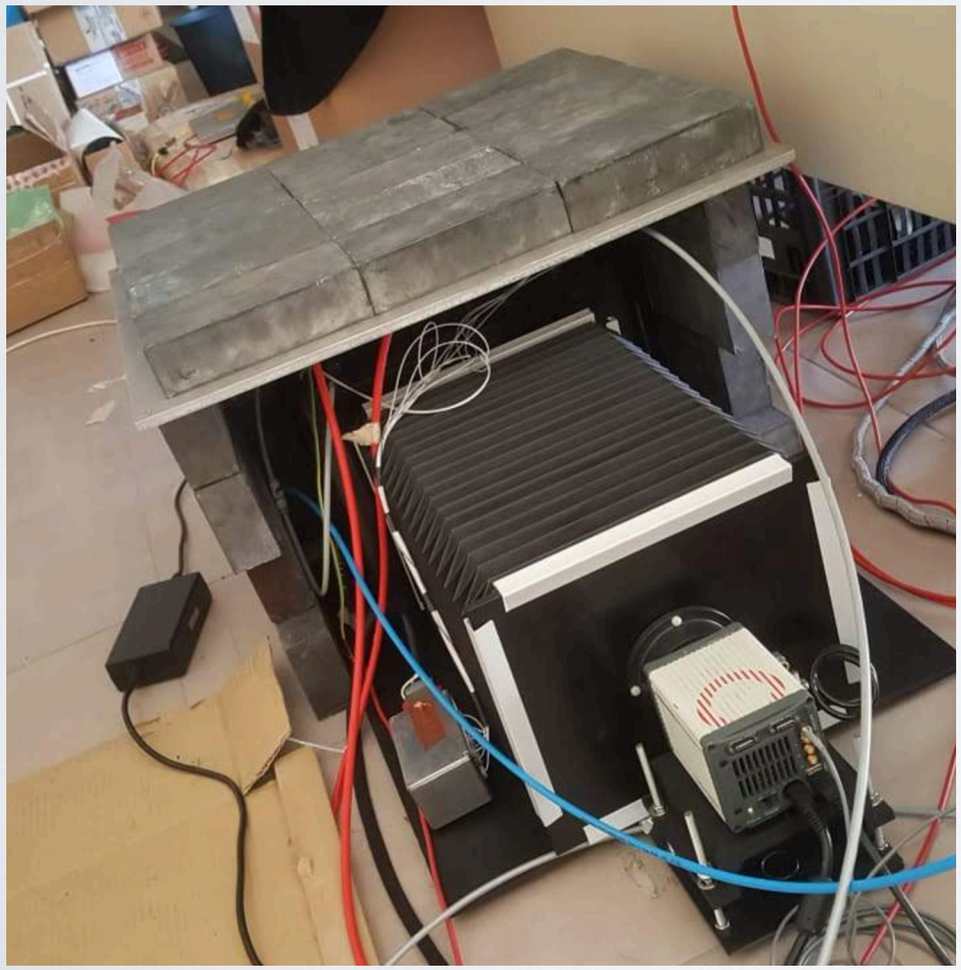
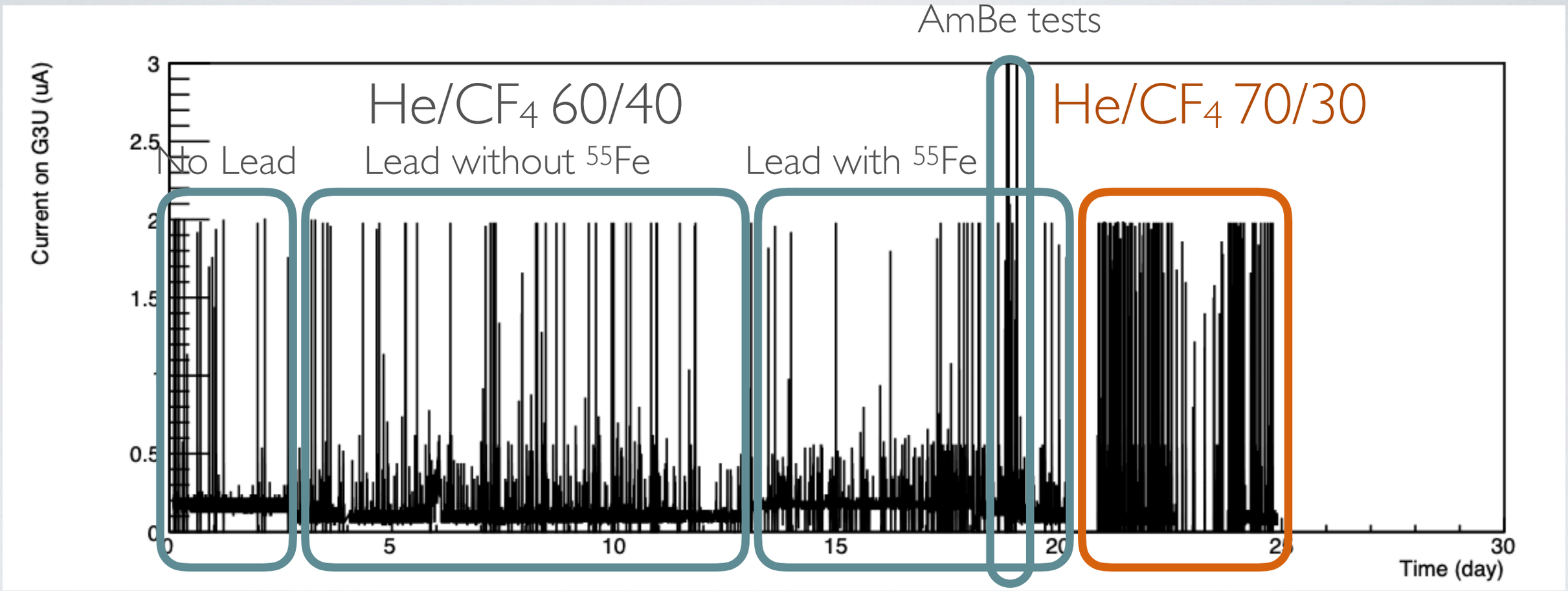
LEMON STABILITY

