

Information about FCalPulse Test Beam Run 2022

Faig Ahmadov

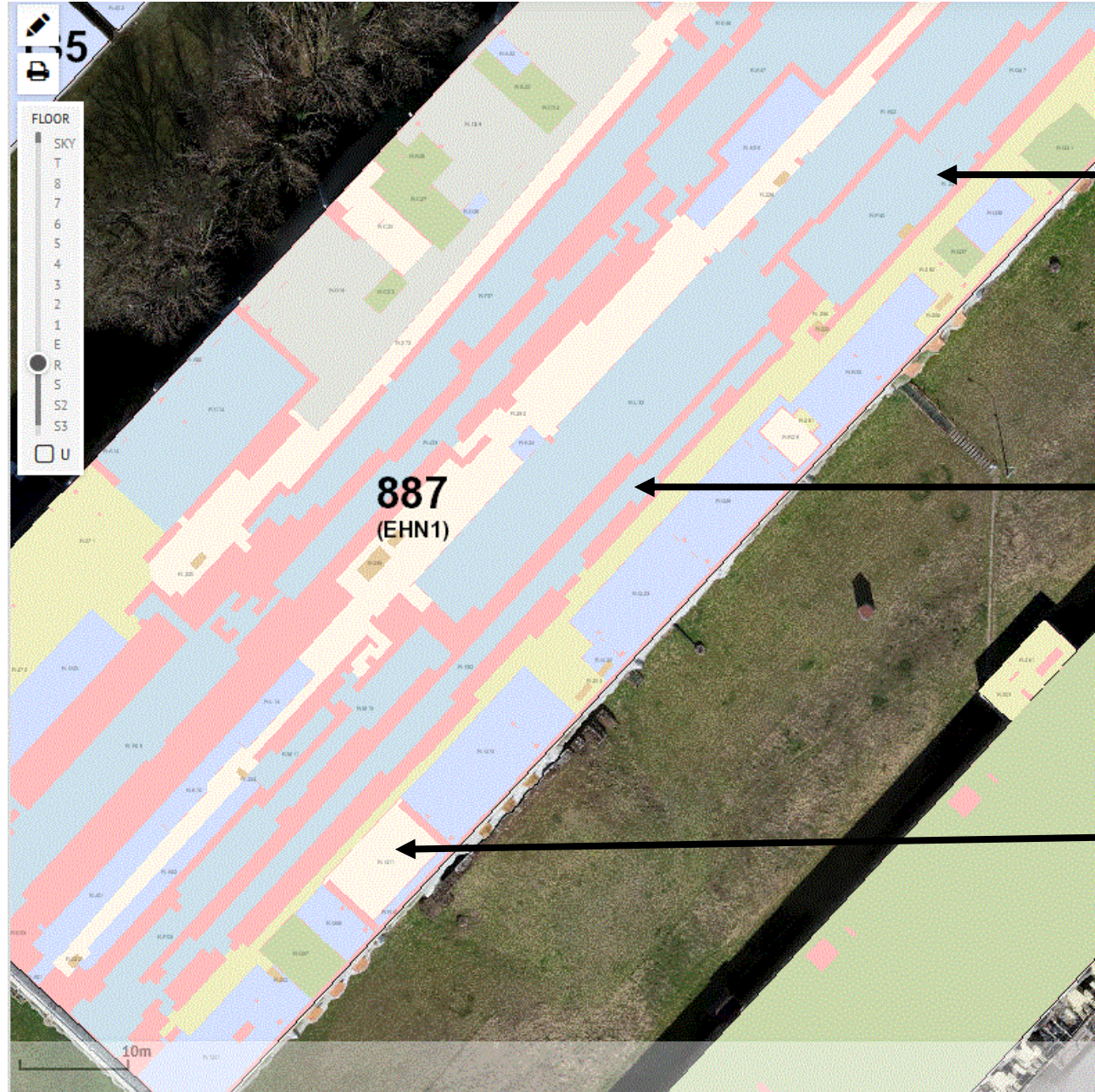
12.09.2022

LHEP, JINR

2022 Test Beam Schedule

- 08 Jul – Ship Sr-90 source to CERN -> 12 Aug.
- 11 Jul – Ship apparatus to CERN
- 27 Jul – Arizona team arrives at CERN
- 6 Aug – Dubna team arrives at CERN
- 8 Aug – Introduction to the software required for the shift
- 10 Aug – Start week in H8 beam -
pure (?) electron beam (≤ 300 GeV) ->13 Aug.
- 17 Aug – End of our week in H8 beam
- 18 Aug - Dubna team leaves CERN
- 20 Aug – Arizona team leaves CERN

