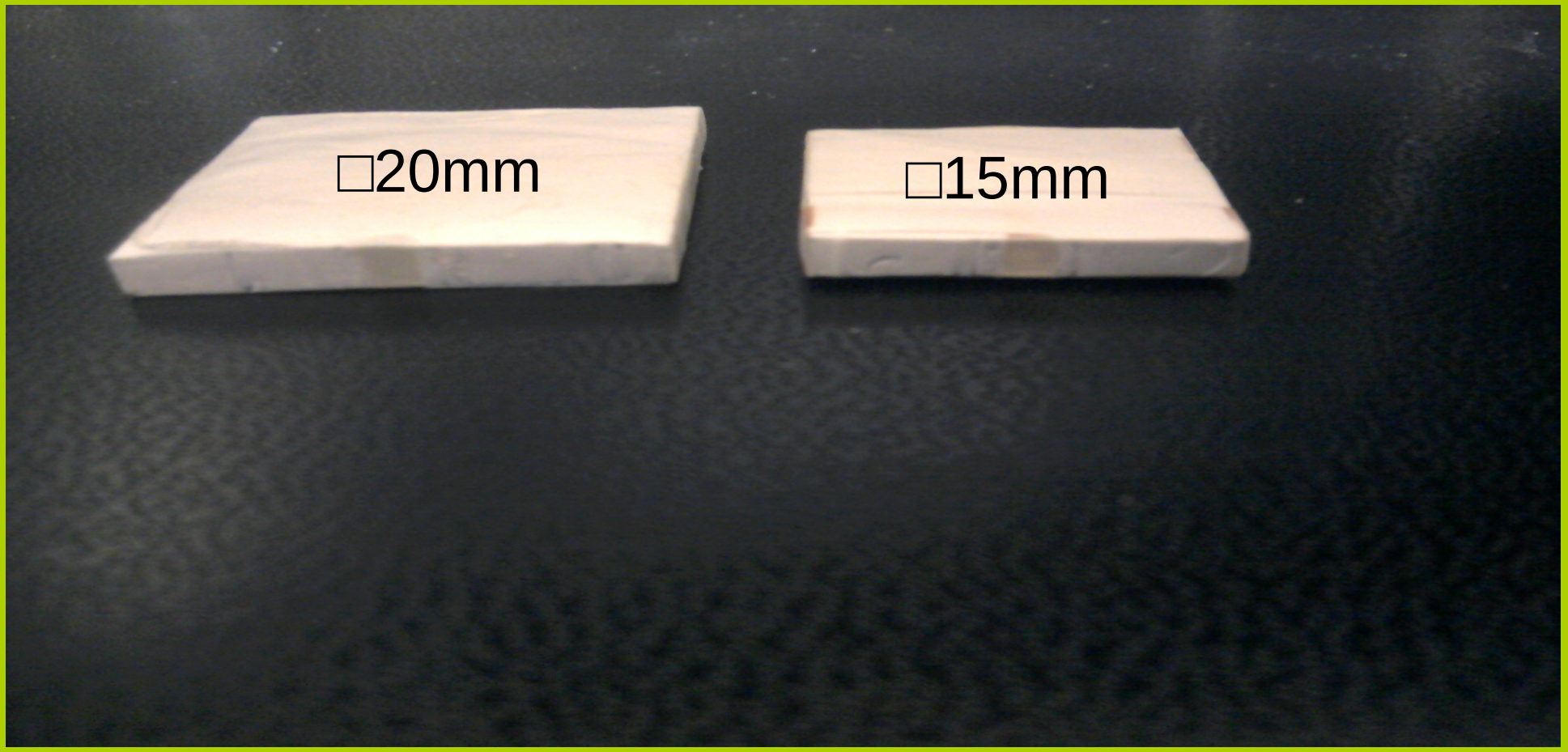


Painted



Same attribute as in the mean of charge distribution

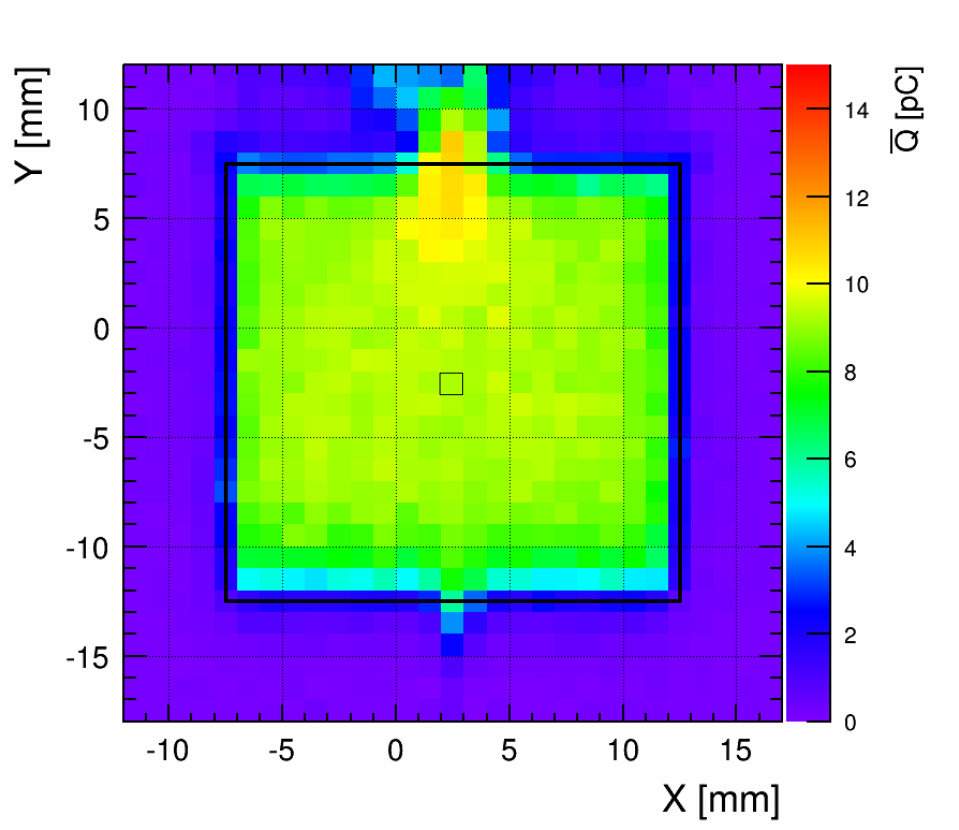