- LEMON is On since October 25: $V_{GEM} = 460$ (455 V in previous test) and $E_T = 2.5$ kV/cm;
- We are recording detector currents (to check high voltage stability), T, P and light (5 min each hour) to check response stability;
- After the first weekend, LEMON was shielded on 4 sides with 5 cm of Pb

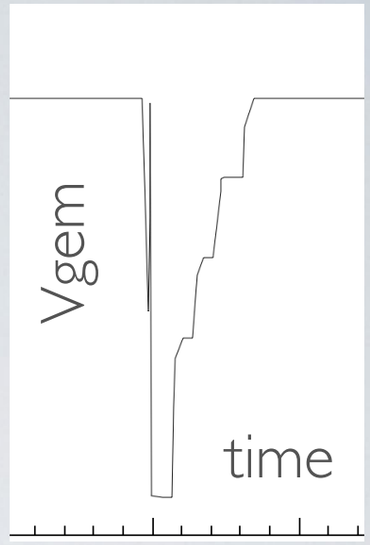


- After the shielding the current dropped by a factor 2;

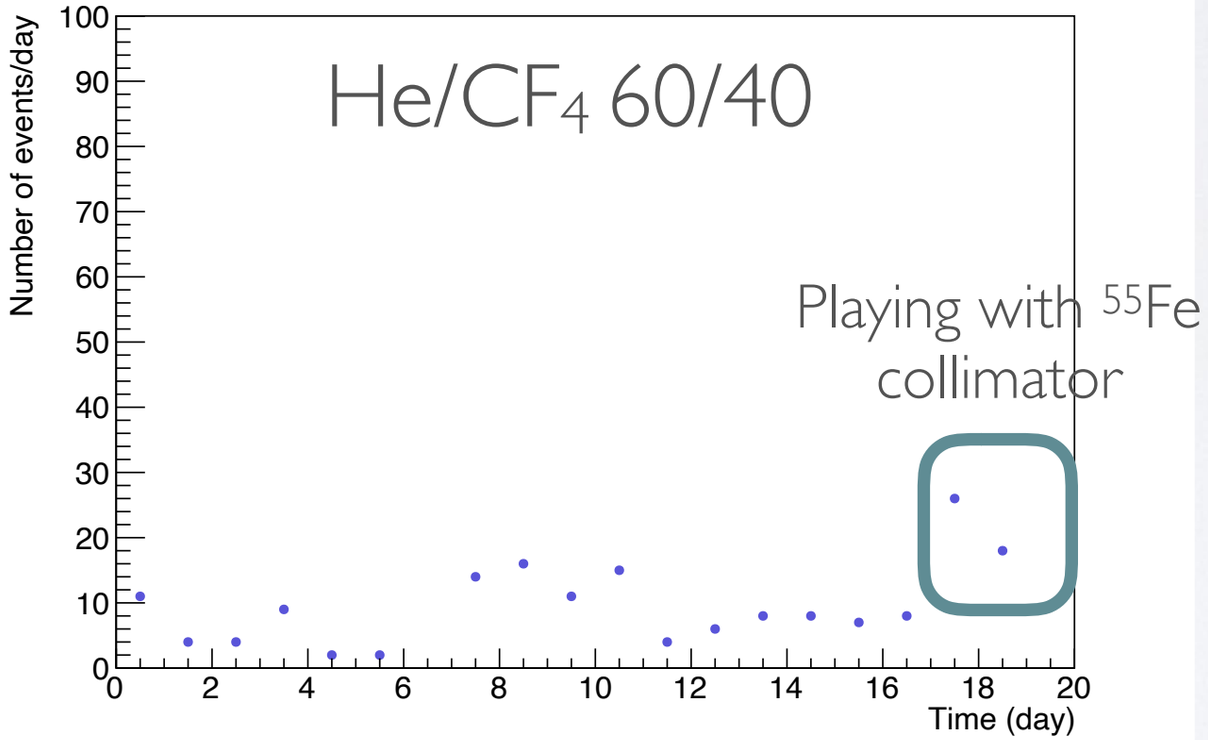


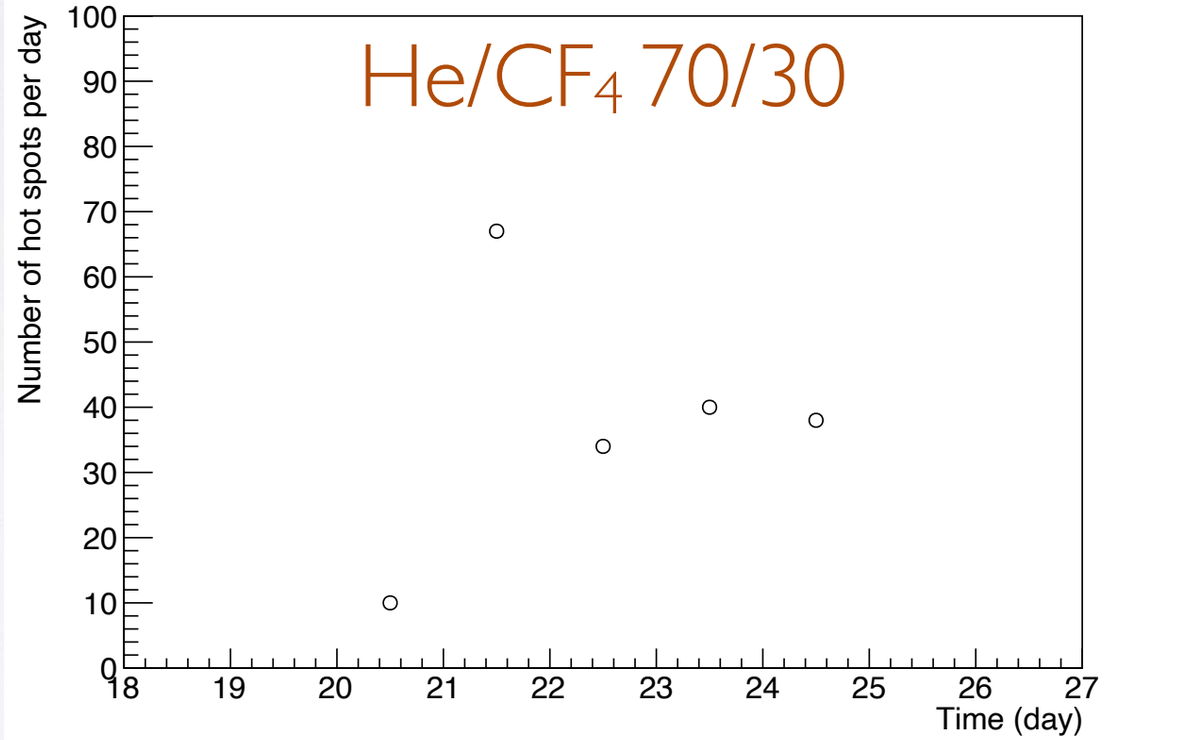
- Overall stability is fine even if more discharges than last test (higher V_{GEM}?);
- Discharge seem increased after shielding:
    - Pb radioactivity?
    - Lower voltage drop [4V/0.1 uA]?

- Whenever a increases of current appears, a recovery procedure is automatically started with a Vgem dreacrese of 100 V and a slow restore to nominal;
- Procedure lasts almost 6 min