North Area Building map

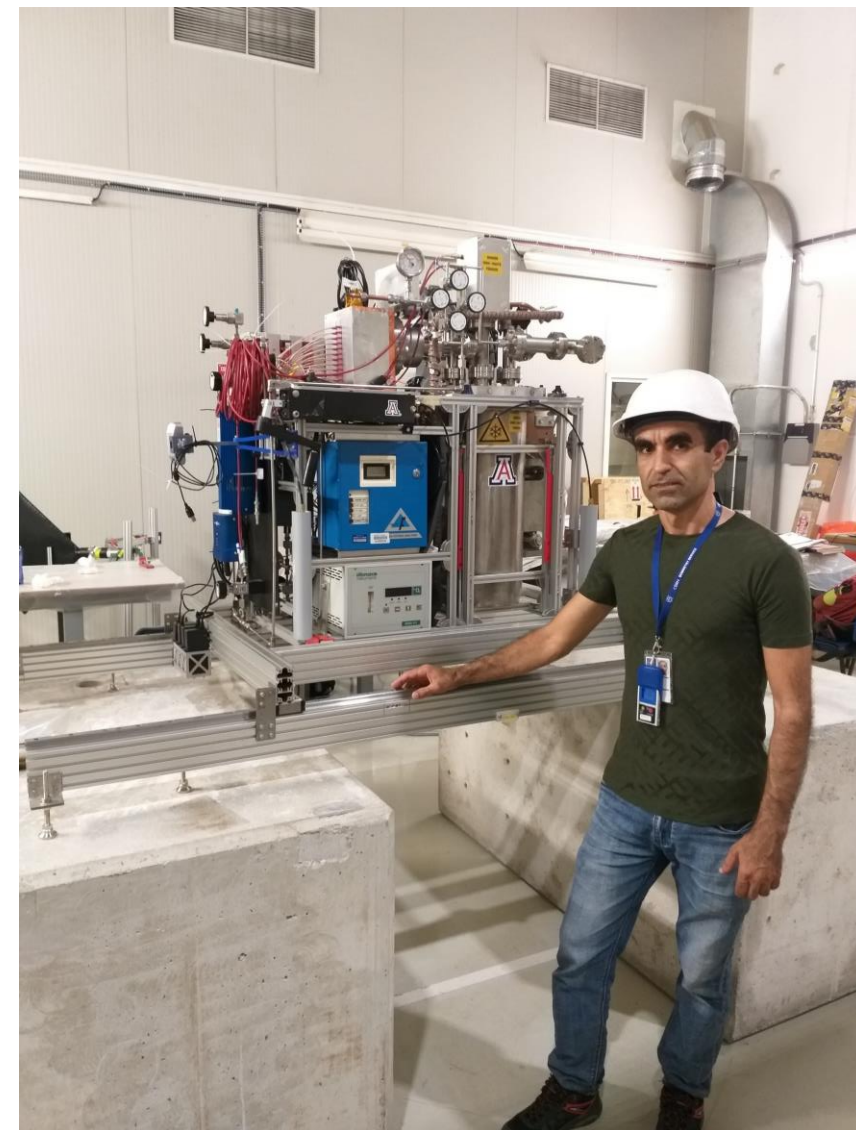


Our zone
H8A

