Data Handling & Data Processing
(Level 1 – v11r1 and v11r2)

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37th JEM-EUSO Collaboration Meeting
Paris, June 4, 2025

"Current" (mid April) dataset

Pouch003: sessions 01 - 14 → complete dataset

Pouch004: sessions 15 - 44 → complete dataset

Level1
v11_r1 / v11_r2

Pouch003_v2: sessions 45 – **150** → partial dataset

(10 or 20 files/session)

Level0

→ complete dataset for sessions: 64, 65, 66, 67

113, 114, 115, 116, 119, 120, 124, 126

→ Data on ground: about 40 sessions (excluding commissioning)

→ **Data on board: about 106 sessions !!!!**

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Session status at mid April

Latest performed sessions

03.04.2025 - session 150 → old software
02.04.2025 - session 149 → old software
05.03.2025 - session 148 → old software
26.02.2025 - session 147 → old software
21.02.2025 - session 146 → old software
29.01.2025 - session 145 → old software
23.01.2025 - session 144 → old software
...
05.12.2024 - session 138 → New software with new dac10 file

Usb pen appears as unformatted after the session – no data

25.11.2024 - session 137 → old software (as 134 and before)
05.11.2024 - session 136 → old software (as 134 and before)
04.11.2024 - session 135 → New software with new dac10 file

Usb pen appears as unformatted after the session – no data

...

Attempts to update dac10 file

Many attempts during last months
but something went wrong: no data on usb pen.

» different pens used;
» new software sent twice to the ISS.

Major problem with HV

Starting from session n. 151 Mini-EUSO is not working properly.

Sessions performed with two different pens:

27.05.2025 - pen 16 - session 156
22.05.2025 - pen 16 - session 155
21.05.2025 - pen 16 - session 154
28.04.2025 - pen 14 - session 153
24.04.2025 - pen 14 - session 152
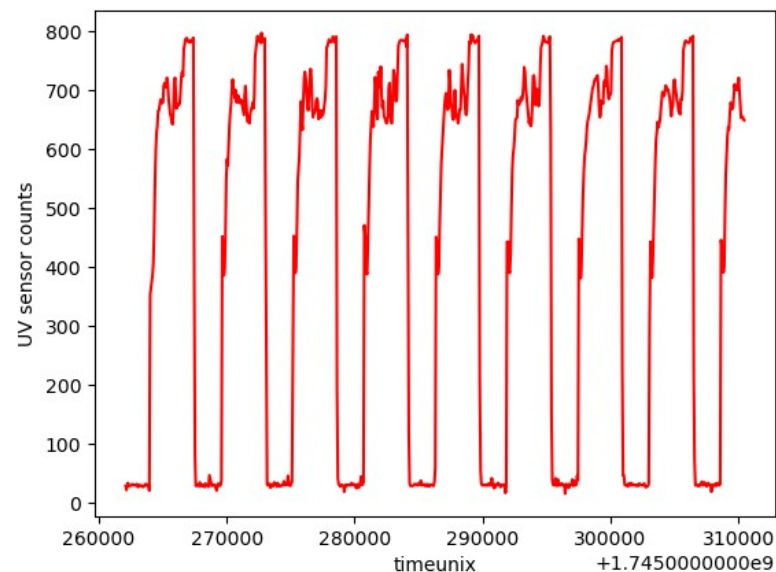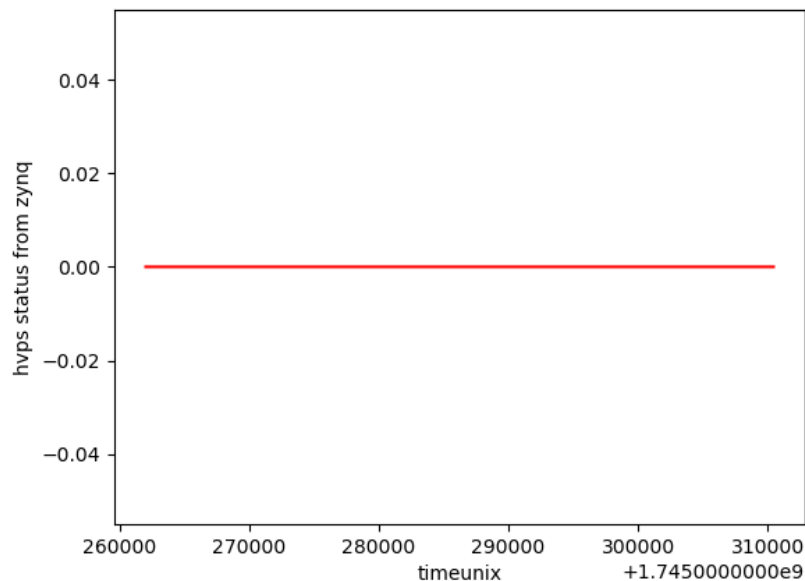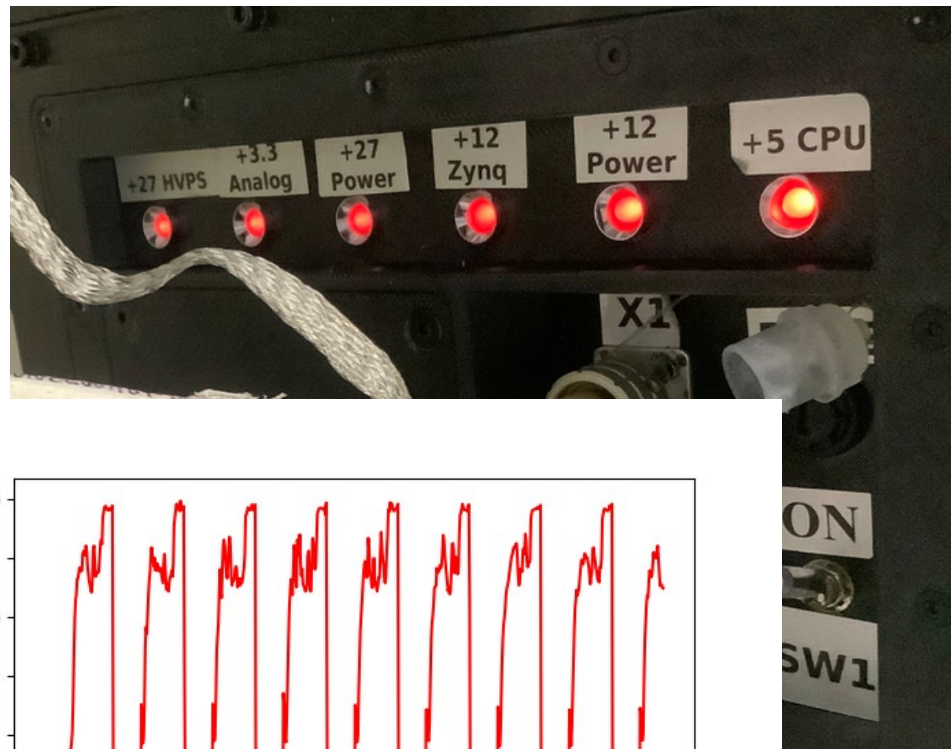21.04.2025 - pen 14 - session 151
03.04.2025 - pen 14 - session 150