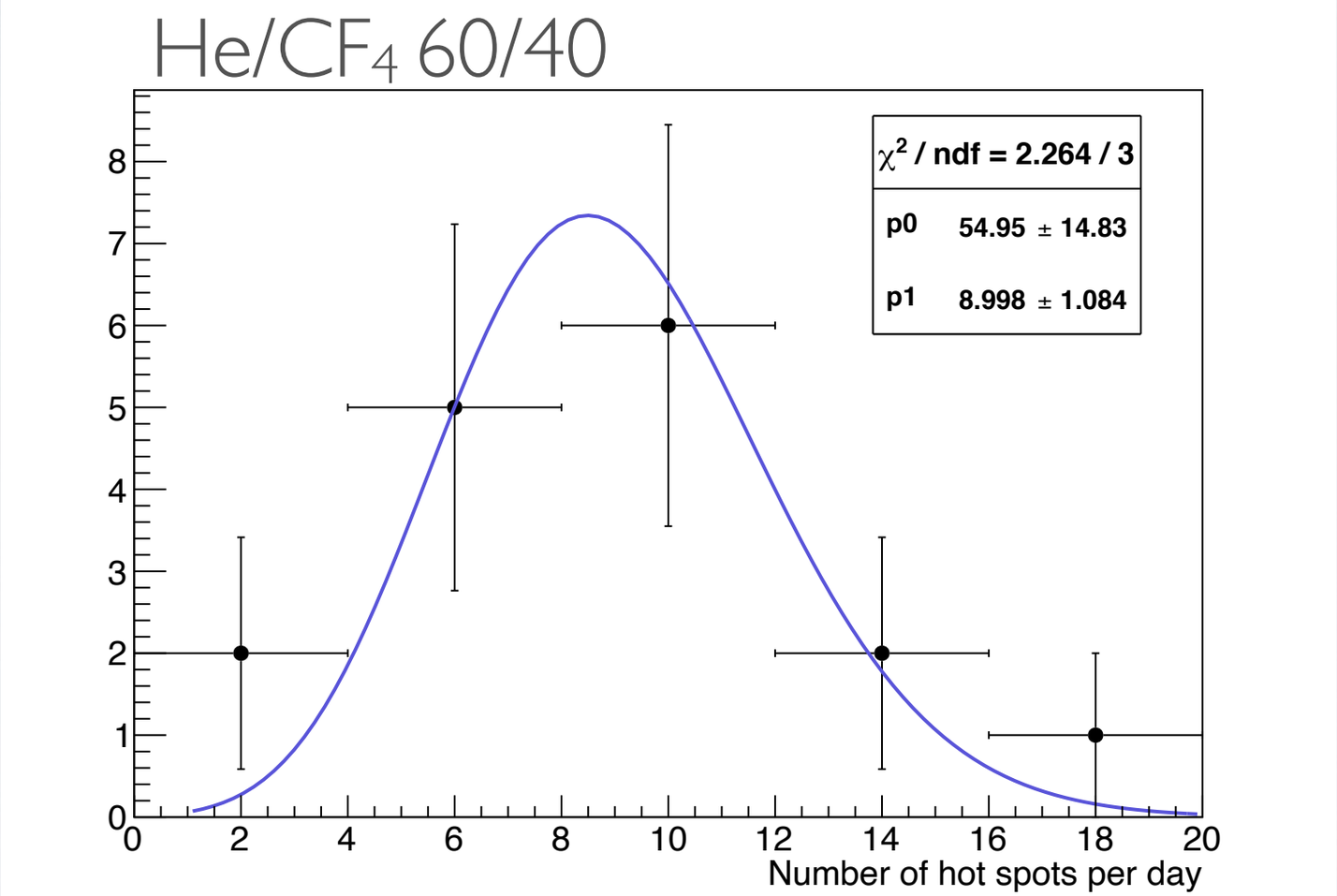
- Number of recovery procedures per day





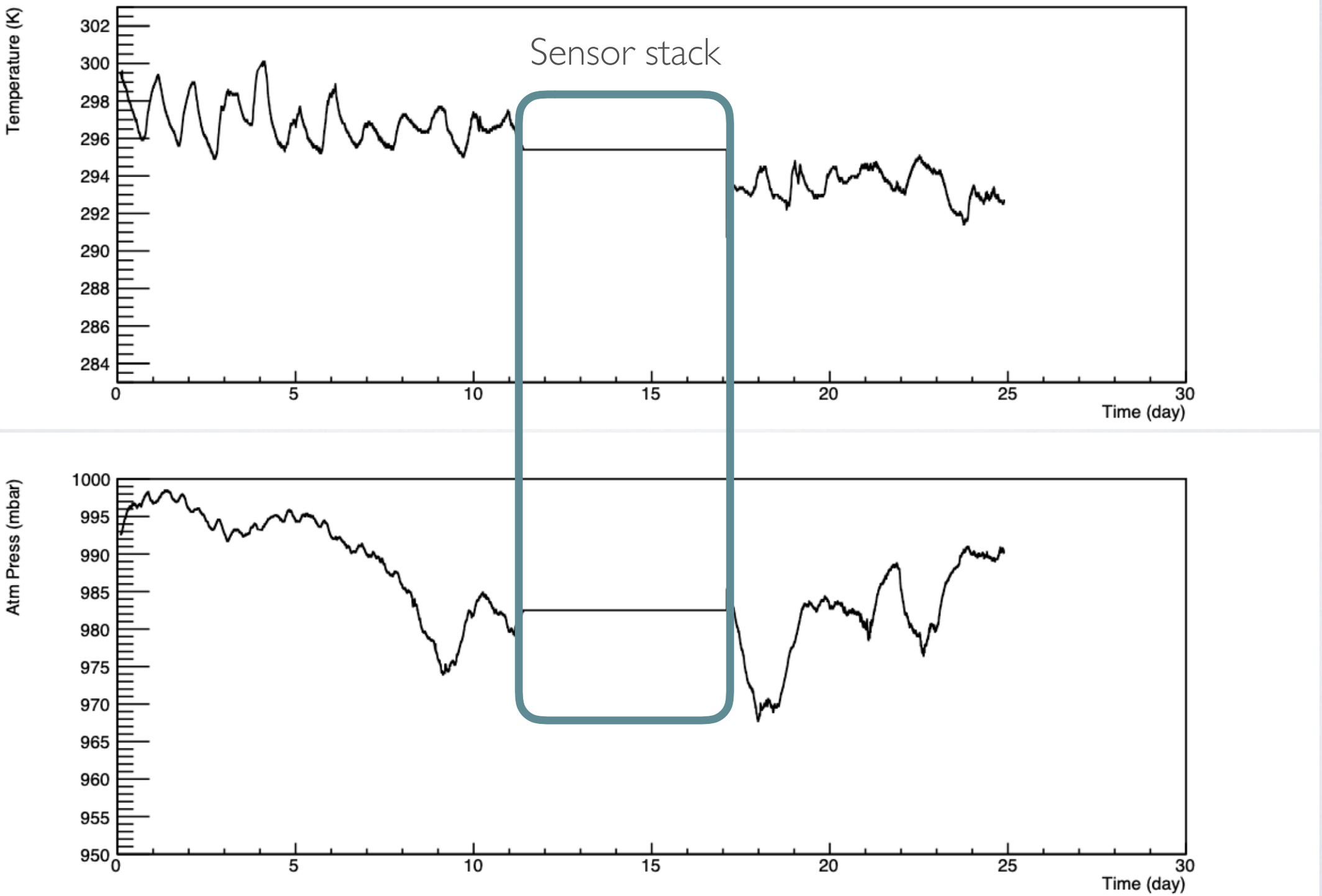
- Even if run at lower Vgem (425 instead of 460) rate of discharges/hotspots in 70/30 has been larger w.r.t. 60/40