H8 beam
line

Our staging
area

Clean room

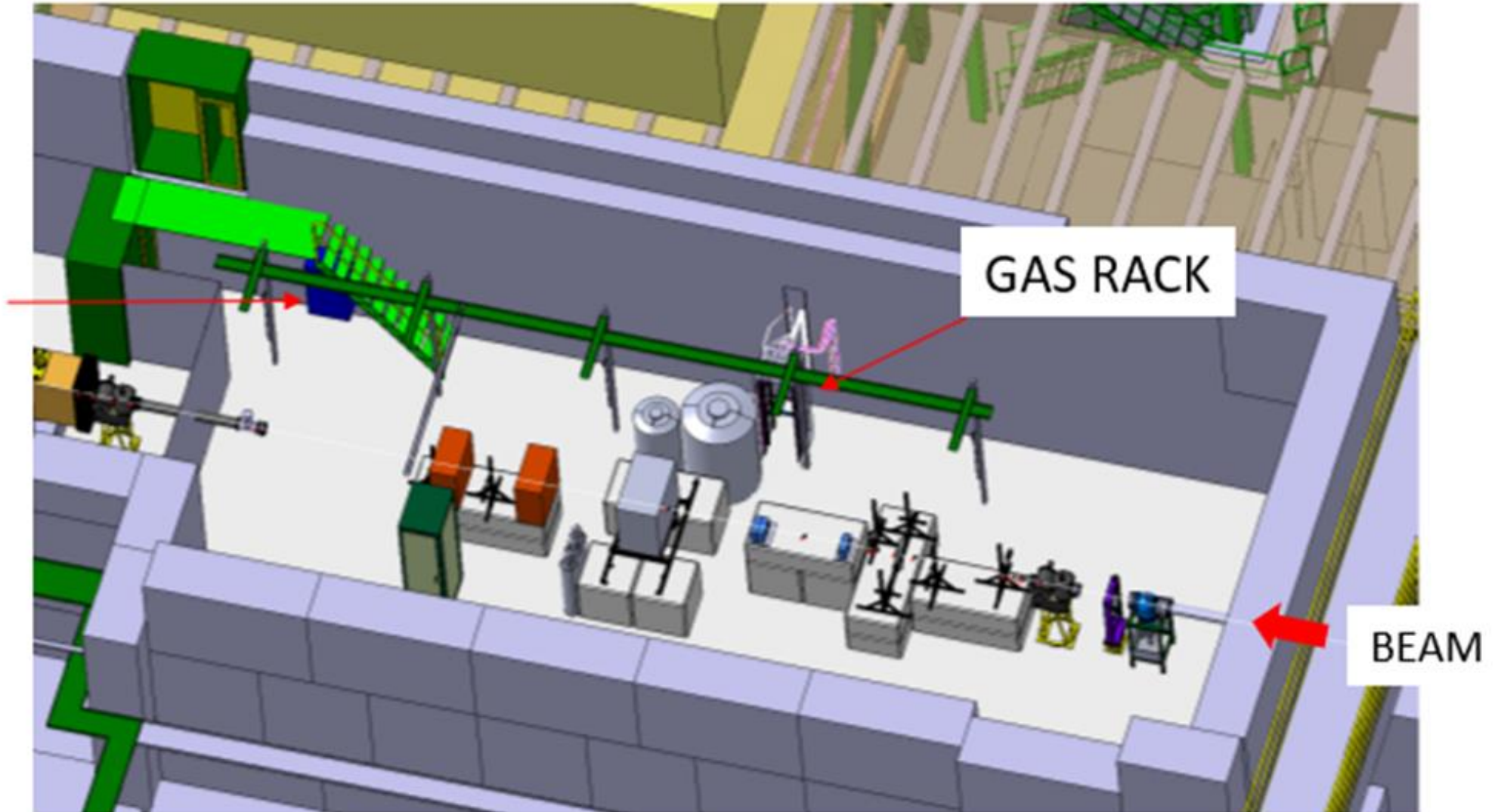


