ECOGAS (RPC 6) pad test

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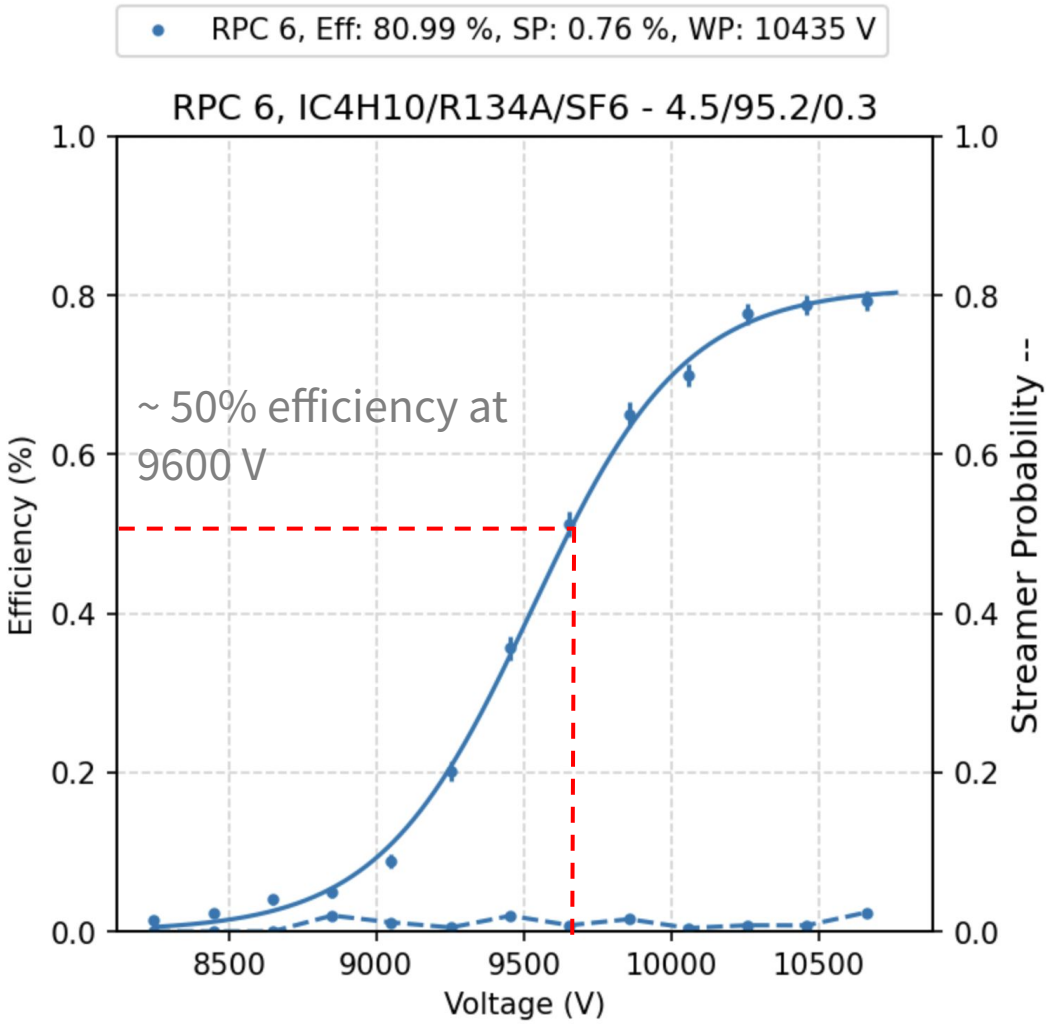
ECOGAS@GIF++ COLLABORATION