Major problem with HV

CPU and Zynq seem working well:
- day/night transition ok
- Files stored
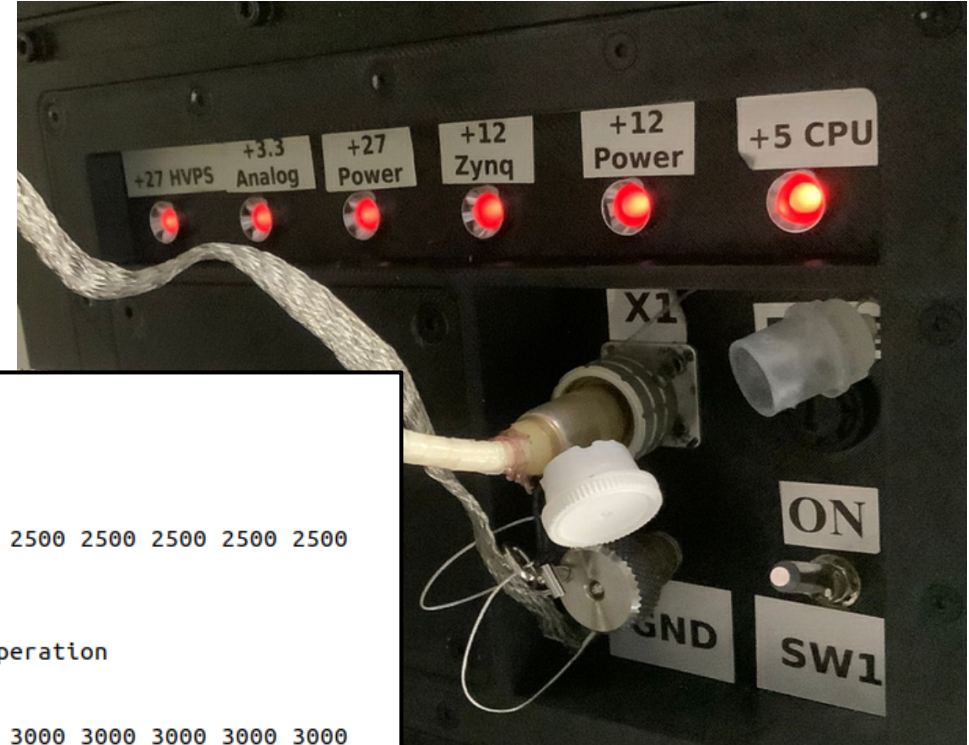
hvps cathode always 000 000 000

Major problem with HV

CPU and Zynq seem working well:
- day/night transition ok
- Files stored

hvps cathode always 000 000 000


```
19:07:18.772839 info: set port to non-blocking
19:07:18.785870 info: connect to socket
19:07:18.800032 info: connected to 192.168.7.10 on port 23
19:07:18.813224 info: sending via telnet: hvps cathode 3 3 3 3 3 3 3 3 3
19:07:18.829043 info: receiving via telnet: Ok
19:07:19.346835 info: sending via telnet: hvps setdac 2500 2500 2500 2500 2500 2500 2500 2500 2500
19:07:19.361161 info: receiving via telnet: Ok
19:07:19.878460 info: sending via telnet: hvps turnon 1 1 1 1 1 1 1 1 1
19:07:20.627667 info: comparing light level to day and night thresholds
19:07:20.641417 info: device /dev/ttyACM0 has been opened and ready for operation
19:07:20.654289 info: now running AnalogManager::SerialReadOut()
19:07:20.800803 info: receiving via telnet: Ok
19:07:21.318920 info: sending via telnet: hvps setdac 3000 3000 3000 3000 3000 3000 3000 3000 3000
19:07:21.332292 info: receiving via telnet: Ok
19:07:21.847680 info: sending via telnet: hvps setdac 3422 3422 3422 3422 3422 3422 3422 3422 3422
19:07:21.859459 info: receiving via telnet: Ok
19:07:22.374874 info: sending via telnet: hvps status gpio
19:07:22.386490 info: receiving via telnet: 0 0 0 0 0 0 0 0 0
19:07:22.905968 info: starting acquisition run
19:07:22.917749 info: clearing FTP server on Zynq side
19:07:22.929133 info: checking connection to IP 192.168.7.10
19:07:22.940496 info: setting up telnet connection
```

Major problem with HV

CPU and Zynq seem working well:
- day/night transition ok
- Files stored

hvps cathode always 000 000 000


```
19:07:18.759096 info: Setting server address
19:07:18.772839 info: set port to non-blocking
19:07:18.785870 info: connect to socket
19:07:18.800032 info: connected to 192.168.7.10 on port 23
19:07:18.813224 info: sending via telnet: hvps cathode 3 3 3 3 3 3 3 3 3
19:07:18.829043 info: receiving via telnet: Ok
19:07:19.346835 info: sending via telnet: hvps setdac 2500 2500 2500 2500 2500 2500 2500 2500 2500
19:07:19.361161 info: receiving via telnet: Ok
19:07:19.878460 info: sending via telnet: hvps turnon 1 1 1 1 1 1 1 1 1
19:07:20.627667 info: comparing light level to day and night thresholds
19:07:20.641417 info: device /dev/ttyACM0 has been opened and ready for operation
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19:07:20.800803 info: receiving via telnet: Ok
19:07:21.318920 info: sending via telnet: hvps setdac 3000 3000 3000 3000 3000 3000 3000 3000 3000
19:07:21.332292 info: receiving via telnet: Ok
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19:07:21.859459 info: receiving via telnet: Ok
19:07:22.374874 info: sending via telnet: hvps status gpio
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19:07:22.905968 info: starting acquisition run
19:07:22.917749 info: clearing FTP server on Zynq side
19:07:22.929133 info: checking connection to IP 192.168.7.10
19:07:22.940496 info: setting up telnet connection
```

Debugging on going on the Lab Model!!!
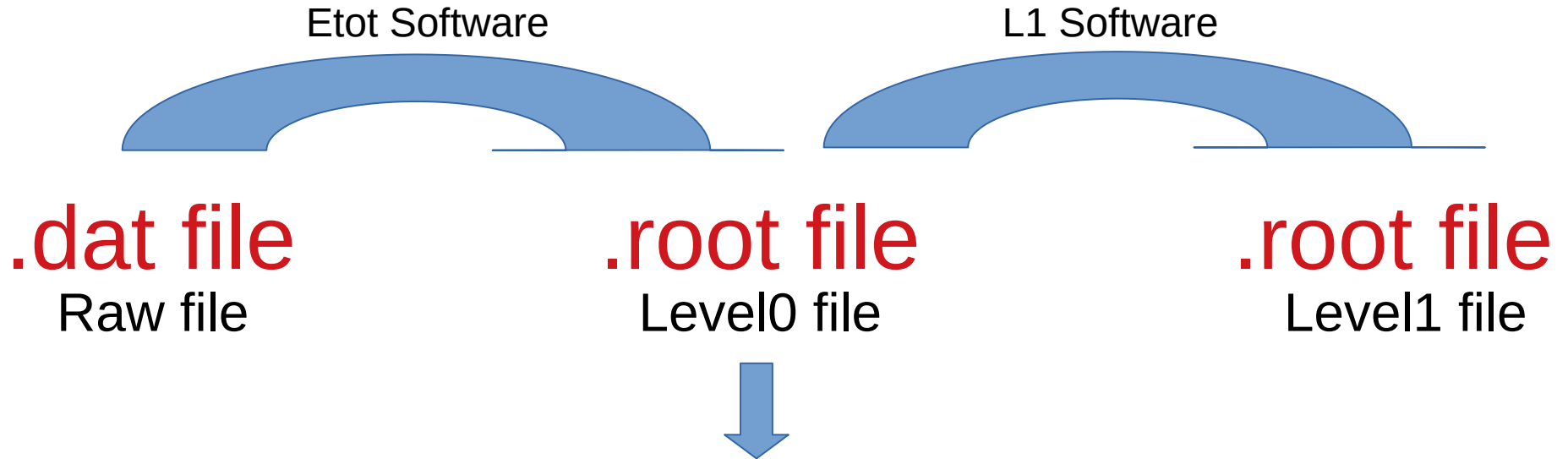
Data Processing