Equipment relocation



Drawings of our zone

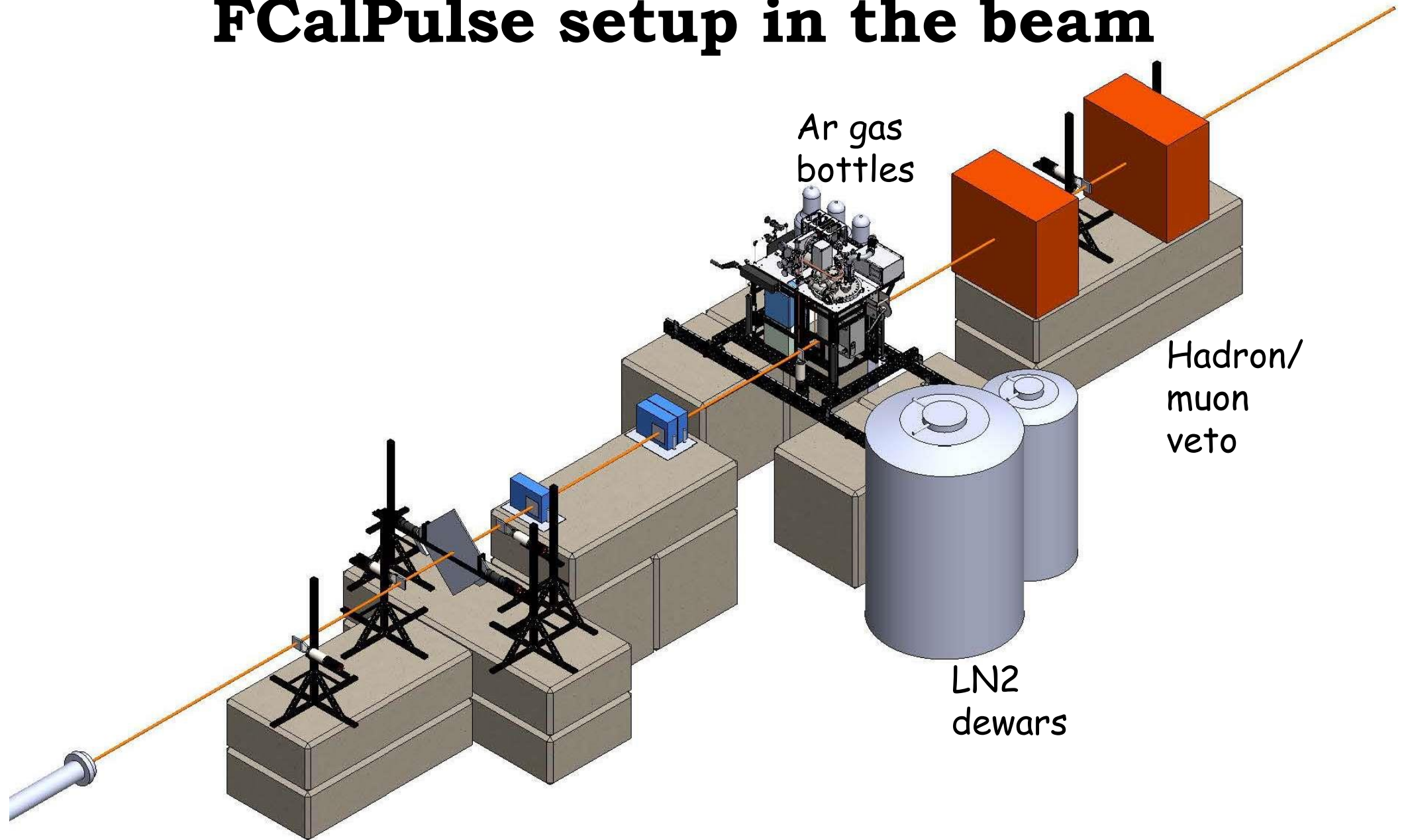