3, The wrapped tiles



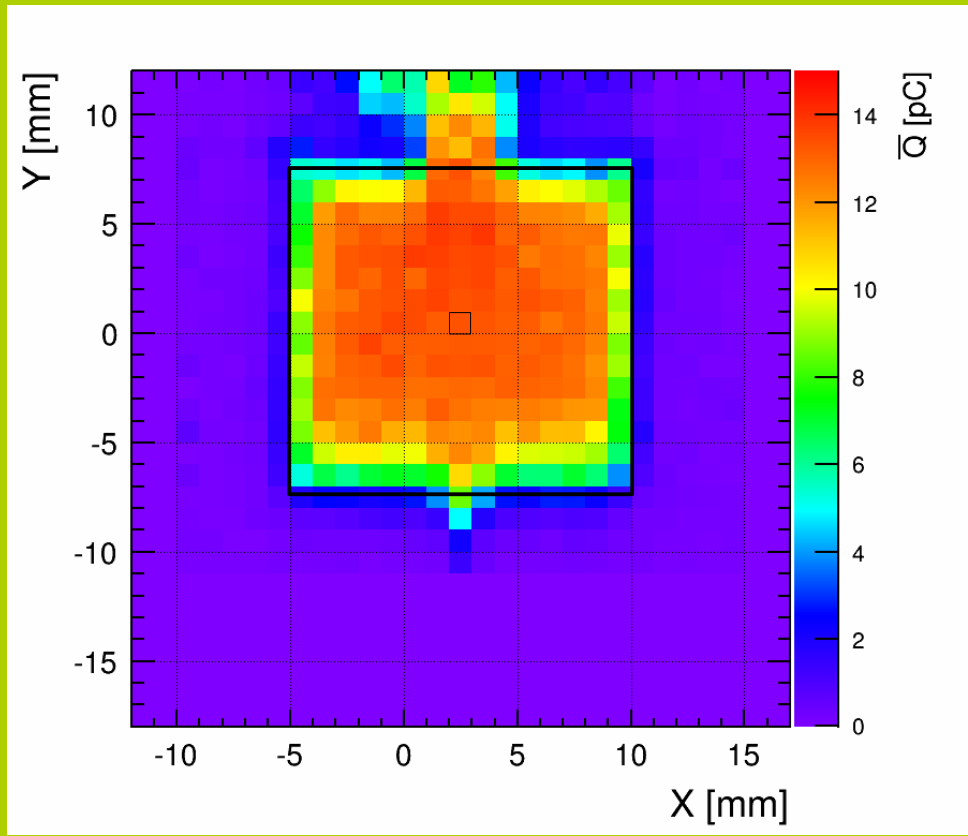
The wrapped tiles

• Mean of Charge

□20mm



□15mm