ETOT: Level0 data

Etot Software

L1 Software

.dat file
Raw file

.root file
Level0 file

.root file
Level1 file
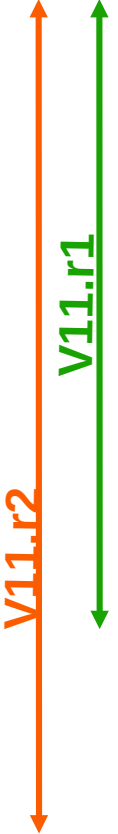
VM with ROOT 6.20/06 and python 2.7.5 used

Etot software version:
etot version 1.8, libetot version 1.7

L1 software - summary

It makes the clone of Level0 data and:

1- corrects the behaviour of the 2 PMTs with bit-shift in the counts;

2- adds orbital info (ISS, Sun and Moon positions); *thanks to Michal and Kenji*

3 - corrects the CPU time introducing a time_offset; *thanks to Michal and Kenji*

4 - adds L1 software version info (TTree "texp");

5 - corrects for "pile-up" in D1 counts;

6 – applies flat flielding correction. *thanks to Matteo*

V11.r1

V11.r2

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New storage area

Link (use standard JEM-EUSO password):

https://owncloud.roma2.infn.it/index.php/s/ONDmLXJp9PsAObh

New data processing

Data dowloading (from session 45) is in progress.

New data processing foreseen in the next months.

If you have any request, please let us know!

Thank you

Next data processing
(waiting for pouch003_v2 data)

ISS Telemetry:

      - no attitude files: Pavel is managing that with Energia

      - telemetry info in L1 files: current or new version?

                               Responsible: Kenji/Michal/Zbigniew?

Time-offset correction:

      - long time required! Responsible: Kenji/Michal?

Flat Fielding:

      - current or new version? Responsible: Matteo

Latest session issues

1) left bottom EC with three (or more) noisy pixels → almost always in cathode2 mode or switched off by safety circuit.

Known issue since session 83.

Some pixels added to the trigger pixel mask file since session 92 but the trigger mask seems to be applied not properly.

→ @ ALL: could it be better, in order to safe the instrument, to keep the EC switched off in the future sessions?
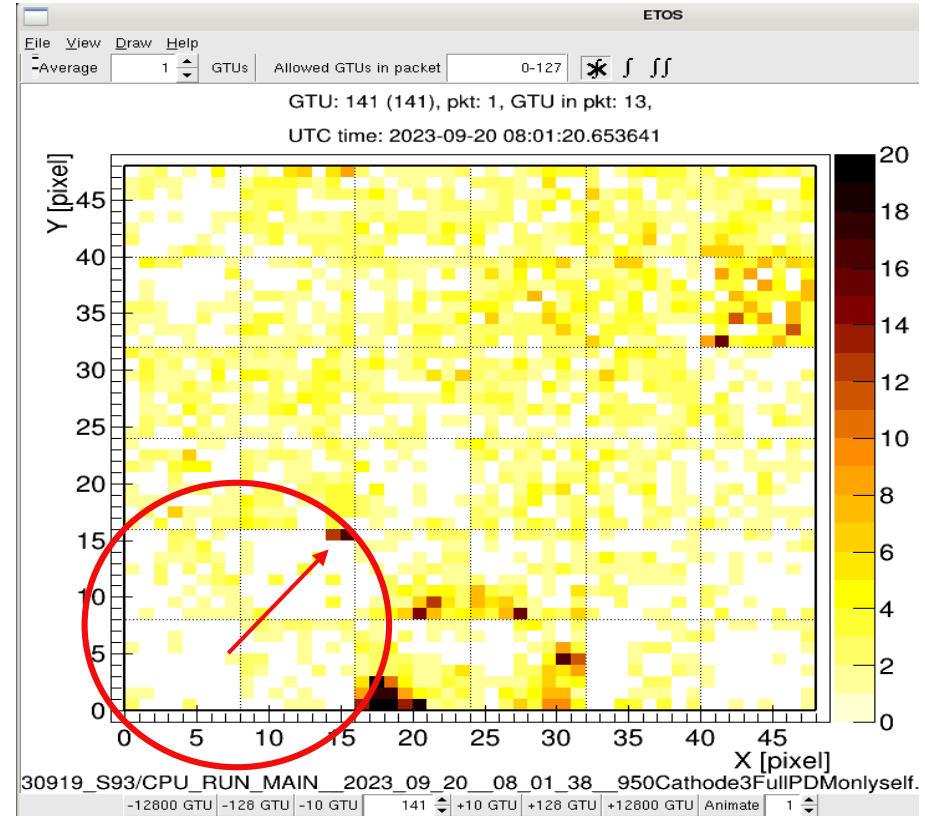
Latest session issues

GTU=61   GTU=62   GTU=63   GTU=64
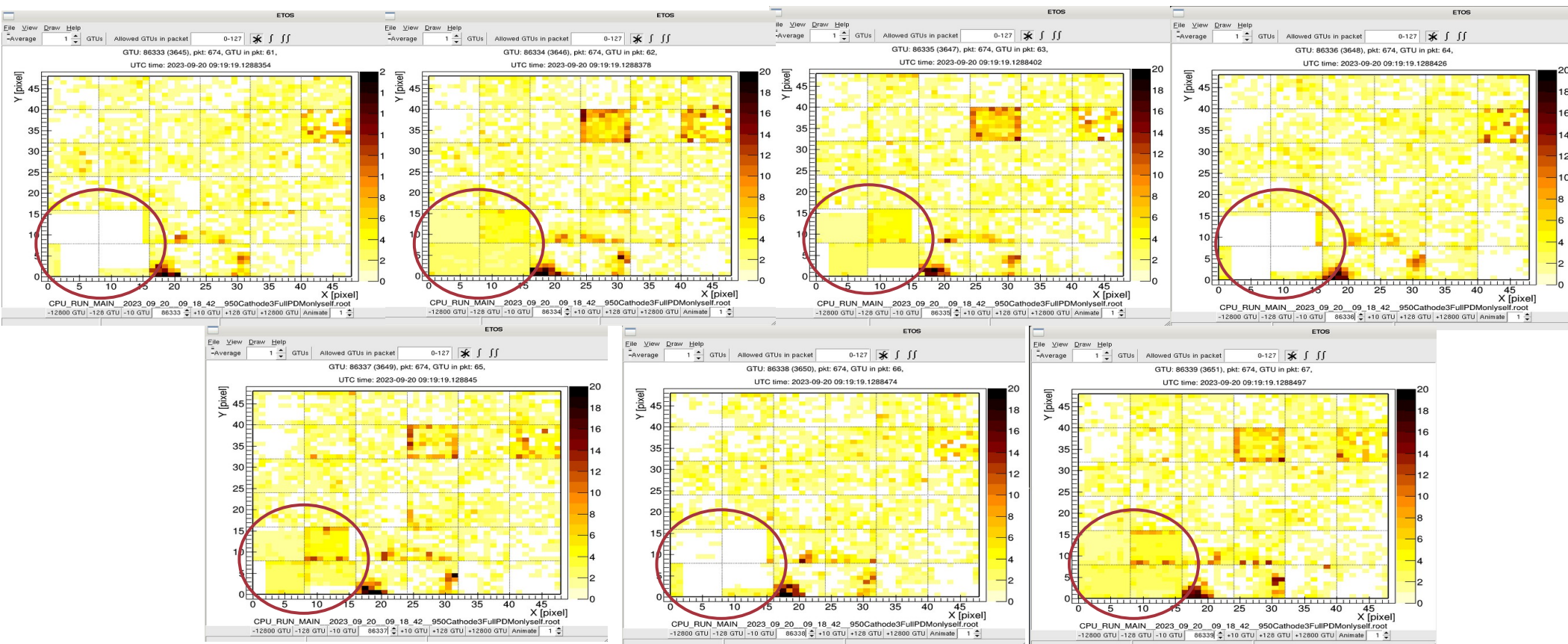
GTU=65   GTU=66   GTU=67