EP-DT
Detector Technologies

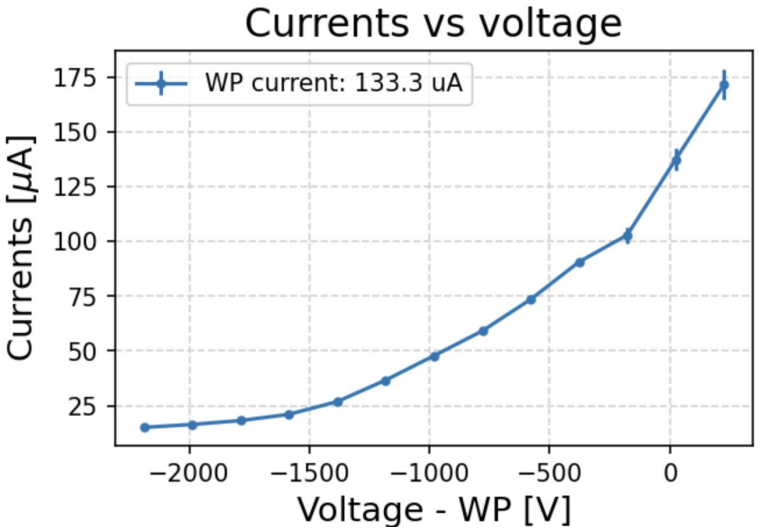
Detectors status



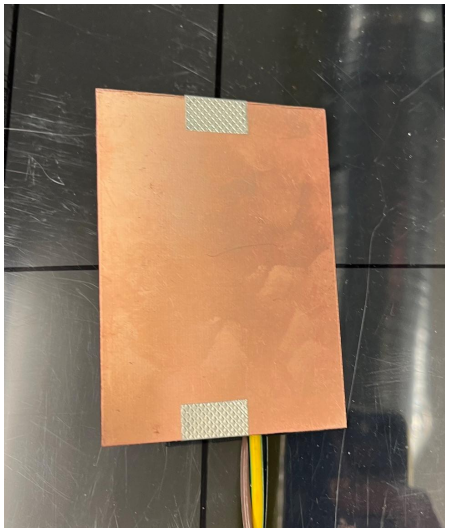
Integrated a total of 300 mC/cm^2

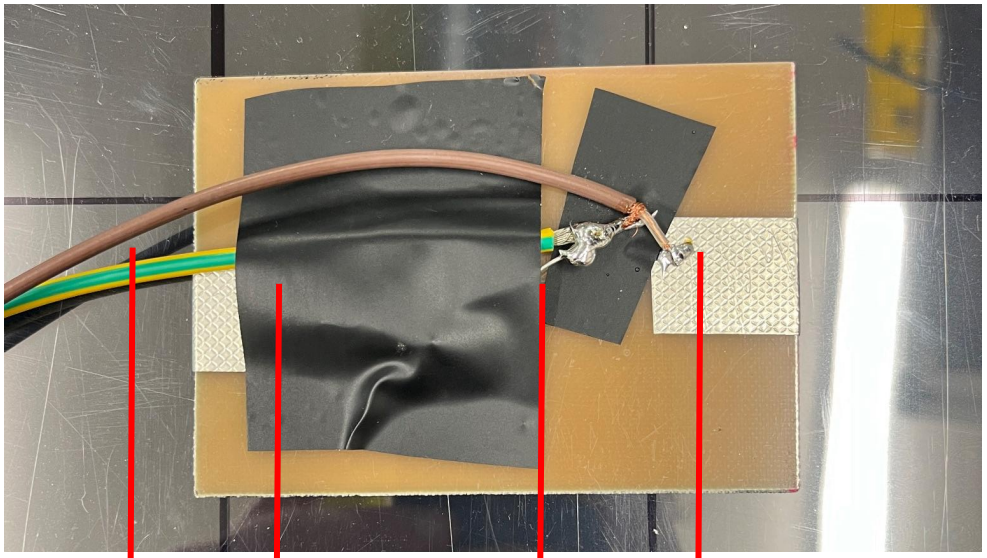
Detector dismounted and tested in the lab with cosmic muons