PATCH PANEL
SIGNAL



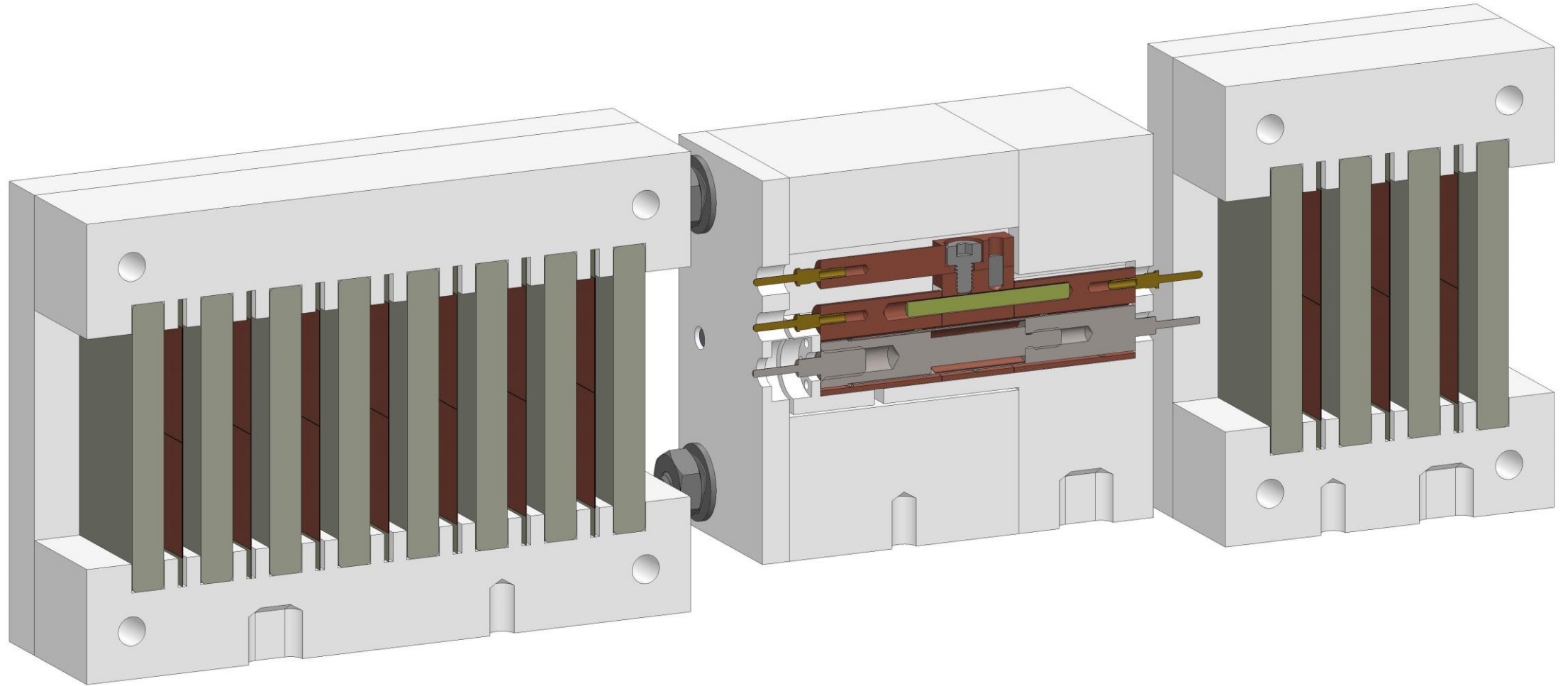
GAS RACK