Latest session issues

2) minor issue: one PMT of the top central EC connected with the activity of the left bottom EC. It happens only occasionally. But what for the future?
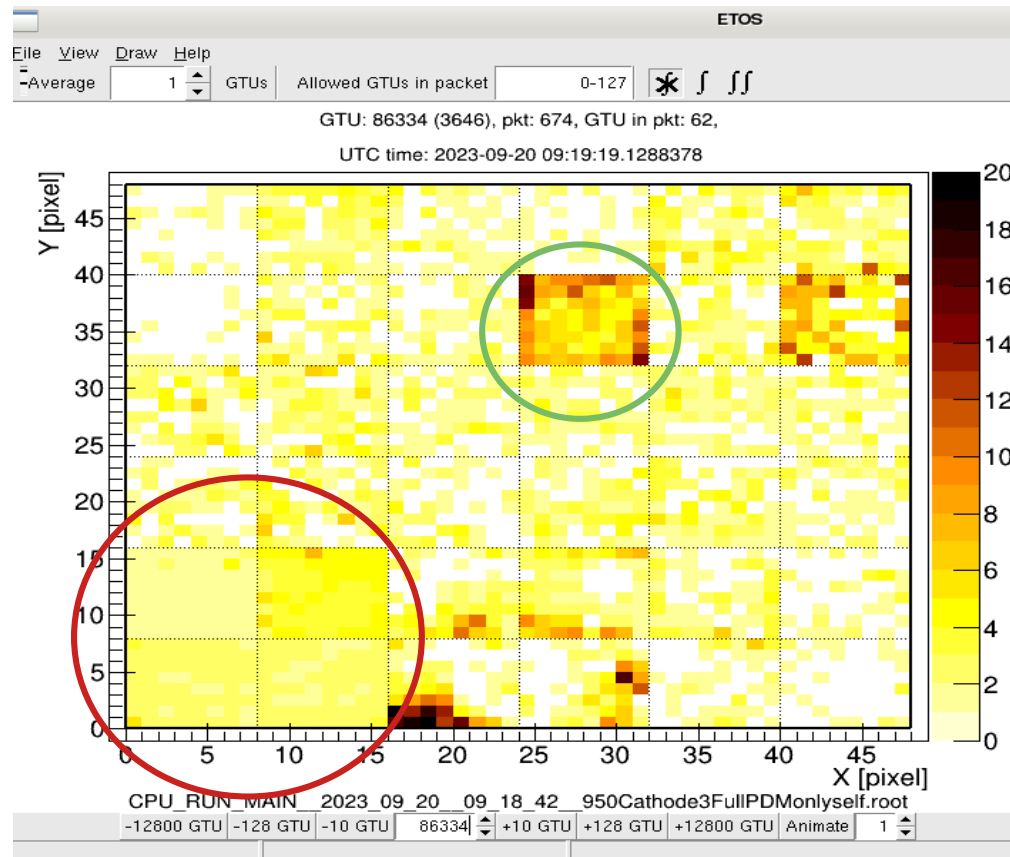
Latest session issues

3) bottom central EC: very noisy during some sessions, it is most probably due to the broken latches and how the cosmonaut installs the instrument.
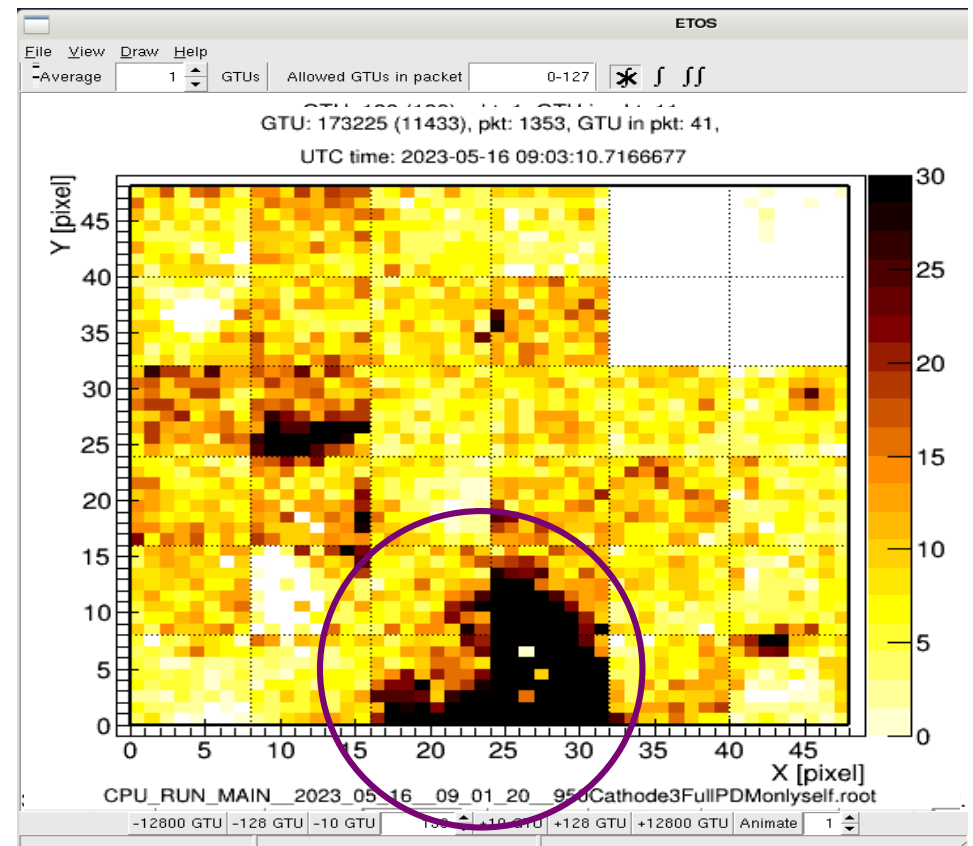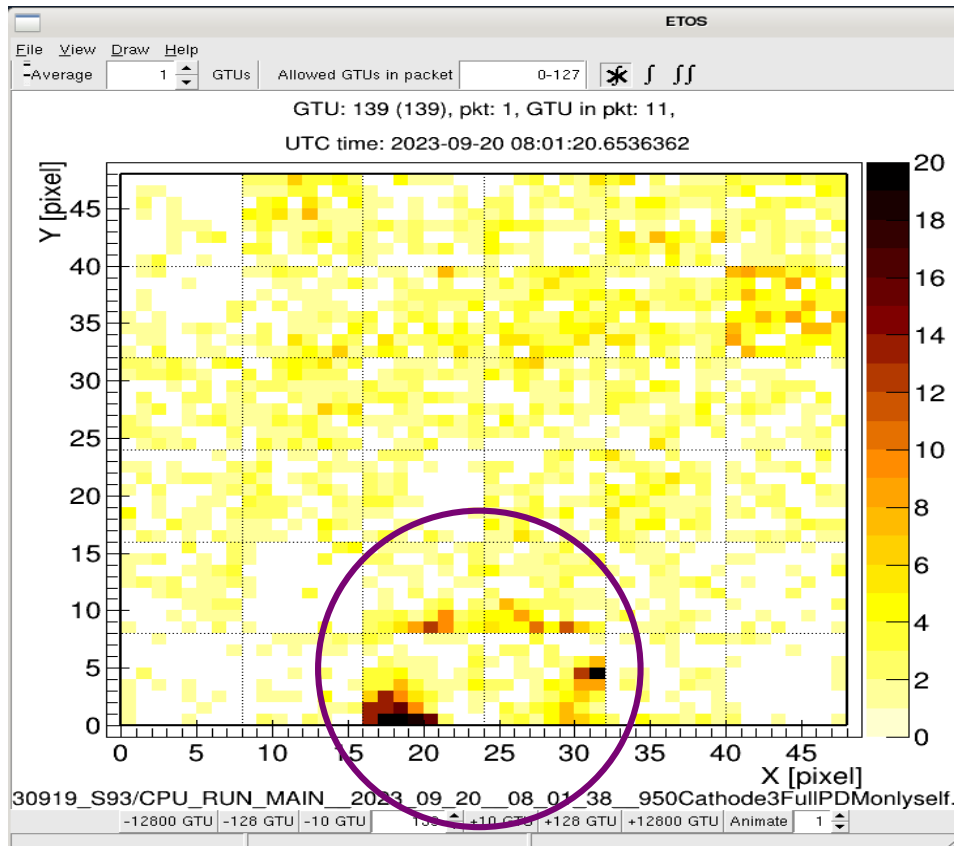
Broken latches