Data taken with STD gas mixture in April 2023

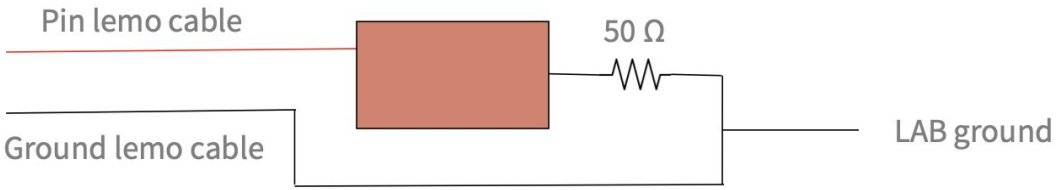


Set up

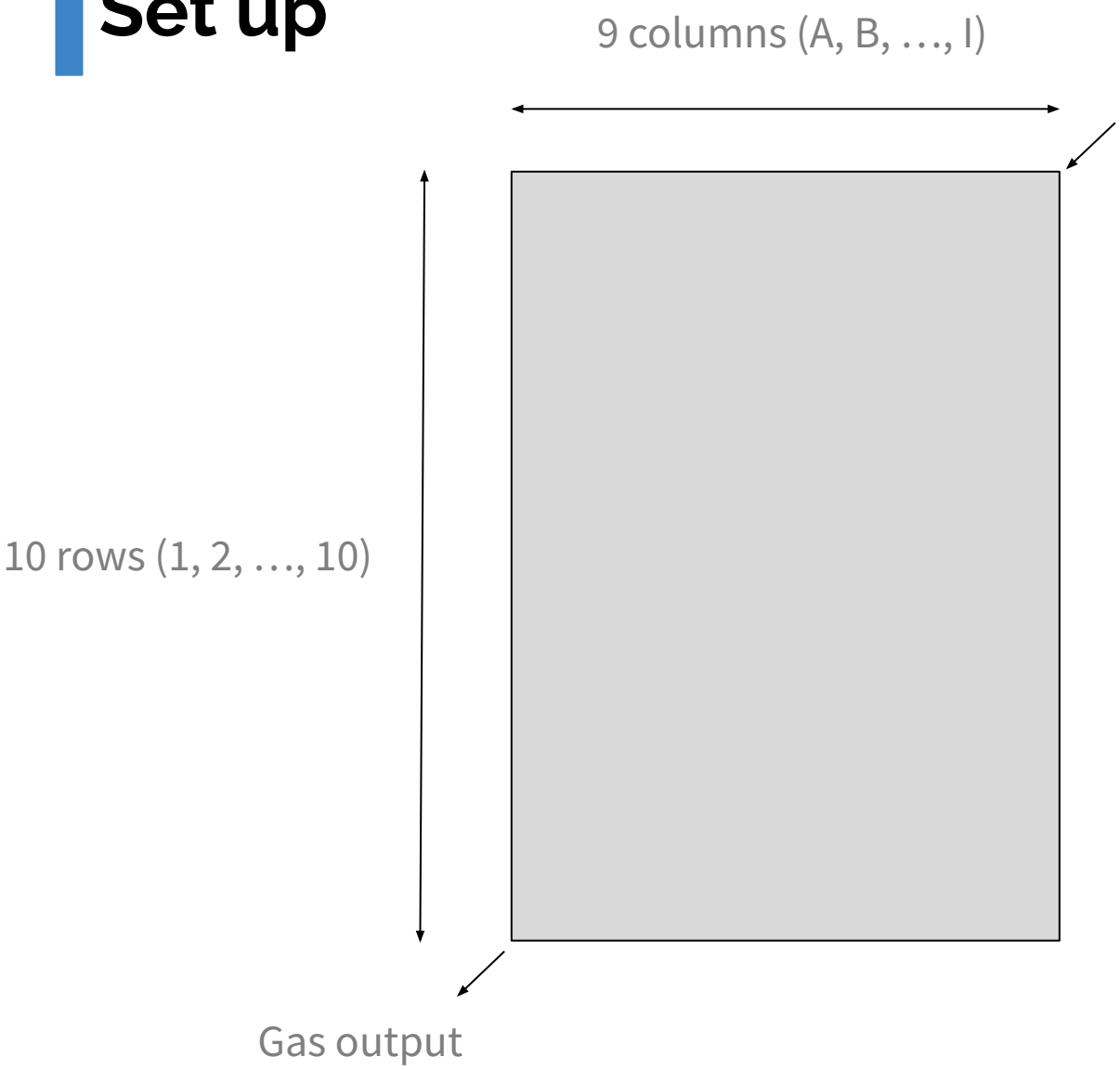


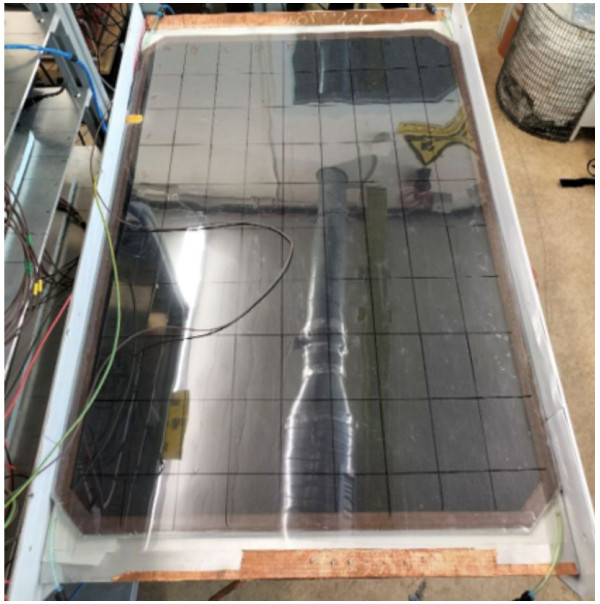


- RPC divided into 9x10 square
- Used digitizer 1730 Desktop for the acquisition



Set up



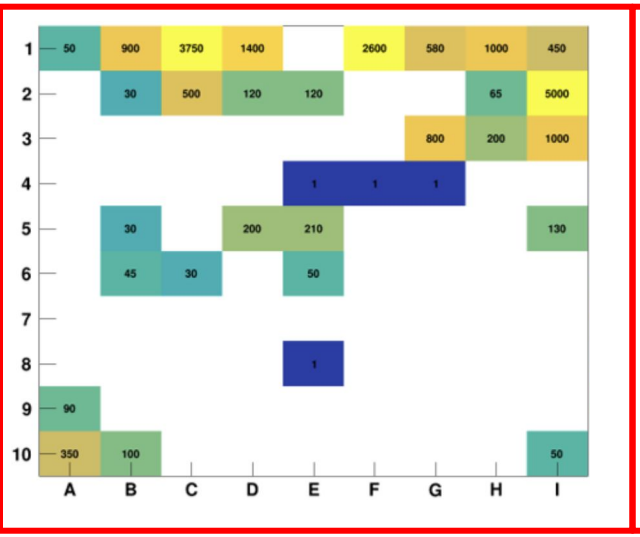


Plot available here