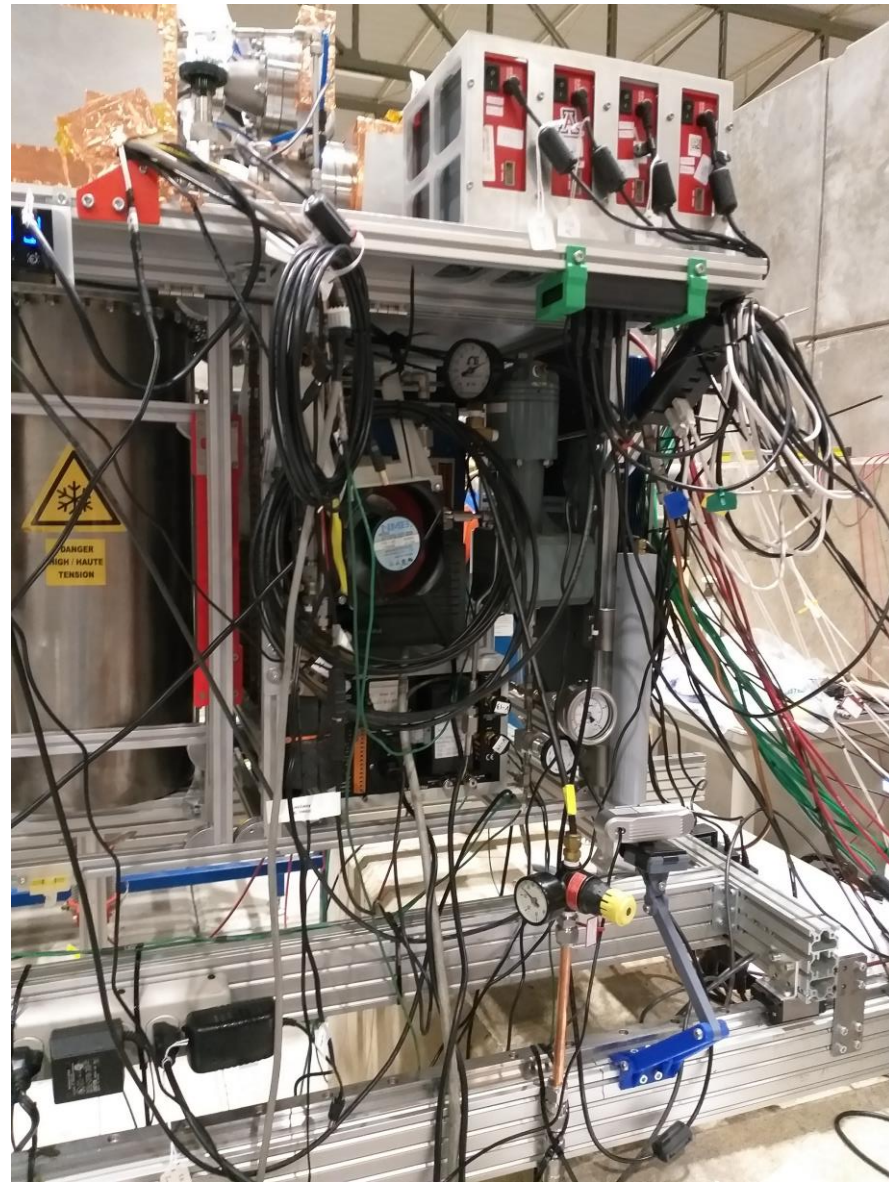
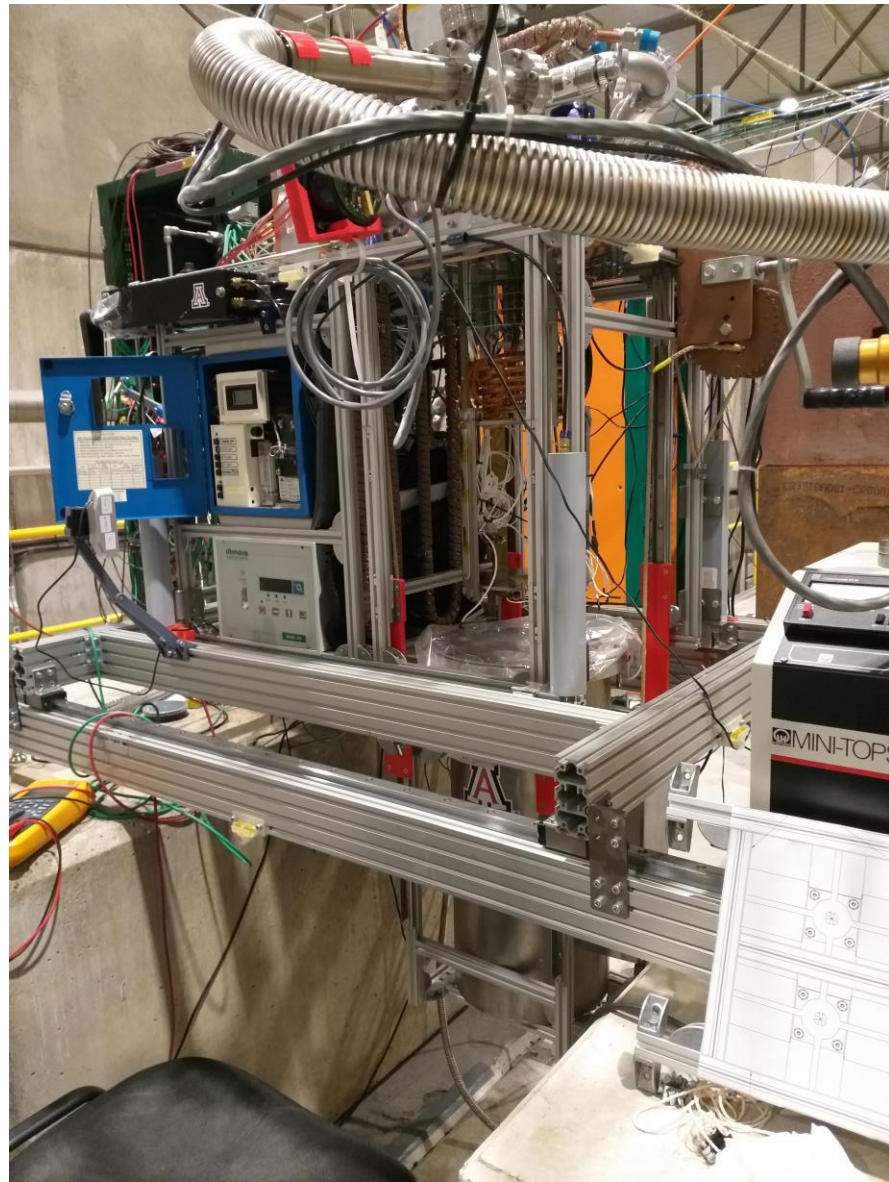
BEAM