NUMBER OF RECOVERY PROCEDURES PER DAY



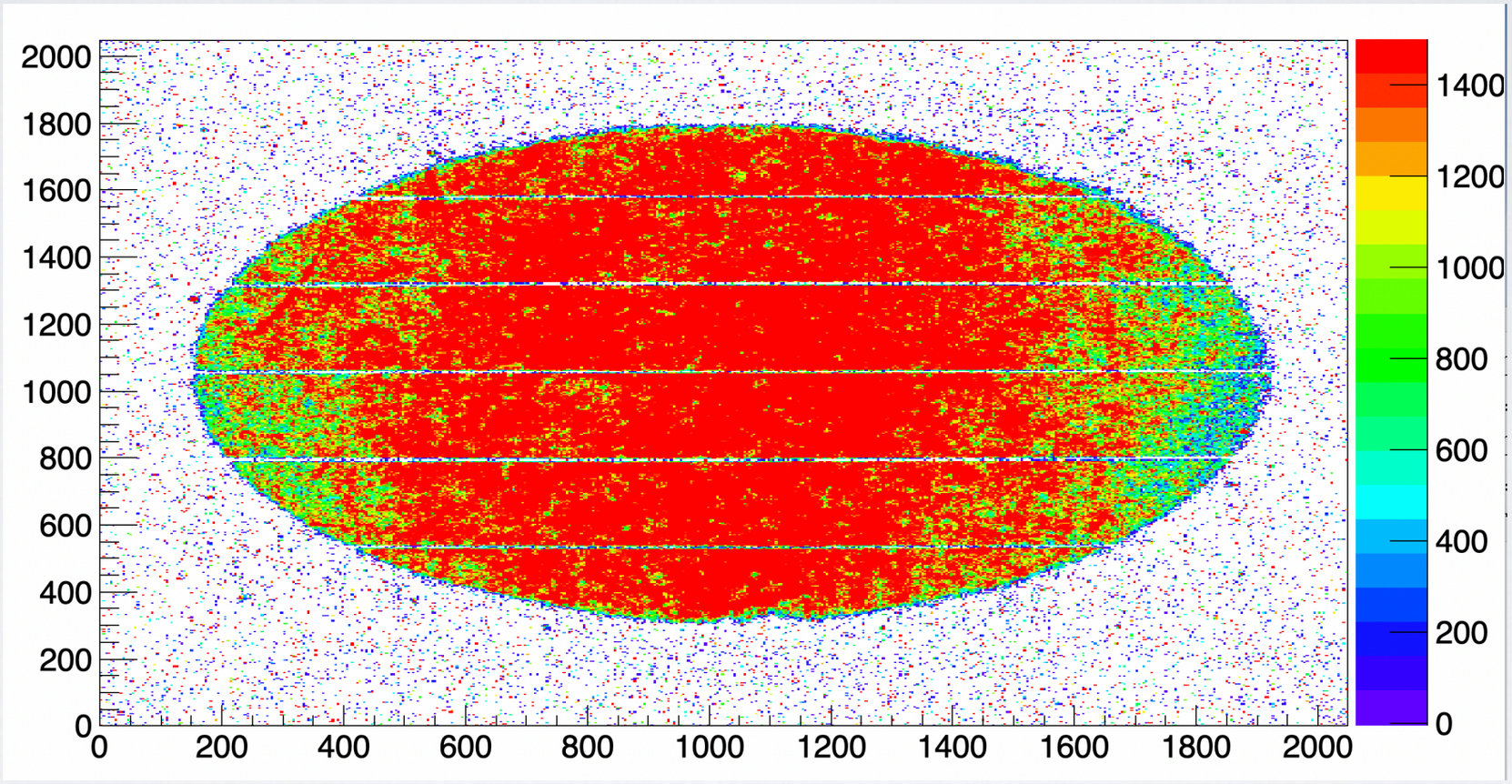
- Fit with a Poisson distribution gives an average of 9 recoveries/day;
- This means 45 min of dead time in a 24 hours: 97% live time;