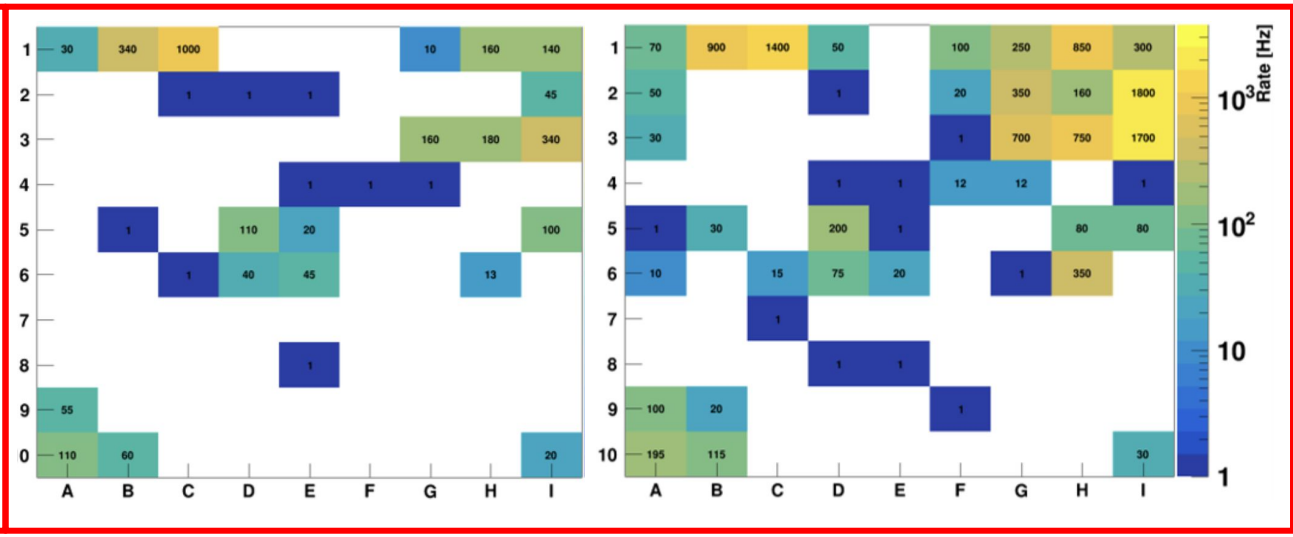
Data taking: Oscilloscope

1. Oscilloscope:
   some spot where tested using only the oscilloscope.
   -> see single signal
   -> selection of the threshold
   -> rate from this data used to confirm the one from the digitizer

7.2 mv



15.2 mv



Data taken by hand. Blue spot (= 1 Hz) are the one that sometimes shows some counting..