Broken latches

Broken latches

Broken latches

Broken latches

Latest session issues

sources move down

S01 – S54
First pixel mask

Masked pixels:

PMTs with bit-shift issue

All border pixels

```
11111111 11111111   11111111 11111111   11111111 11111111
10000001 10000001   10000001 10000001   10000001 10000001
10000001 11000001   10000001 10000101   10000001 10000001
10000001 10000001   10000001 10000001   10000001 11000001
10000001 10000001   10000001 10000001   10000001 10000001
10000001 10000001   10000001 10000001   10000001 10000001
10000001 10000001   10000001 10000001   10000001 10000001
11111111 11111111   11111111 11111111   11111111 11111111

11111111 11111111   11111111 11111111   11111111 11111111
11111111 10000001   10000001 10000001   10000001 10000001
11111111 10000001   10000001 10000001   10000001 10000001
11111111 10000001   10000001 10000001   10000001 10000001
11111111 10000001   10000001 10000001   10000001 11000001
11111111 10000001   10100001 10000001   10000001 10000001
11111111 10000001   10000001 10000001   10000001 10000001
11111111 11111111   11111111 11111111   11111111 11111111

11111111 11111111   11111111 11111111   11111111 11111111
11000001 11000001   10010001 10010001   10010001 10001001
10000001 10000001   10000001 10000001   10000001 10000001
10000001 10000001   10000001 10000001   10000001 10000001
10000001 10000001   10000001 10000001   10000001 10000001
10000001 10000001   10100001 10000001   10000001 11000001
10000001 10000001   10000001 10000001   10000001 10000001
11111111 11111111   11111111 11111111   11111111 1111111

11111111 11111111   11111111 11111111   11111111 11111111