- The light yield of the □15mm tile is also higher. e.g.:

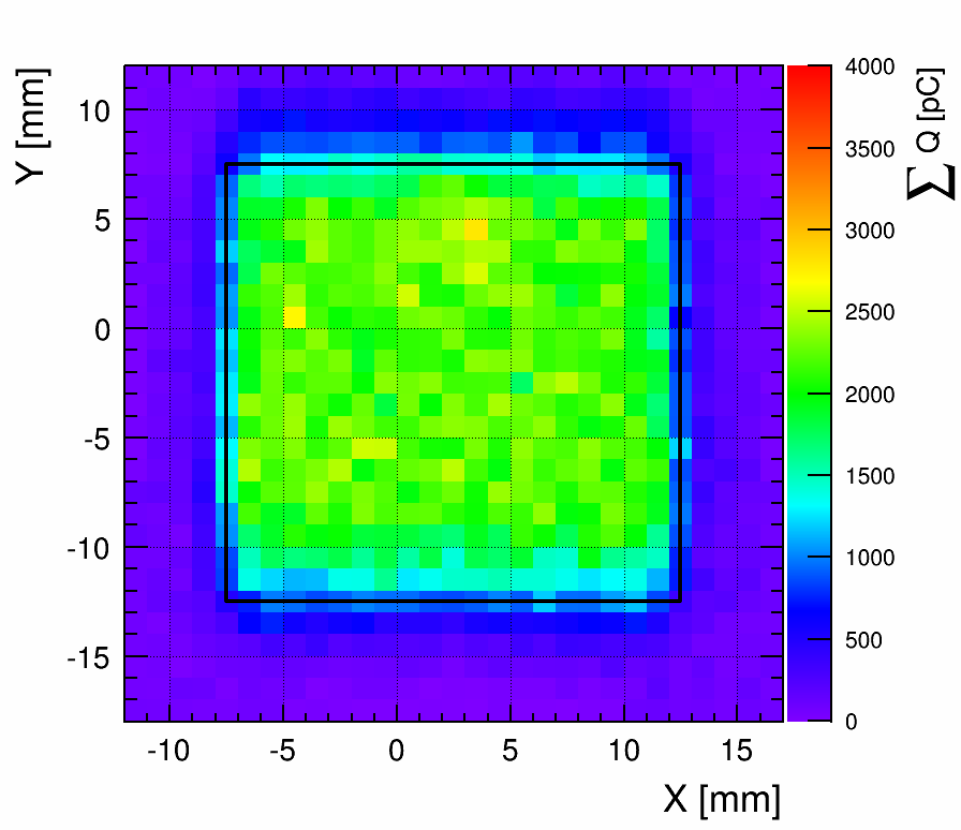
  $\overline{Q}_{20,wrapped}$(x=2.5mm;y=-2.5mm) ≈ 9 pC