FCalPulse setup in the beam

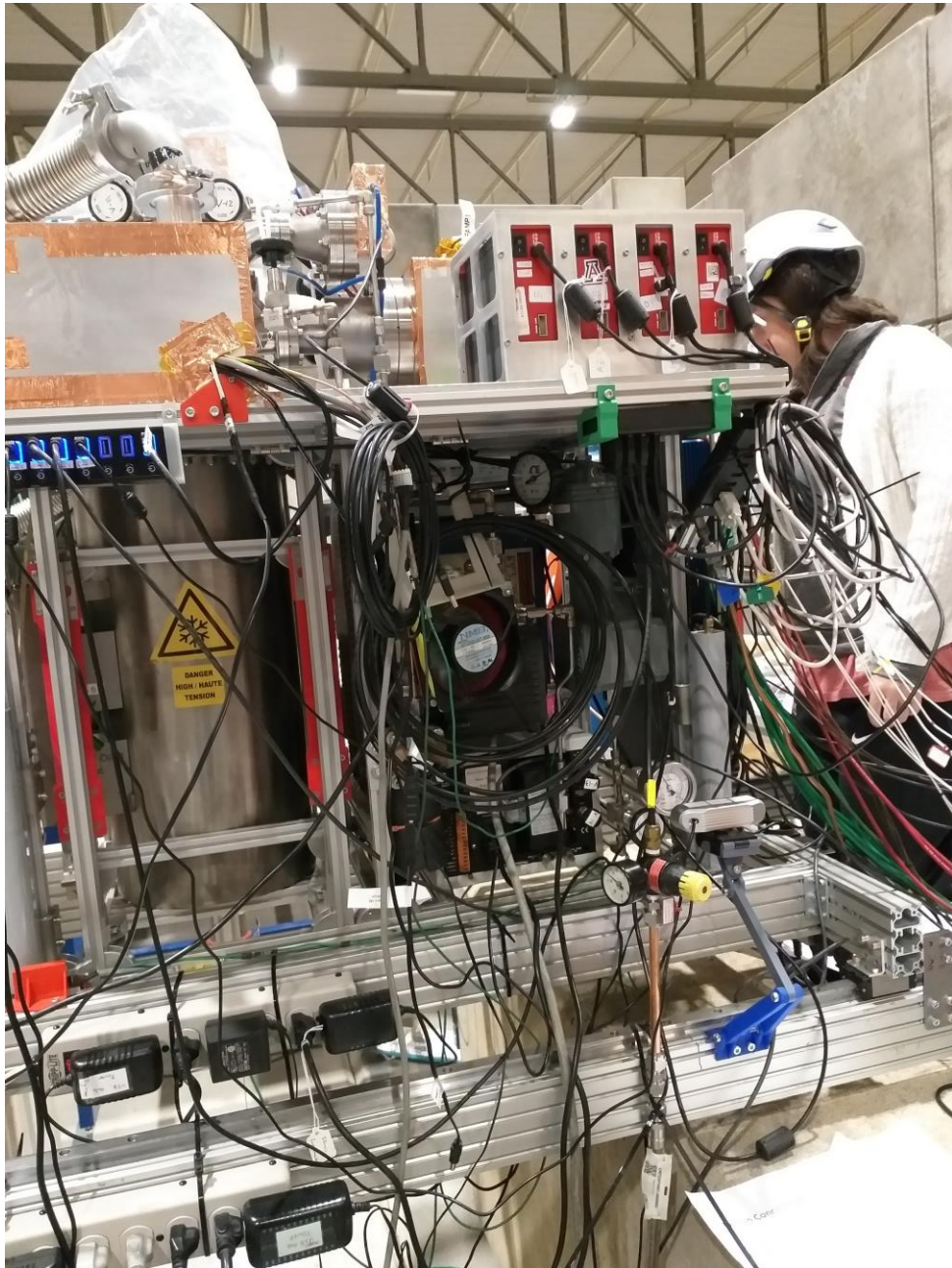


