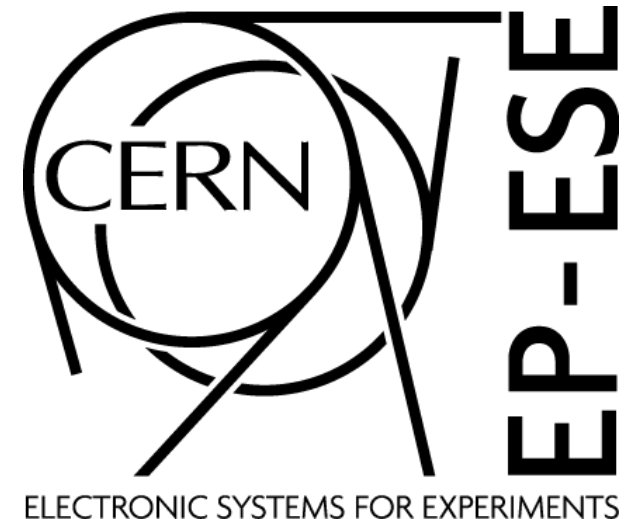


The Timepix chip



Summary

- Microelectronics at CERN
- The Medipix collaboration
- Timepix
- Pixet software
- Example of acquisition
- Demo



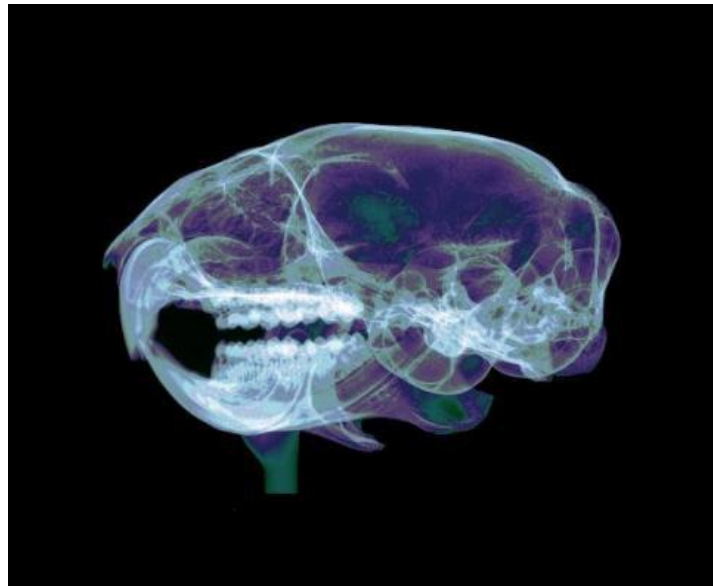
Microelectronics at CERN

CERN is developing specific electronic chips for detectors. They are named ASICs (Application Specific Integrated Circuits). For instance they have to be tolerant to radiation.

- DC-DC converters
 - Electrical circuit that converts one voltage level to another
- GBT & Versatile Link
 - To transmit big quantity of data from detector to the “counting room”
- Medipix
 - Family of Pixelated chips for imaging

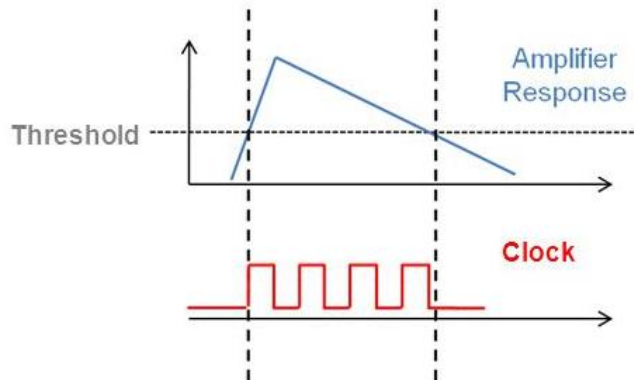
Medipix collaboration

- Chip designers at CERN and different institutes around the world
- Read-out systems for particle imaging and detection
- Medipix 1-4
- Application areas
 - Medical imaging
 - Space dosimetry
 - Material analysis