TEMPERATURE AND PRESSURE



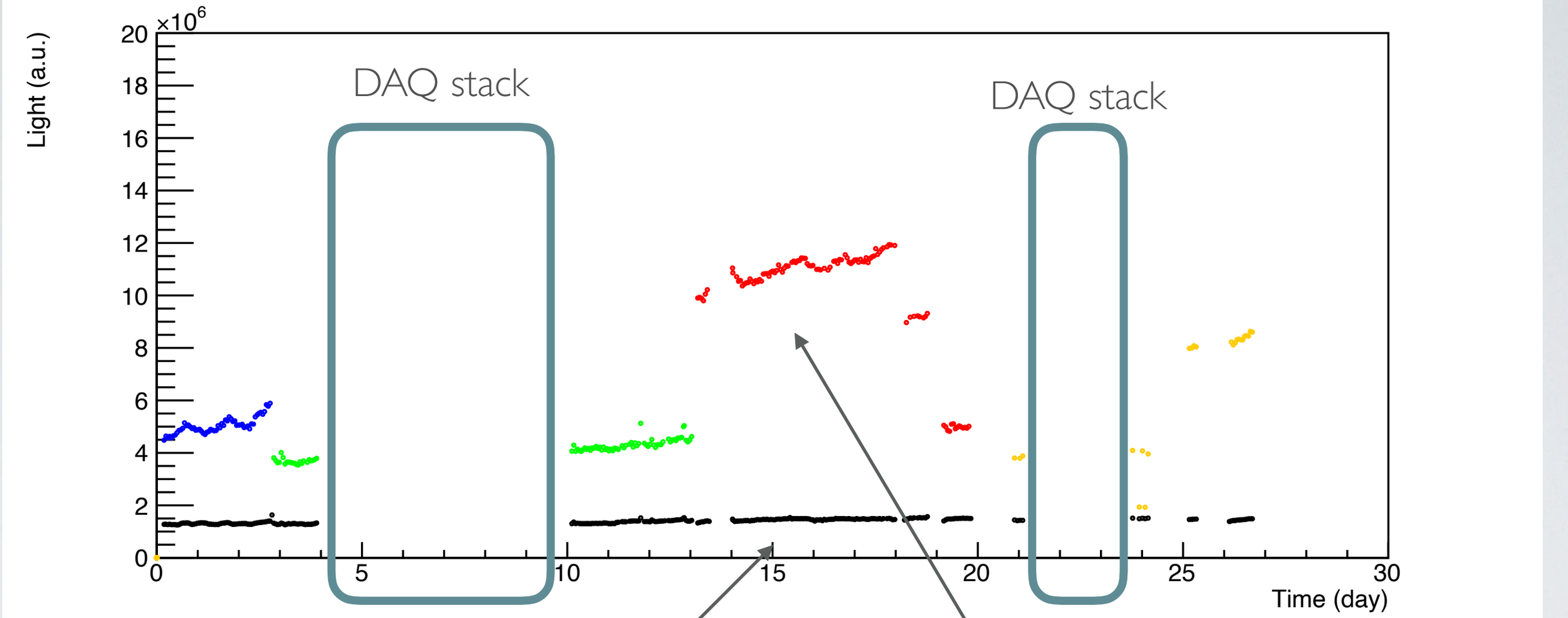
LEMON RESPONSE

- To evaluate the stability of the detector response, 30 images with 10 second exposure were taken each hour for (almost) all the test period;



- Total light collected inside and outside the sensitive volume were recorded

DETECTOR RESPONSE



Light outside sensitive Volume

Light outside sensitive Volume:

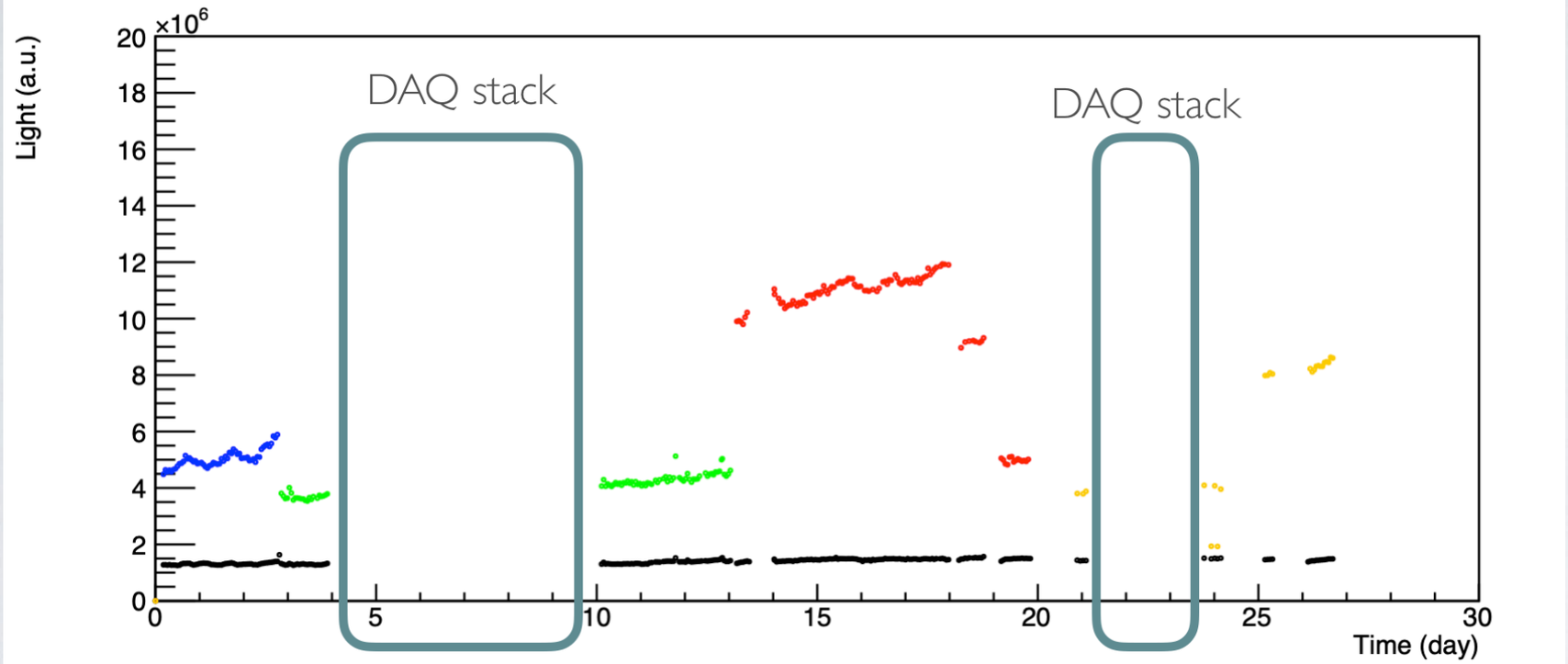
60/40 - Without lead case

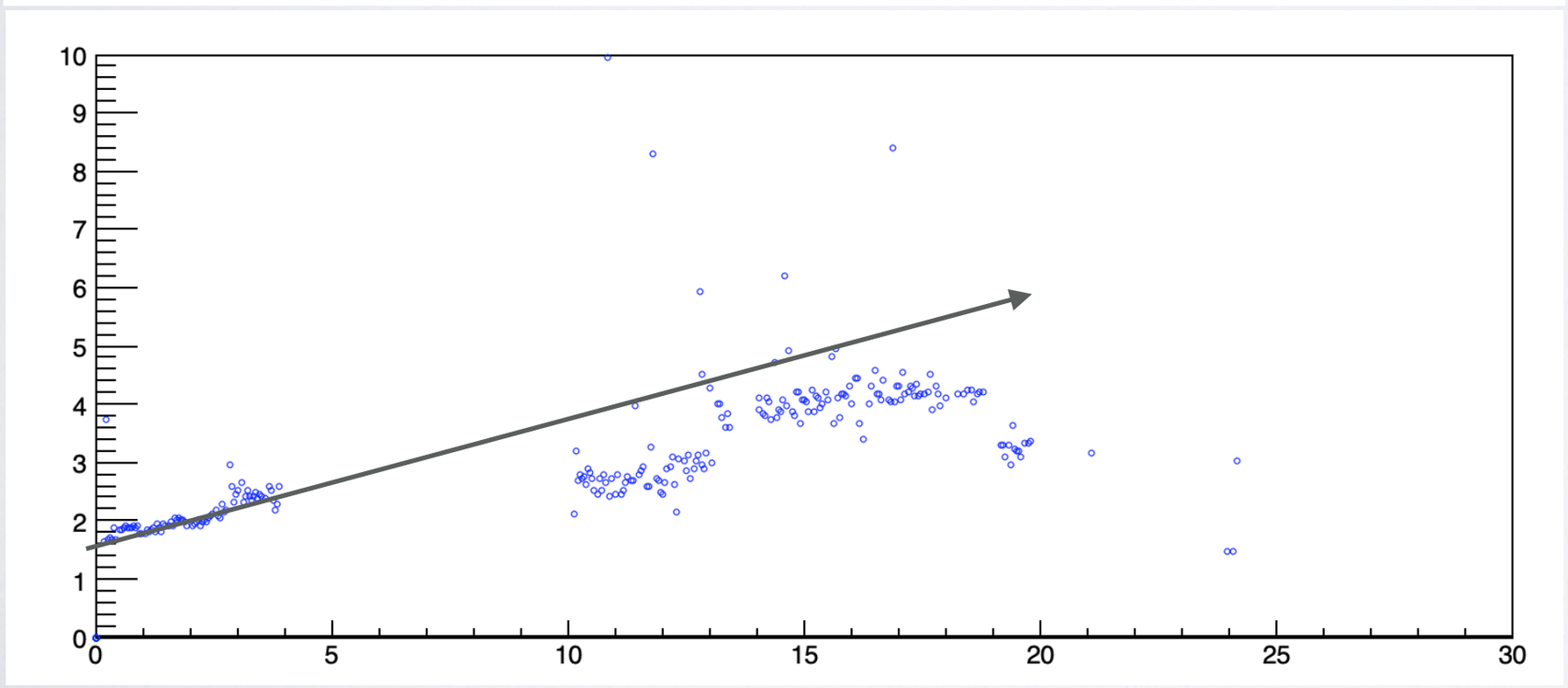
60/40 - With lead case

60/40 - With lead case + ^{55}Fe (different collimators)