Data taking: Digitizer

2. Digitizer:

   We selected a low threshold: 7.2 mV
   We selected two different HV: 9000 V and 9600 V
   -> the acquisition is taken in autotrigger with the threshold set in the wavedump config file
   -> we set 10000 events for each position
   -> for very low rate, the acquisition had been stopped before

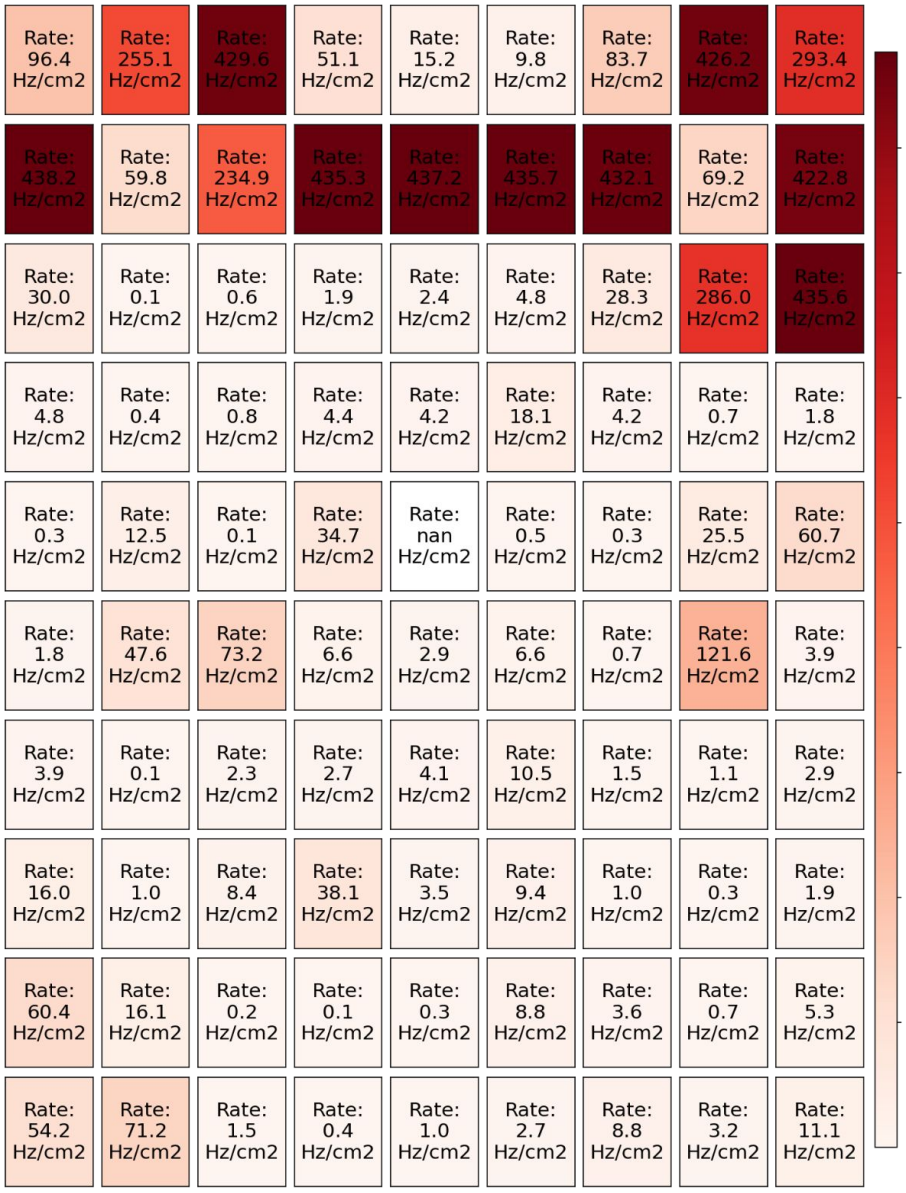
Analysis:

- Computation of the rate

Comparison between 2 acquisitions

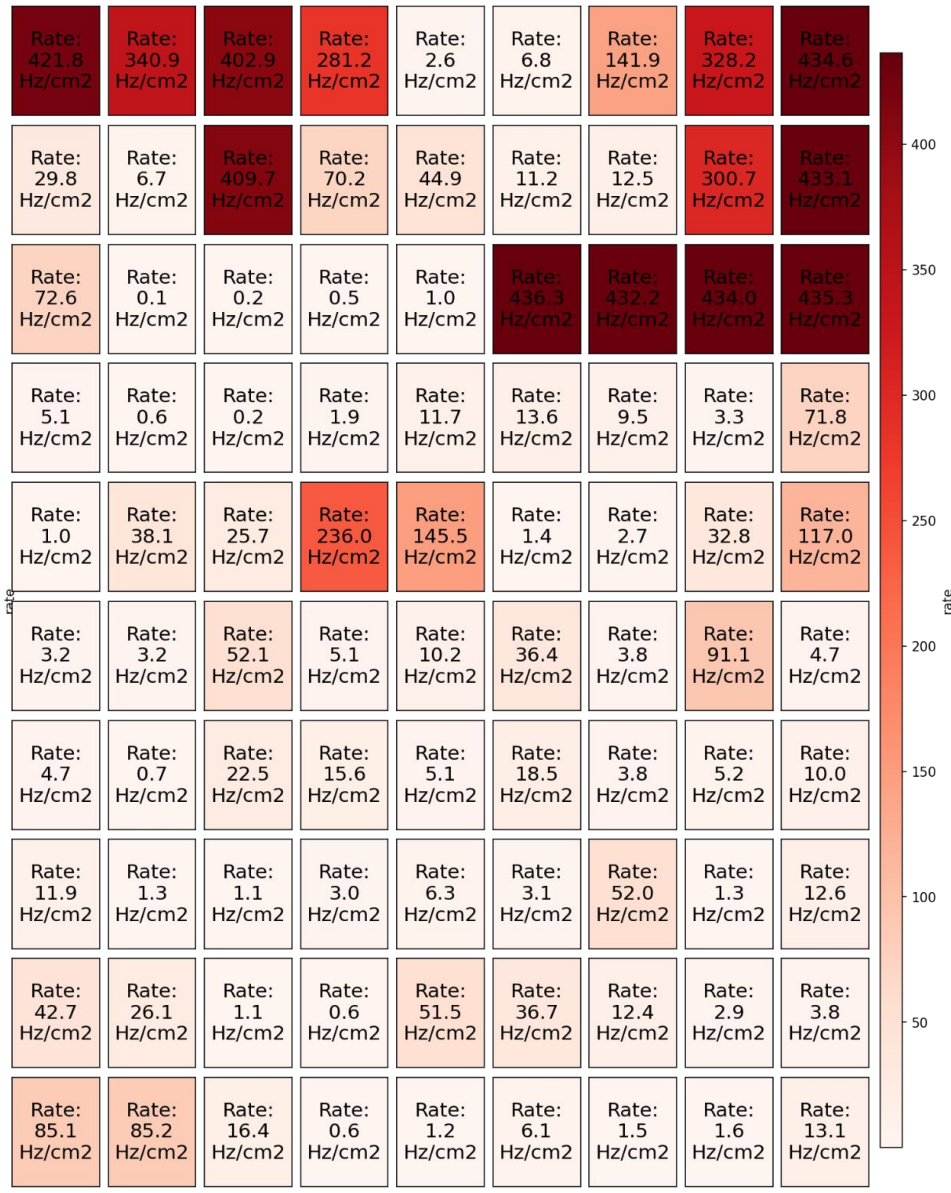
Threshold: 7.2 mV
High voltage: 9000 V and 9600 V

Rate gradient



9000 V

Rate gradient



9600 V

Results

The analysis shows that the top part of the detector has higher local rate.

-> This method could allow to find problematic gap spot, but it doesn't allow to fully understand the issue
-> it can be useful to test the detector before the first irradiation, and then periodically

It is also needed a comparison with a working RPC.

Future tests

1. Can Ar help?

   Let the detector ‘on’ with Ar for some weeks, then re-take the measurements

Once the detector will be opened:

1. Analyze different region where the rate was different
2. See if high rate correspond to some irregularities of the gap
3. See the position of the spacer