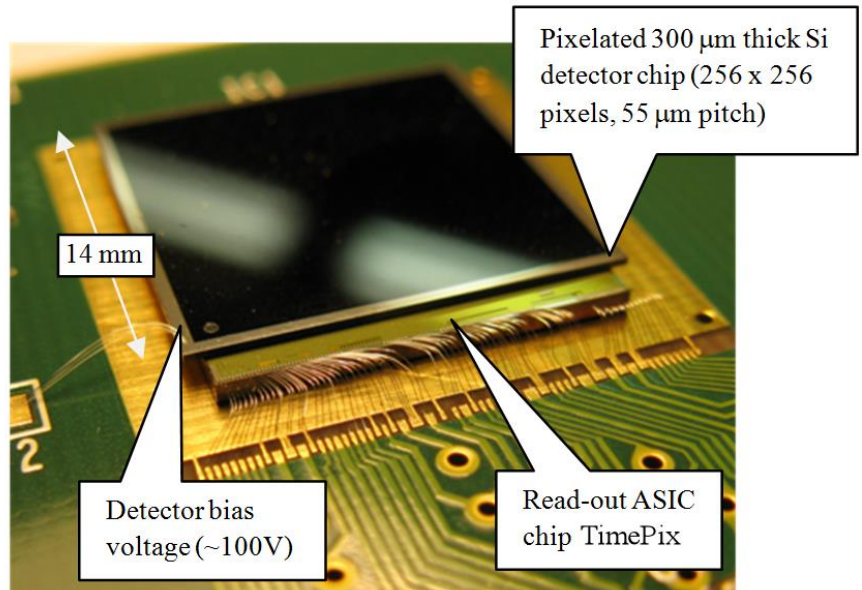


Timepix

- Evolved from Medipix2 development
- Pixel read-out chip
 - 1 Single photon counting
 - 2 Time over threshold
 - 3 Time of arrival