11000001 11000001   10010001 10010001   10001001 10010001
10000001 10000001   10000001 10000001   10000001 10000001
10000001 10000001   10000001 10000001   10000001 10000001
10000001 10000001   10000001 10000001   10000001 10000001
10000001 10000001   10100001 10000001   10000001 11000001
10000001 10000001   10000001 10000001   10000001 10000001
11111111 11111111   11111111 11111111   11111111 11111111

11111111 11111111   11111111 11111111   11111111 11111111
11000001 10000001   11000001 10010001   11111111 11111111
10000001 10000001   10000001 10000001   11111111 10000001
10000001 10000001   10000001 10000001   11111111 10000001
10000001 10000001   10000001 10000001   11111111 10010001
10000001 10000001   10100001 10000001   11111111 10000001
10000001 10000001   10000001 10000001   11111111 11000001
11111111 11111111   11111111 11111111   11111111 10000001
                                         11111111 11111111

11111111 11111111   11111111 11111111   11111111 11111111
11000001 11000001   11000001 11010001   10000001 10000001
10000001 10000001   10000001 10000001   10000001 11000001
10000001 10000001   10000001 10000001   10100001 10010001
10000001 10000001   10000001 10000001   10000001 10000001
10000001 10000001   10100001 10000001   10000001 11000001
10000001 10000001   10000001 10000001   10000001 10000001
11111111 11111111   11111111 11111111   11111111 11111111
```
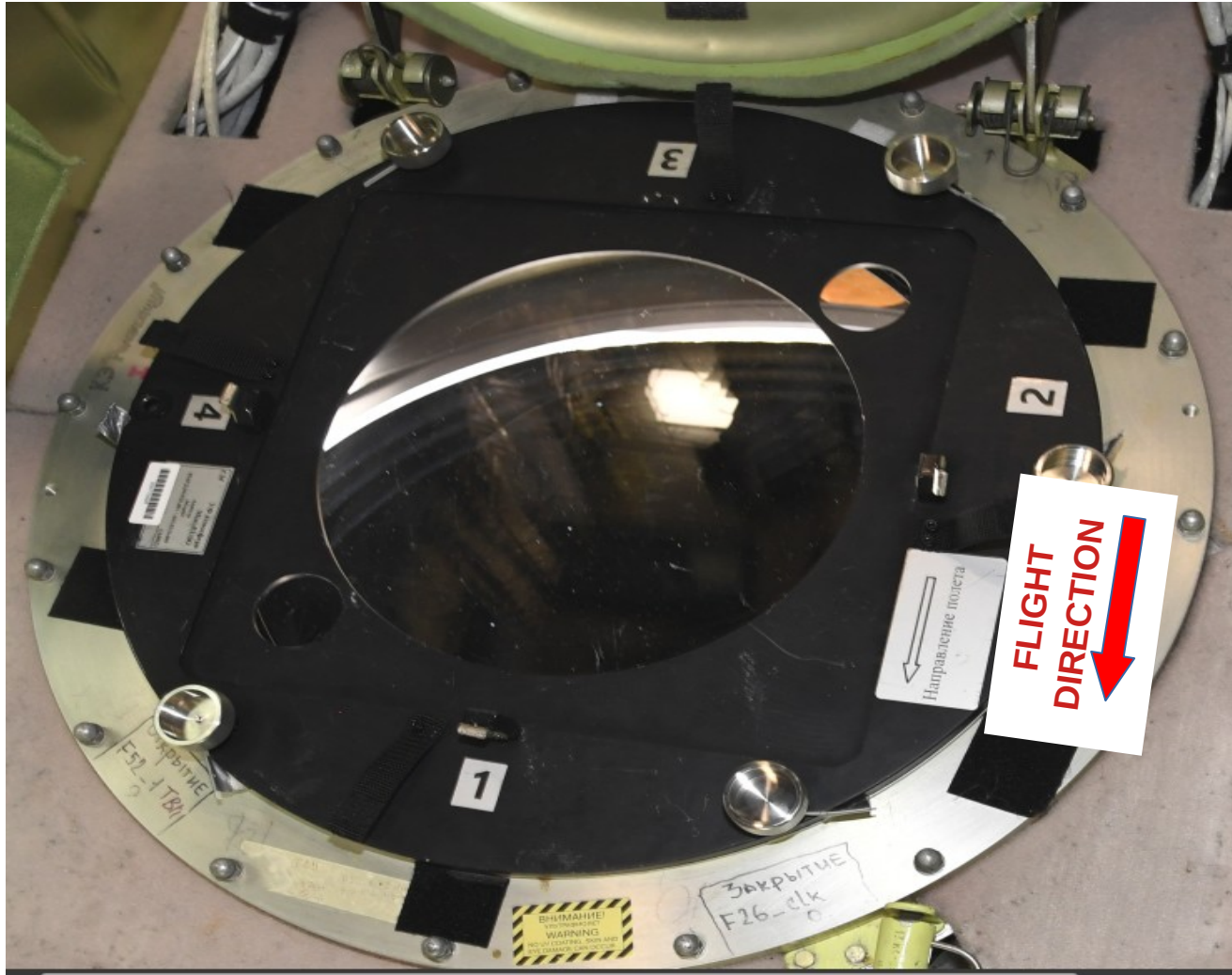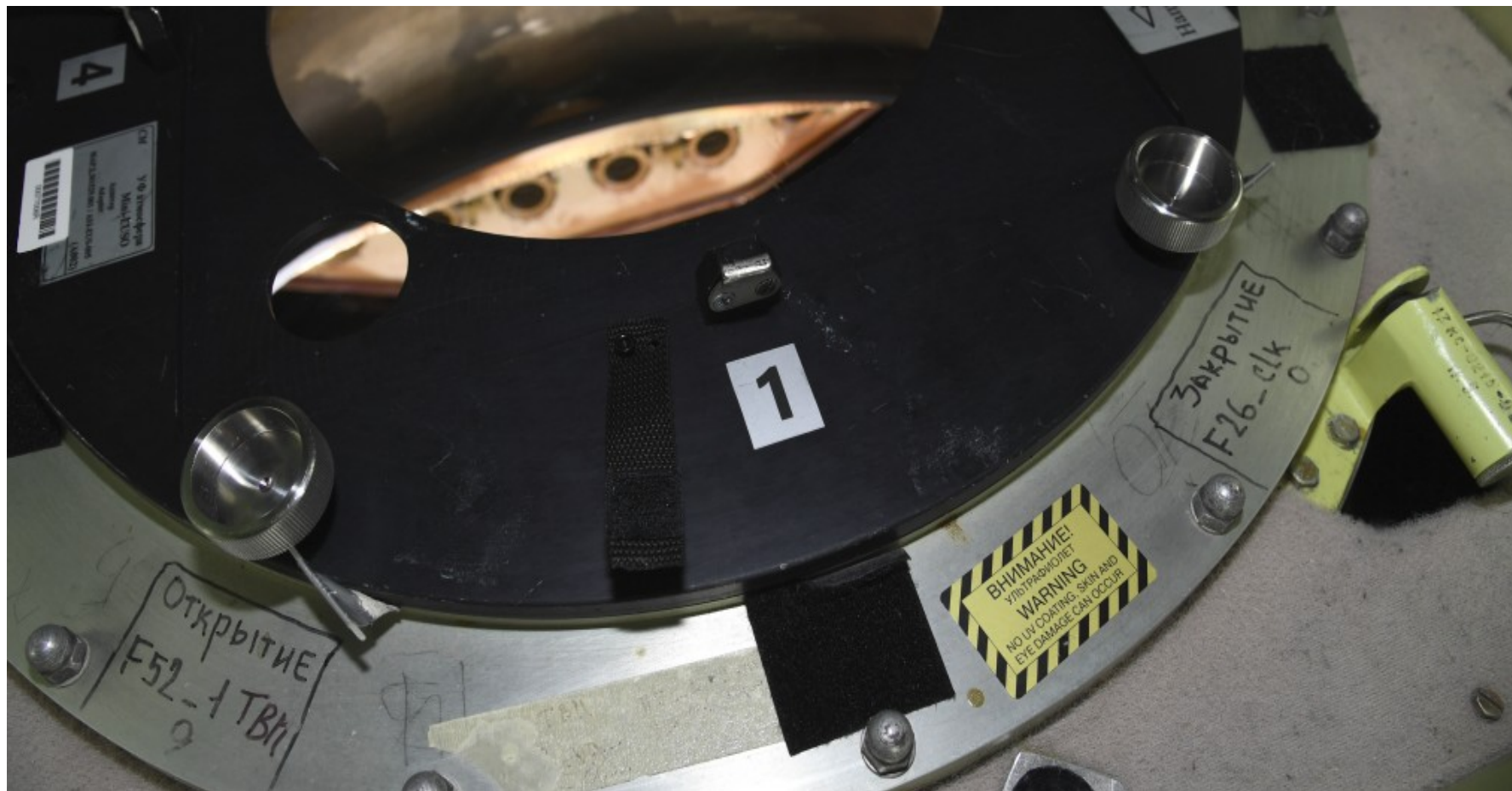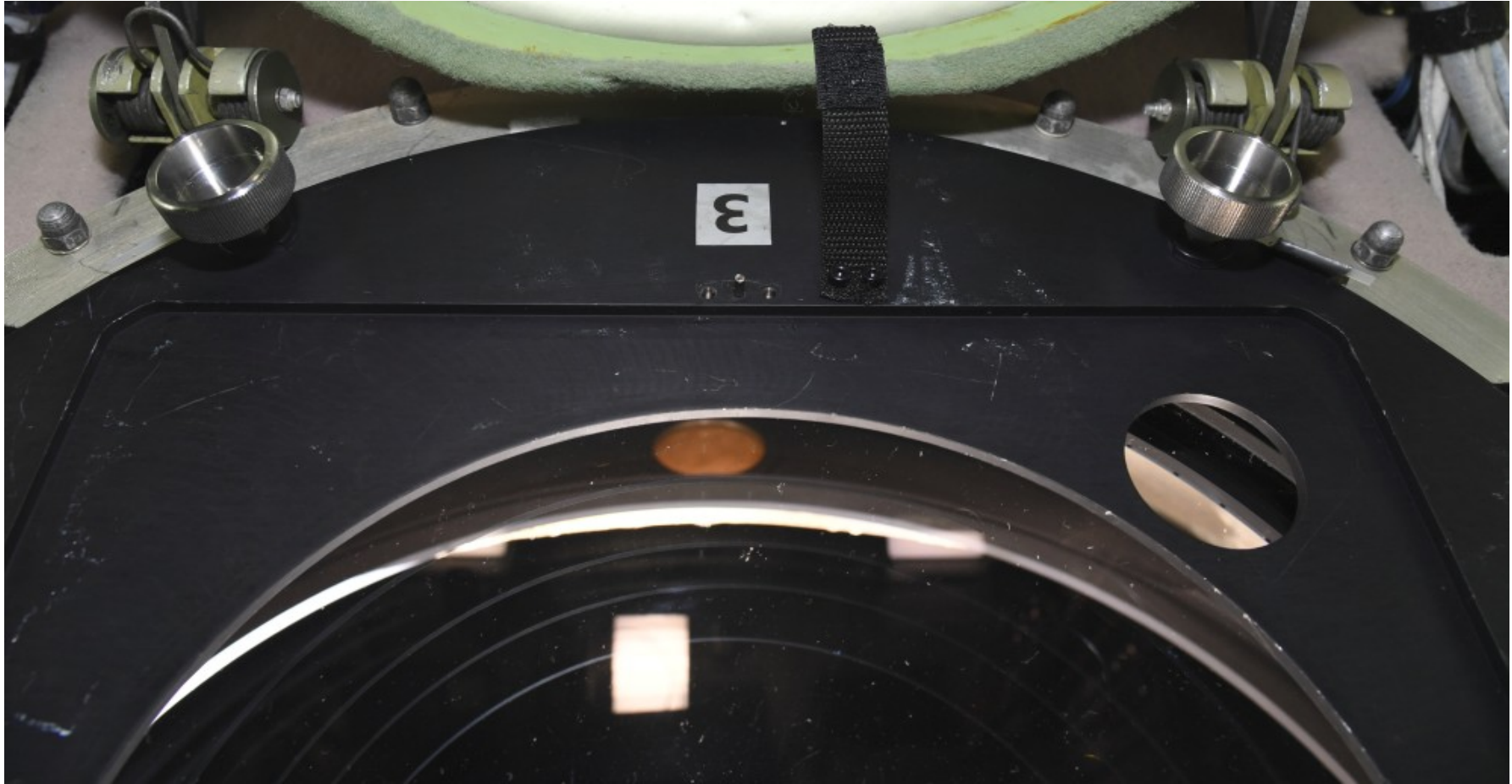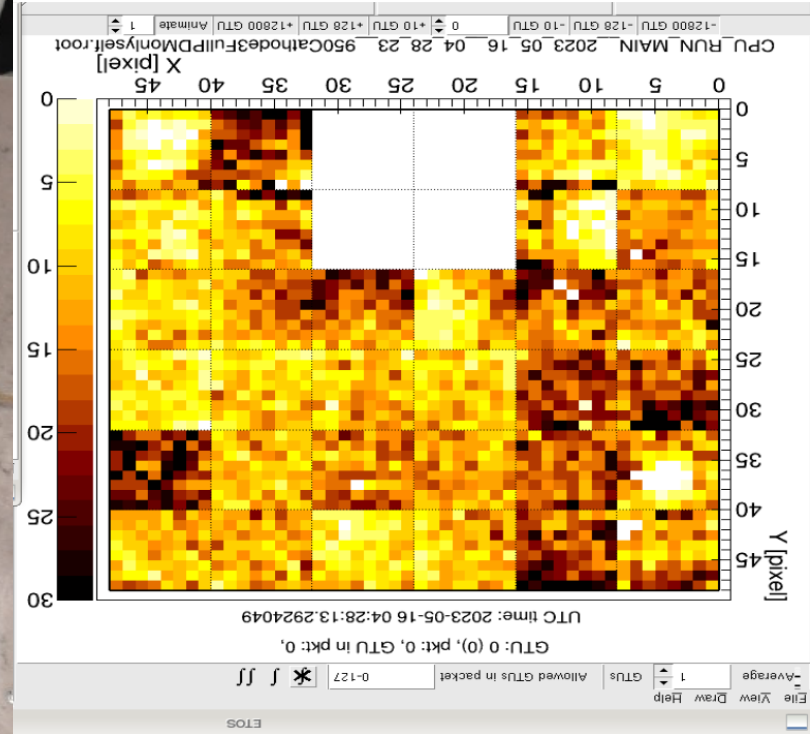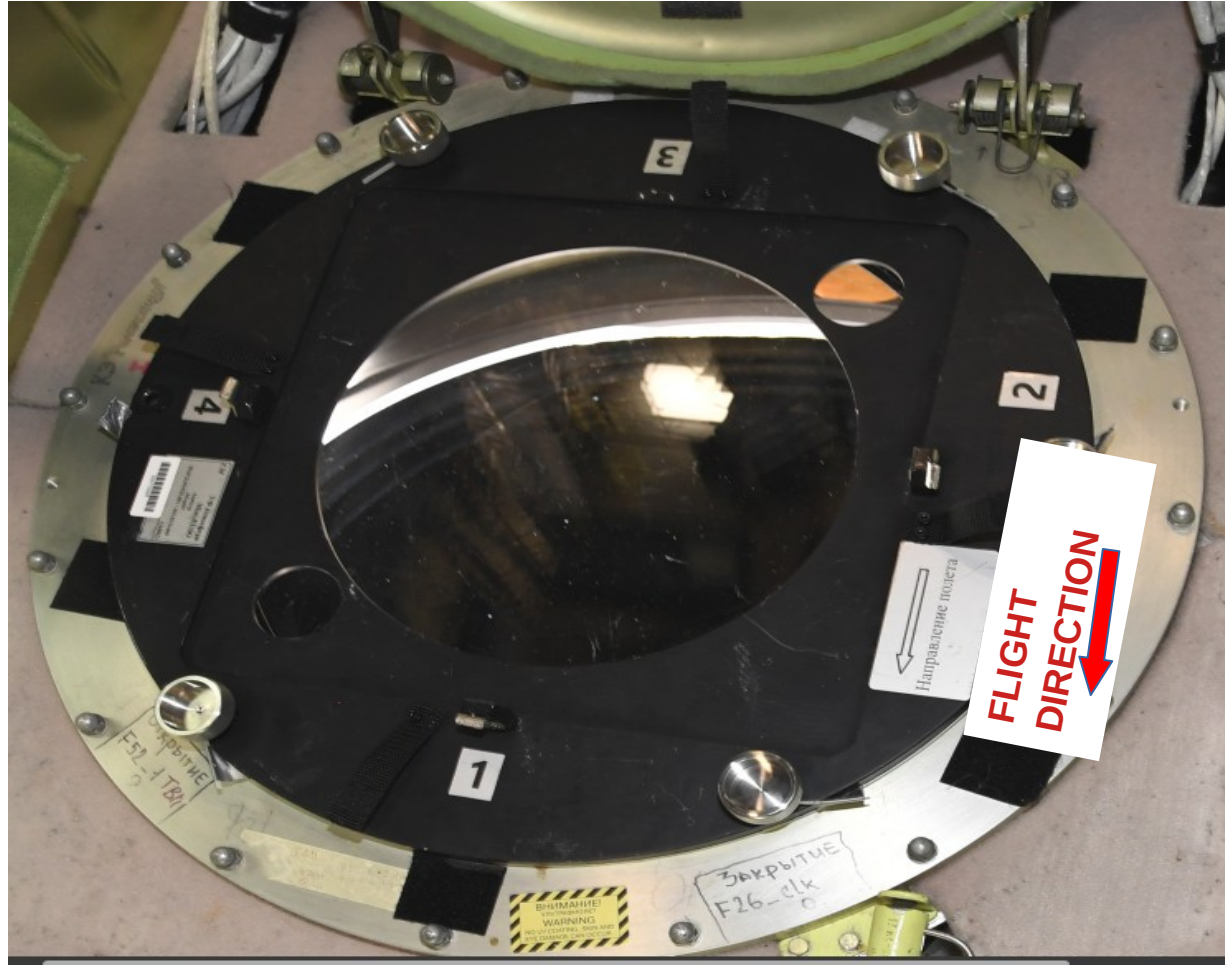
S01 – S54
First pixel mask