  $\overline{Q}_{15,wrapped}$(x=2.5mm;y=0.5mm) ≈ 13 pC

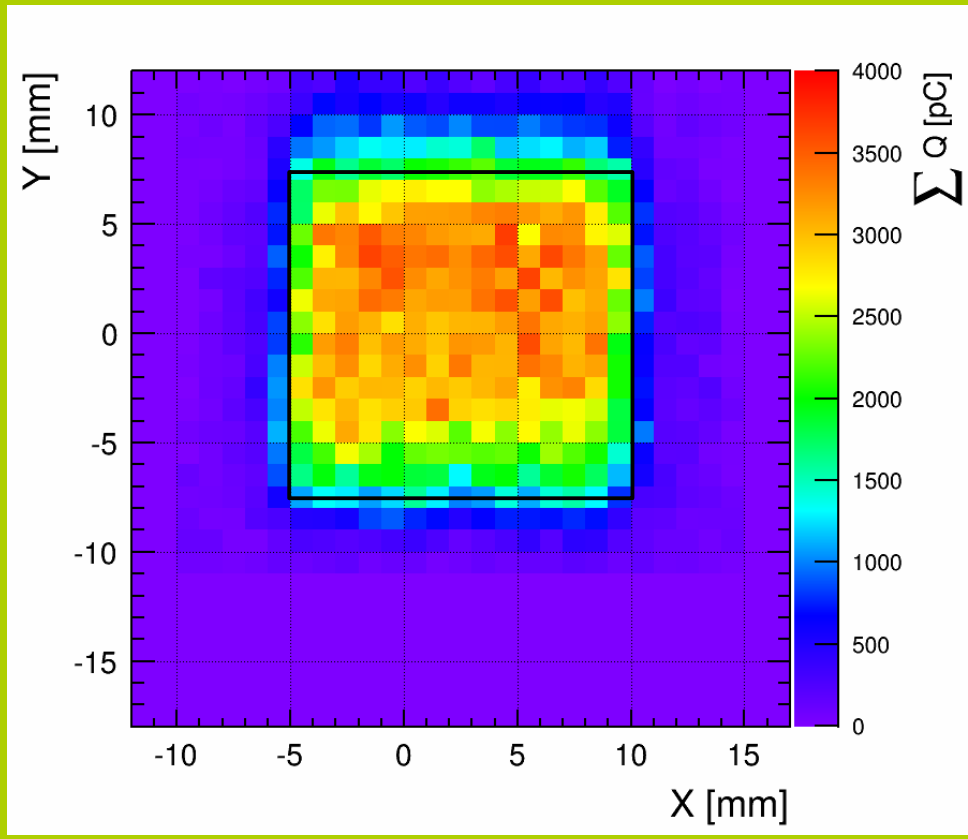
The wrapped tiles

• Sum of Charge

□20mm

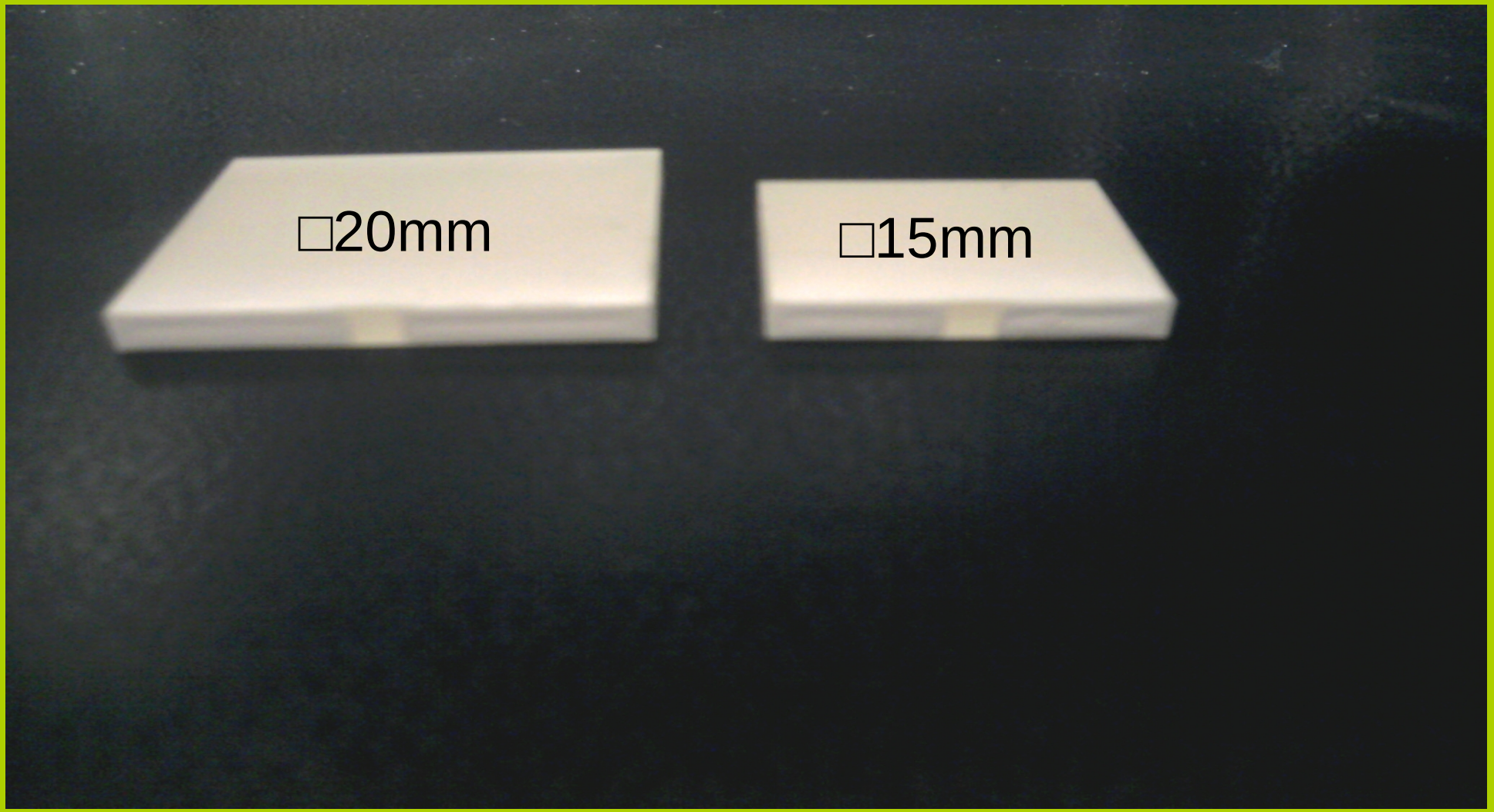