E.g. $20\text{ke}^- \sim 1\mu\text{s} = 40 \times 25\text{ns}$



Pixet software



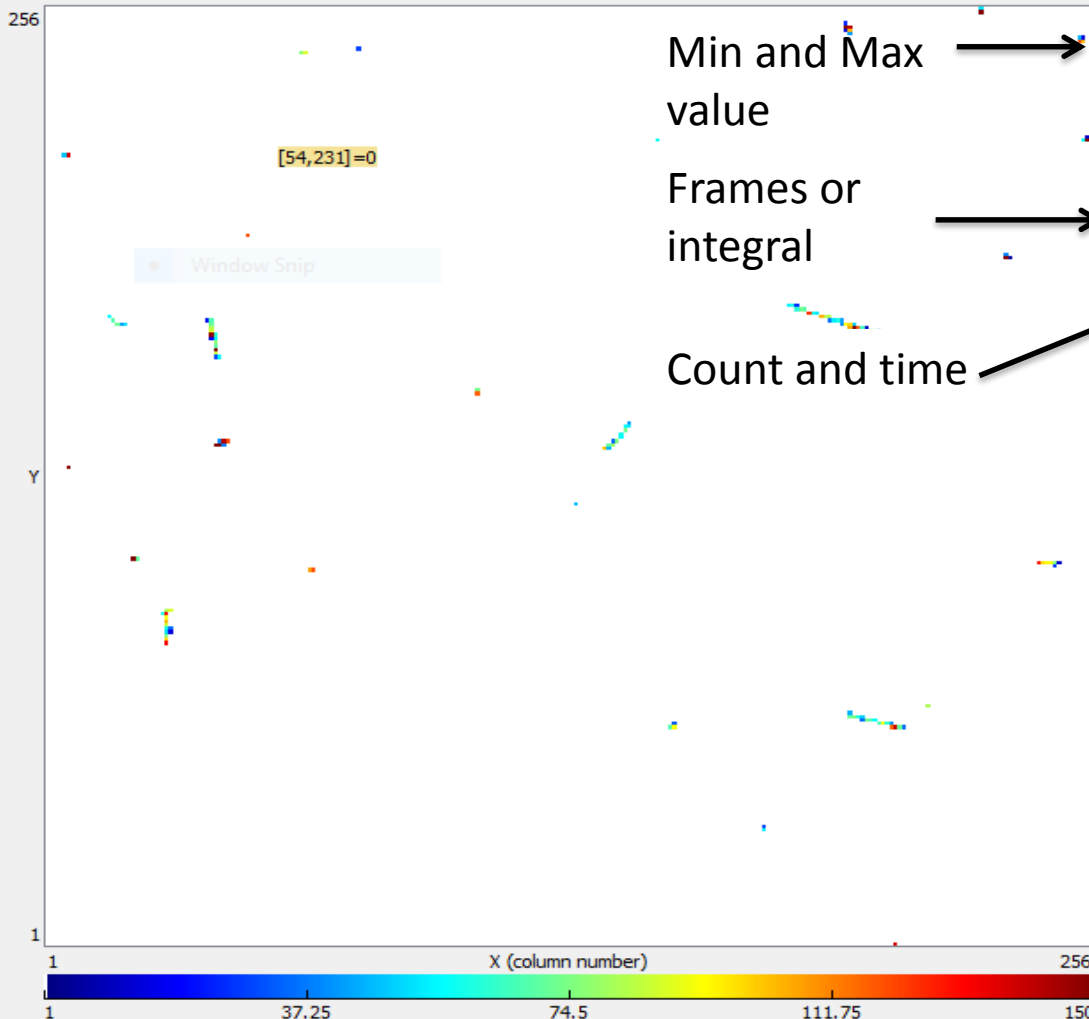
Pixet 1.4.7.573 - MiniPIX E08-W0239

File View Panels Tools Help



E08-W0239

DMY
W00-X0000



Min and Max value

Frames or integral

Count and time

License: CERN

Image Properties

Min: 1 Max: 150

Auto range: Min-Max

Measurement

Type: Integral Count: 1000 Time: 1

Repeat File output

0 Pro\data\test30.txt

Start

Detector Settings

Threshold [keV]: 5.0 Bias: 200 Clock: 10.2857

Mode: Energy

Filters

Apply Filter

Flat-Field

Image Info

| | |
|--------------|-----------|
| [X,Y]: | [53, 230] |
| Count: | 0 |
| Min: | 0 |
| Max: | 281 |
| Pixel Count: | 153 |
| Total: | 12039 |