Masked pixels:
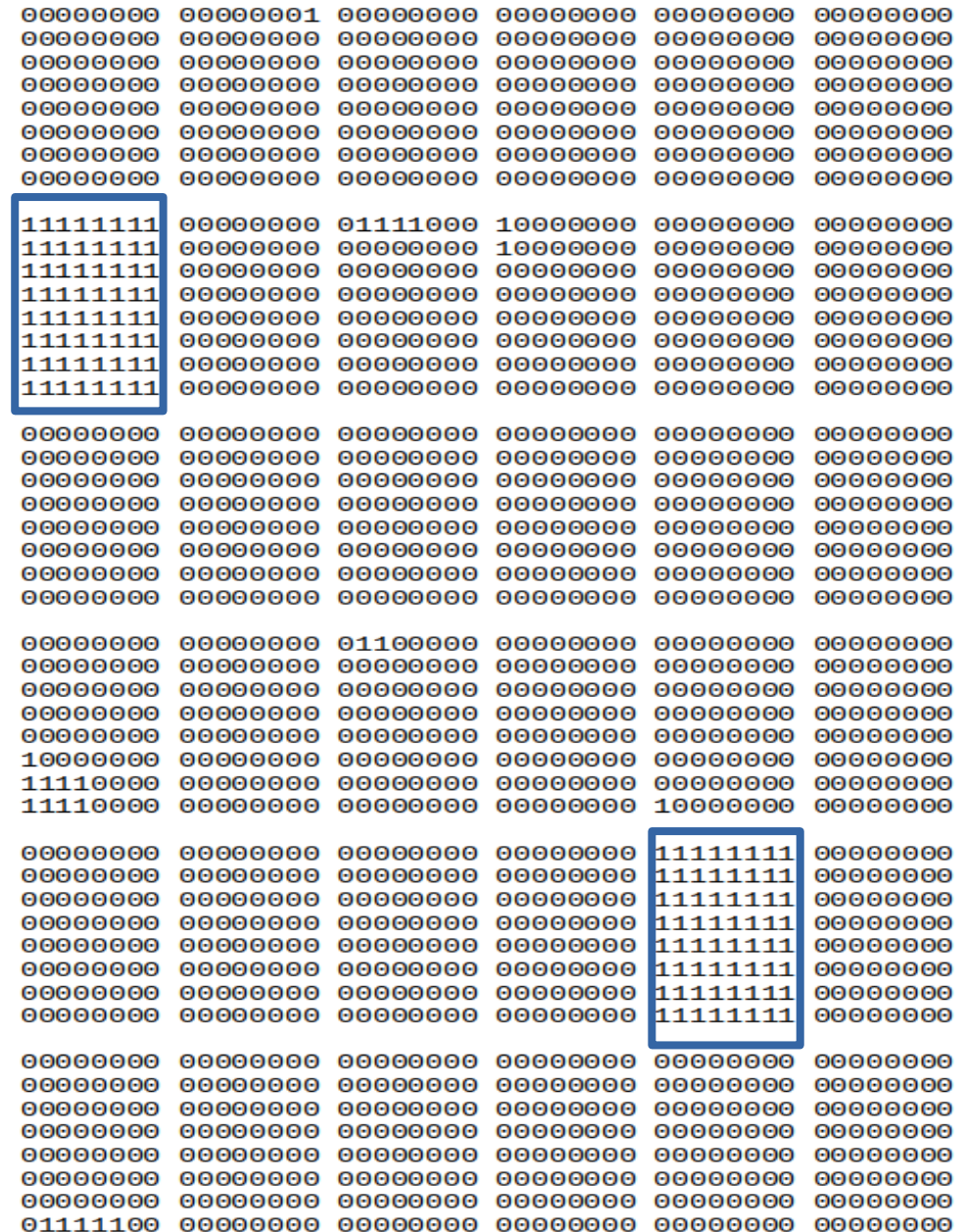
PMTs with bit-shift issue