□15mm



Same attributes as in the mean of charge distribution

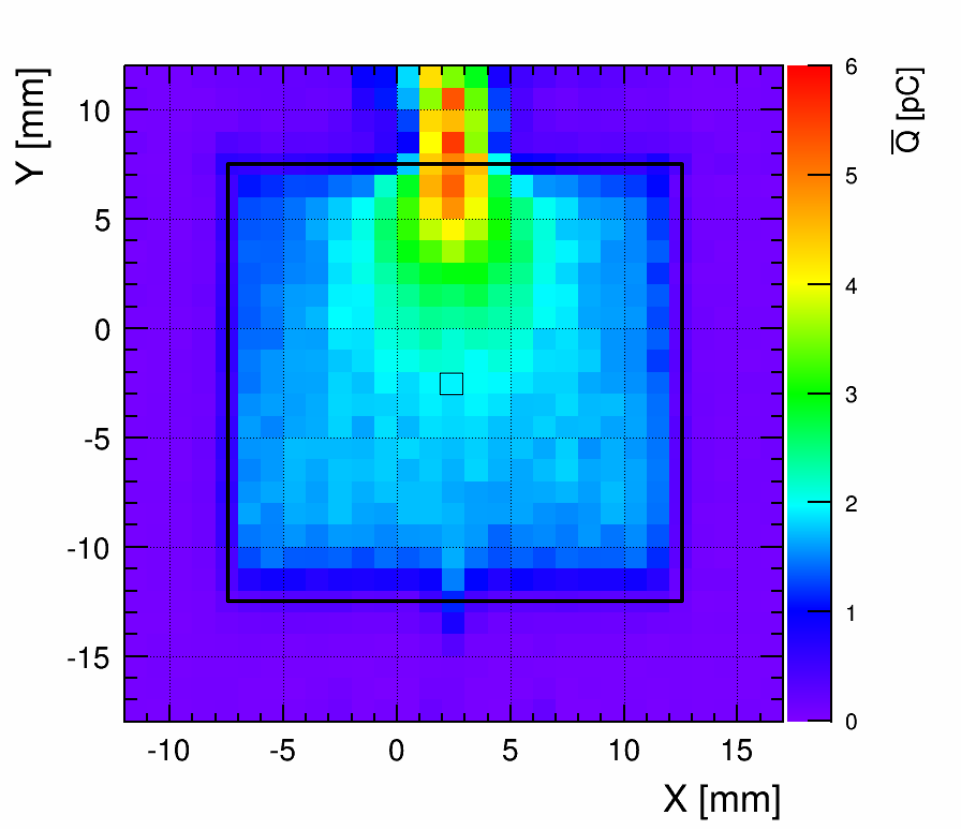
4, The painted tiles



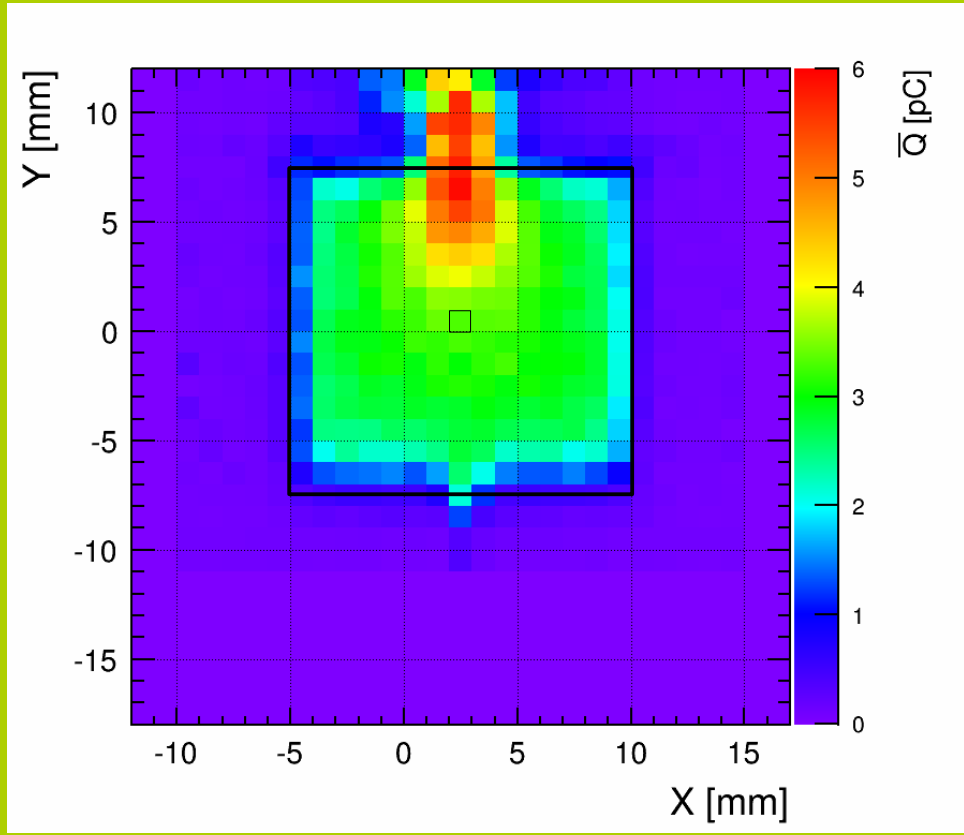
The painted tiles