Histogram

1 Messages 2 DAC Panel

FPS: 0 T: 0 s R: 0/0 A: 0/0

MPX
E08-W0239
DMY
W00-X0000

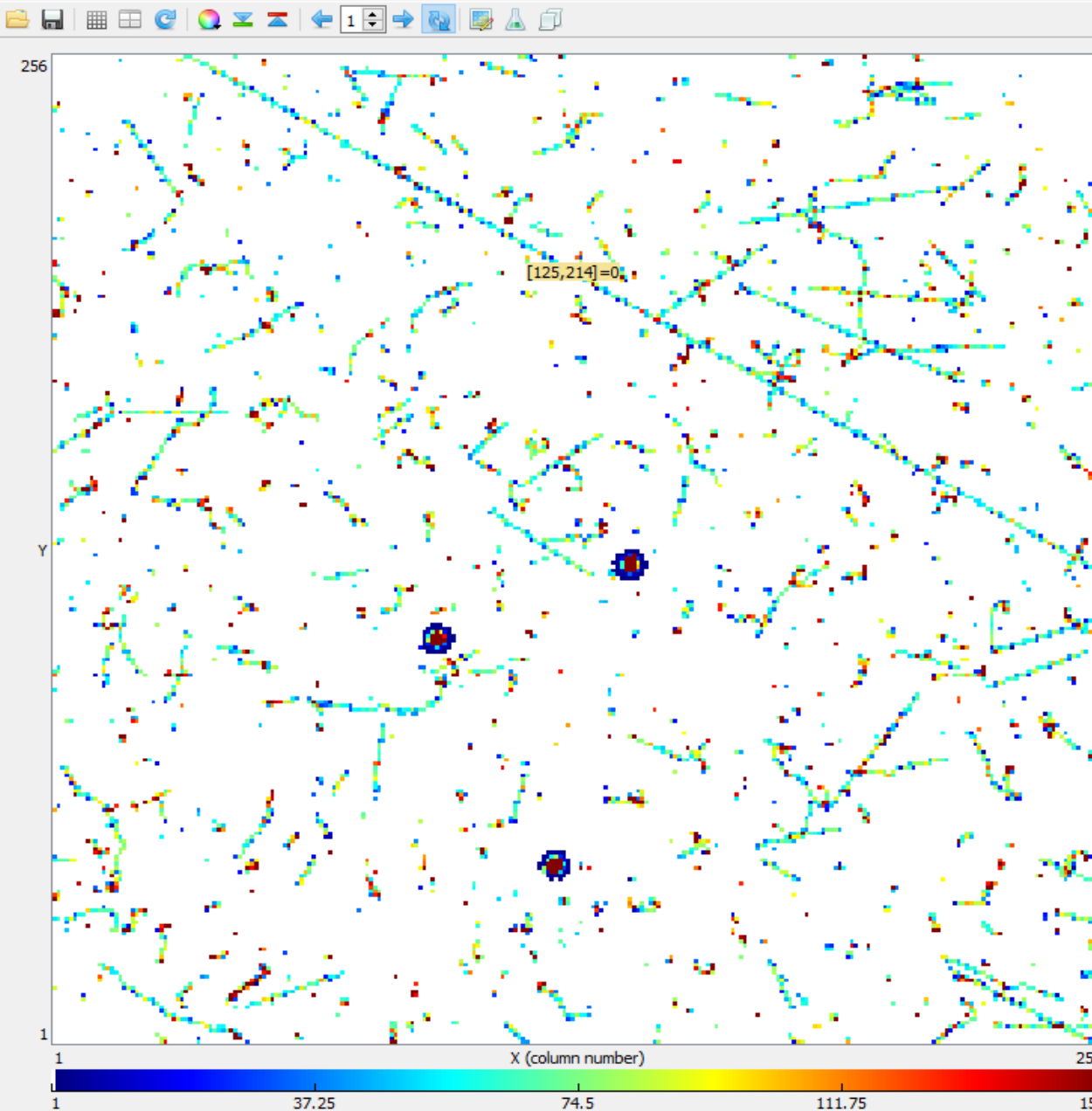


Image Properties

Min: Max:
 Auto range:

Measurement

Type: Count: Time:
 Repeat File output

Detector Settings

Threshold [keV]: Bias: Clock:
Mode:

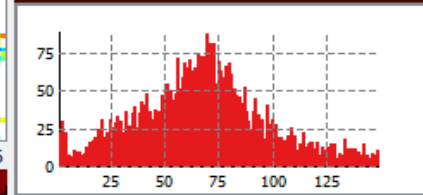
Filters

Apply Filter

Image Info

| | |
|--------------|------------|
| [X,Y]: | [124, 213] |
| Count: | 0 |
| Min: | 0 |
| Max: | 5119 |
| Pixel Count: | 5143 |
| Total: | 460192 |
| Mean: | 7.02197 |