All border pixels

S55 - S91 –
Old pixel mask

Masked pixels:

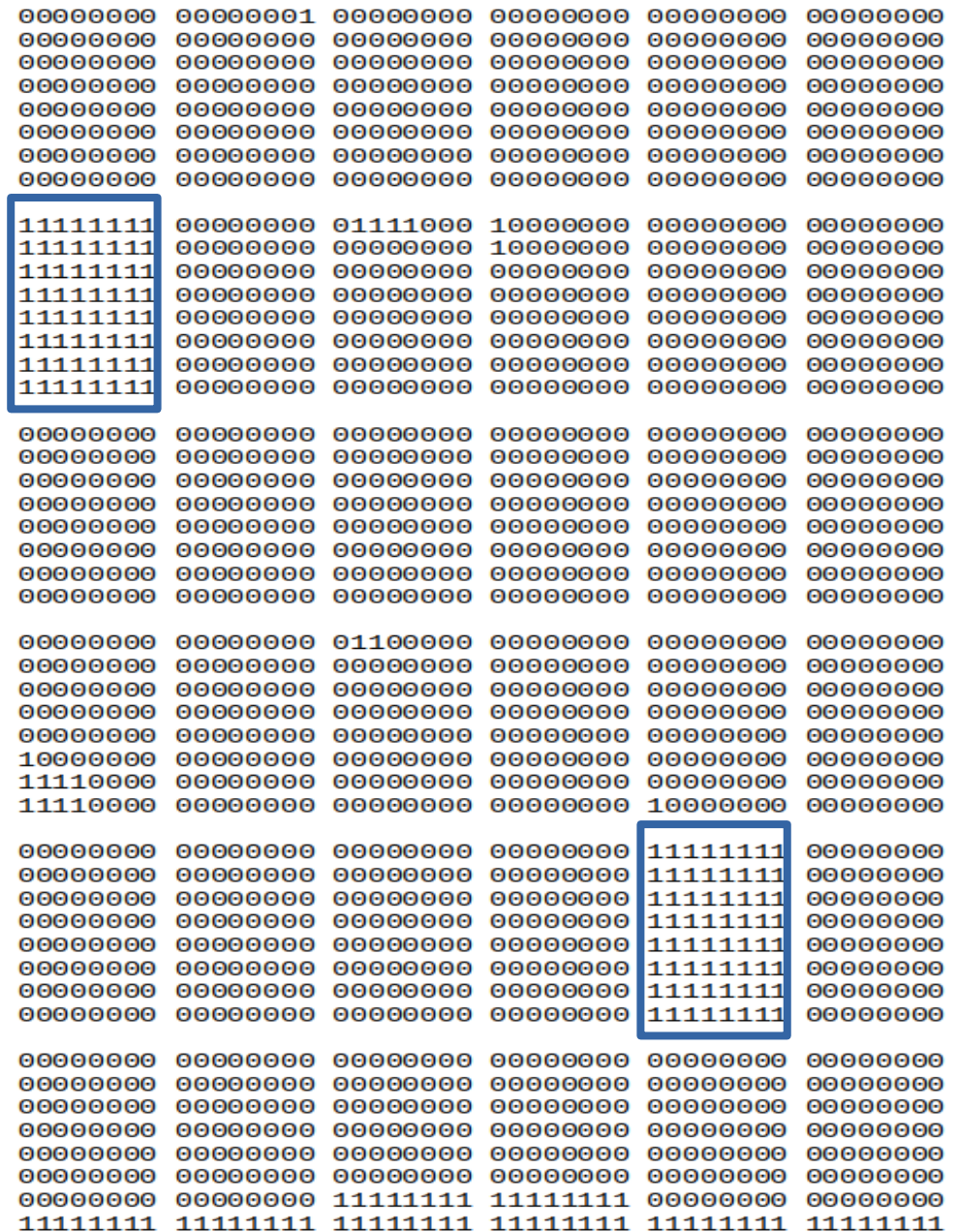PMTs with bit-shift issue

Some border pixels (Matteo's study)

From S92 – New pixel mask

Masked pixels:

PMTs with bit-shift issue

Some border pixels (Matteo's study)

Some bottom pixels to overcome latest problems

From S92 – New pixel mask

Masked pixels:

PMTs with bit-shift issue

Some border pixels (Matteo's study)

Some bottom pixels to overcome latest problems

IT DOESN'T WORK!!!!

Some of the masked pixels generate triggers