• Mean of Charge

□20mm



□15mm



- The light yield of the □15mm tile is higher. e.g.:

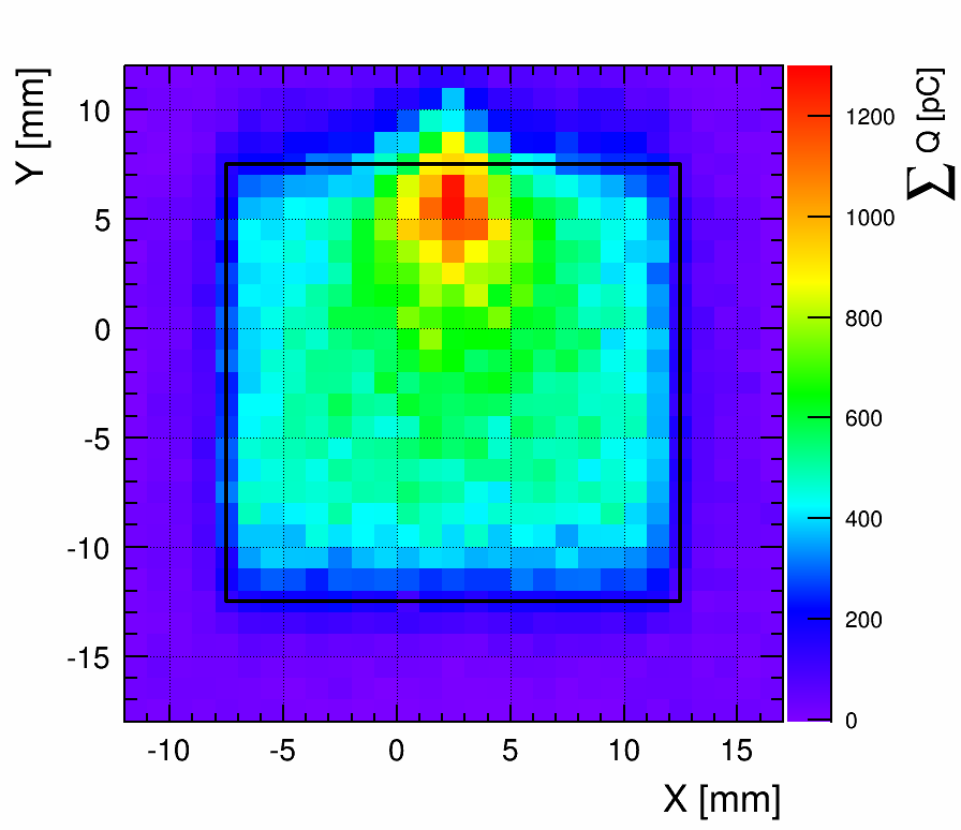
  $\overline{Q}_{20,painted}$(x=2.5mm;y=-2.5mm) ≈ 2 pC