Histogram



MPX
E08-W0239
DMY
W00-X0000

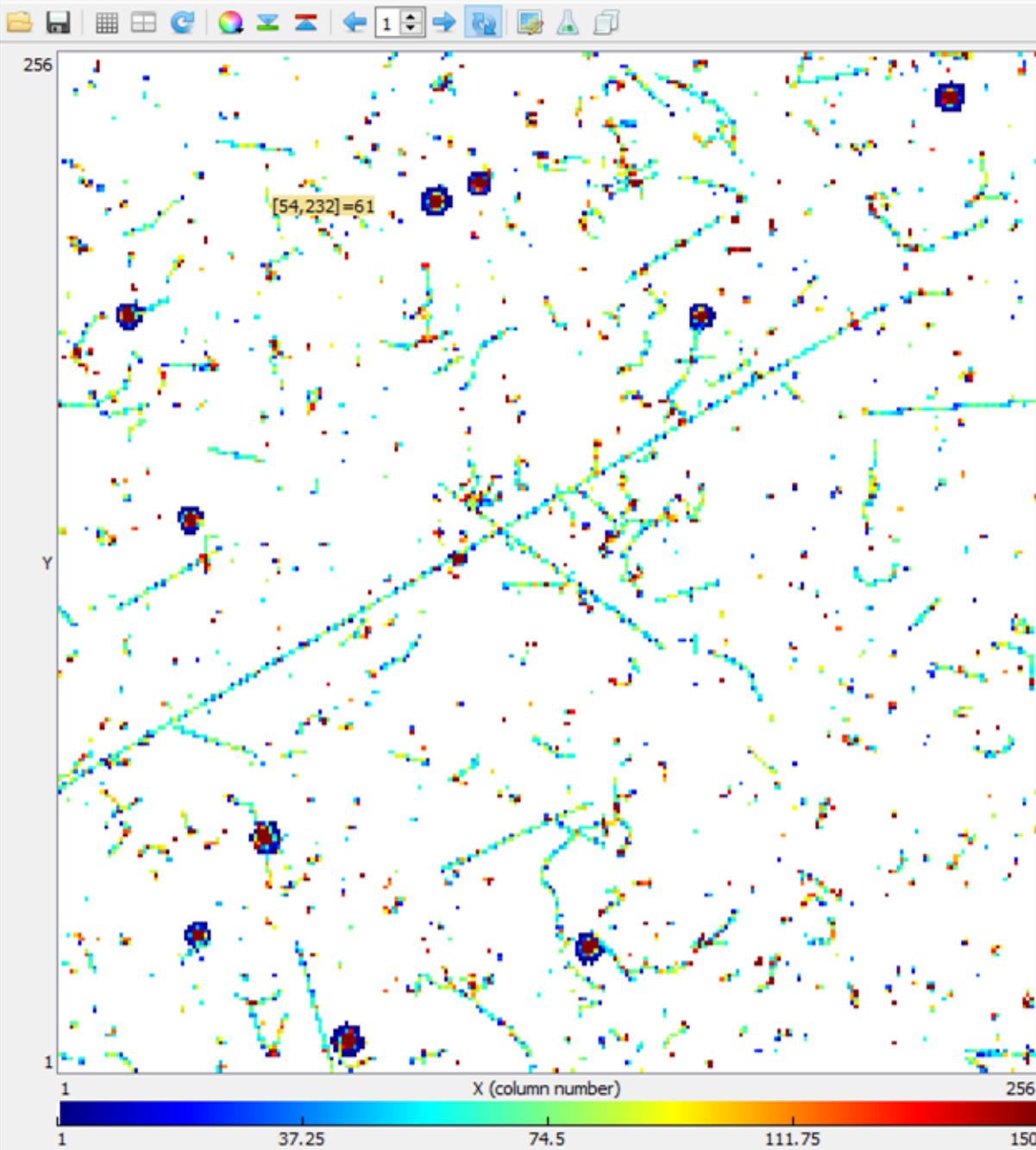


Image Properties

Min: 1 Max: 150

Auto range: Min-Max

Measurement

Type: Integral Count: 3600 Time: 1

Repeat File output

0 id_jerome_1hour.txt

Start

Detector Settings

Threshold [keV]: Bias: 5.0 Clock: 200 10.2857

Mode: Energy

Filters

Apply Filter

Flat-Field

Image Info

| | |
|--------------|-----------|
| [X,Y]: | [53, 231] |
| Count: | 61 |
| Min: | 0 |
| Max: | 5762 |
| Pixel Count: | 4886 |
| Total: | 532666 |

Histogram