70/40 - With lead case + ^{55}Fe (different collimators)

DETECTOR RESPONSE





Light outside sensitive Volume:

60/40 - Without lead case

60/40 - With lead case

60/40 - With lead case + ^{55}Fe (different collimators)

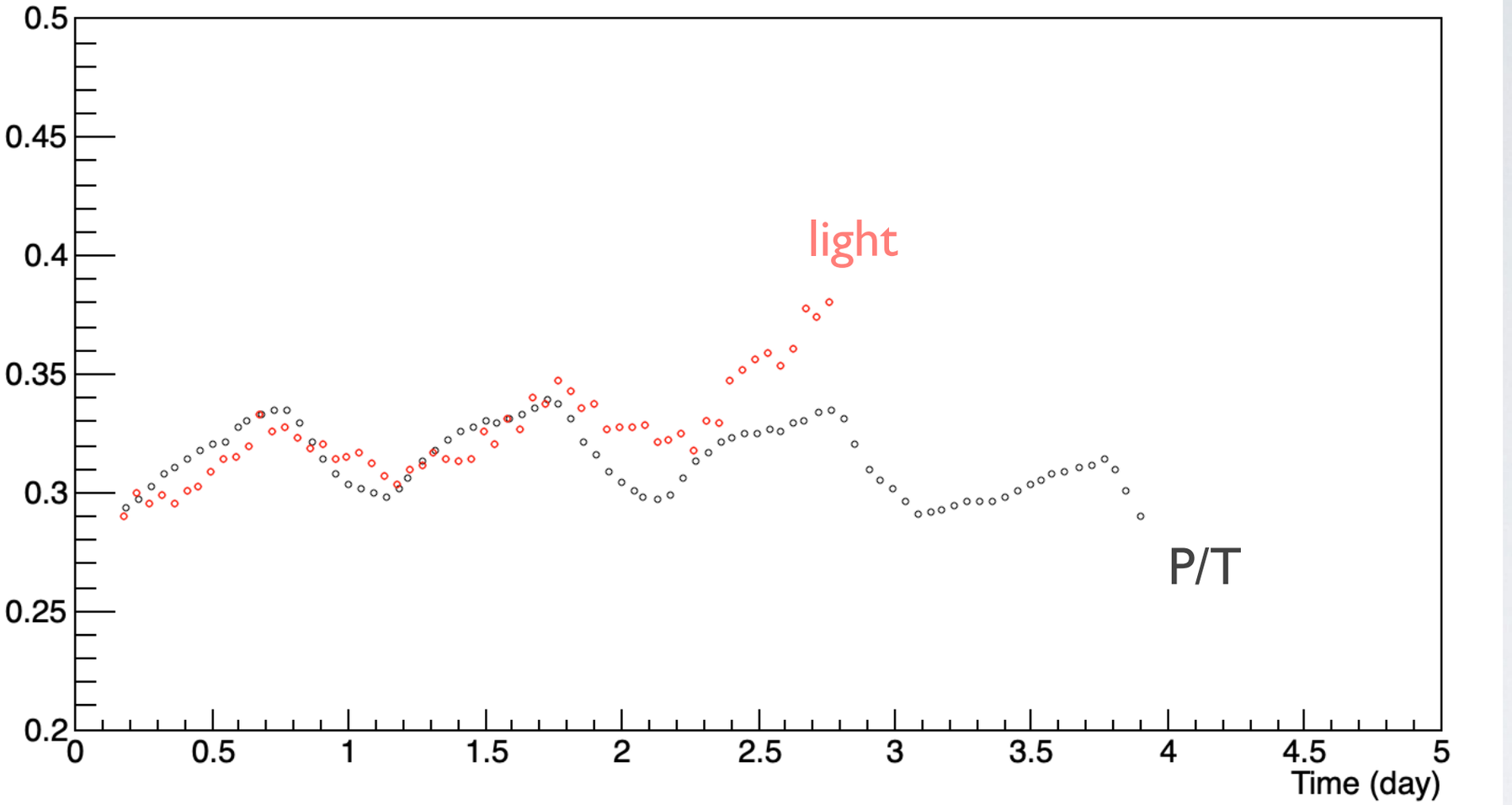
70/40 - With lead case + ^{55}Fe (different collimators)

To get rid of the different setup, we can normalize the light with the measured current;

It works, but not perfectly;

A strange increasing behavior is still present

SENSOR RESPONSE



Together with the increasing behavior, there is a clear correlation with the gas density (P/T) that seems not visible in the current;

To be studied.

CONCLUSION

- Detector seems quite stable;
- 60/40 is really more stable than 70/30;
- With 60/40 we should expect few hot/spots or discharges per day per Triple-GEM;
- Response behavior to be understood:
- There is a clear increasing behavior in light (not visible in current) probably due to the sensor. During Christmas Holidays we should take sensor runs;
- There is an unexpected dependence proportional to the gas density. To be studied by artificially increase the gas pressure (LIME?);