  $\overline{Q}_{15,painted}$(x=2.5mm;y=0.5mm) ≈ 3.5 pC

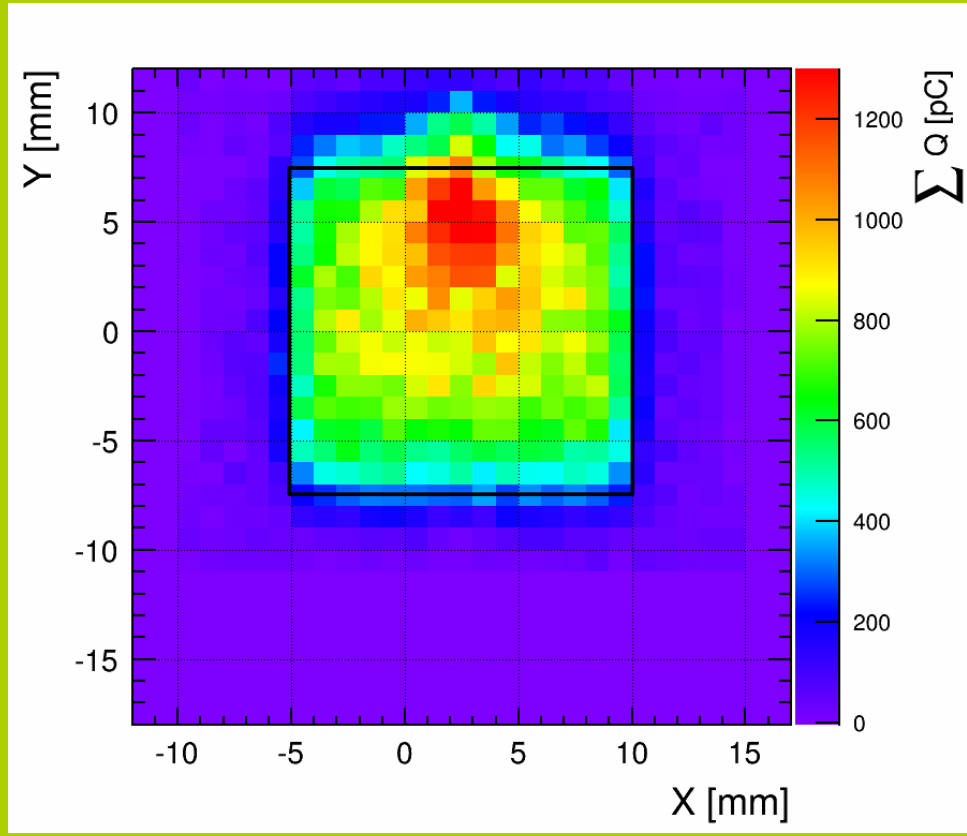
The painted tiles

- **Sum of Charge**

□20mm



□15mm



Same attributes as in the mean of charge distribution

Summary

- A wrapped tile and a painted tile with tile sizes □20mm and □15mm were investigated
- The wrapped tile produced more charge than the painted one
- The smaller tile produced more charge than the bigger tile
- Have to find quantitative definition of uniformity

Thank you for your attention!