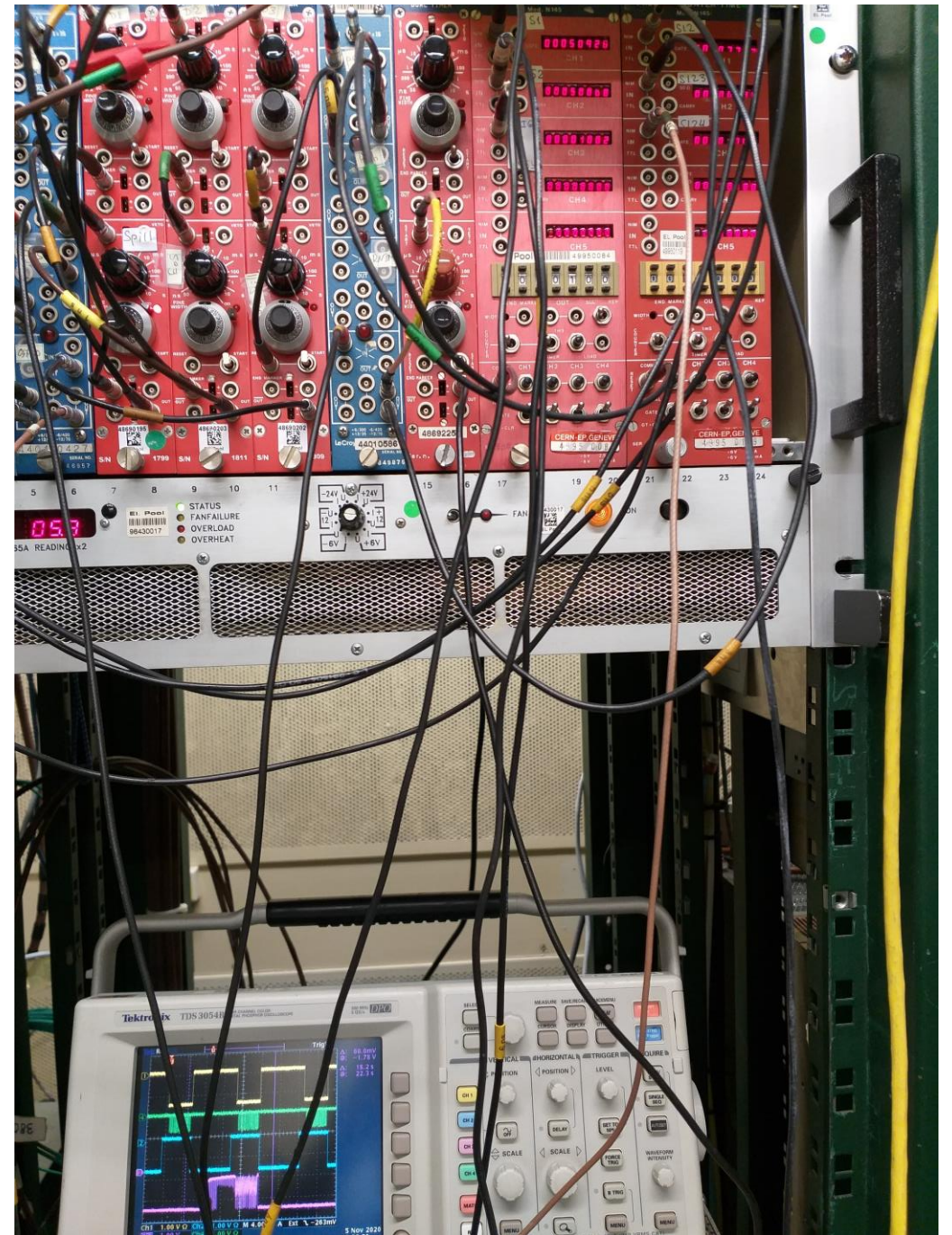
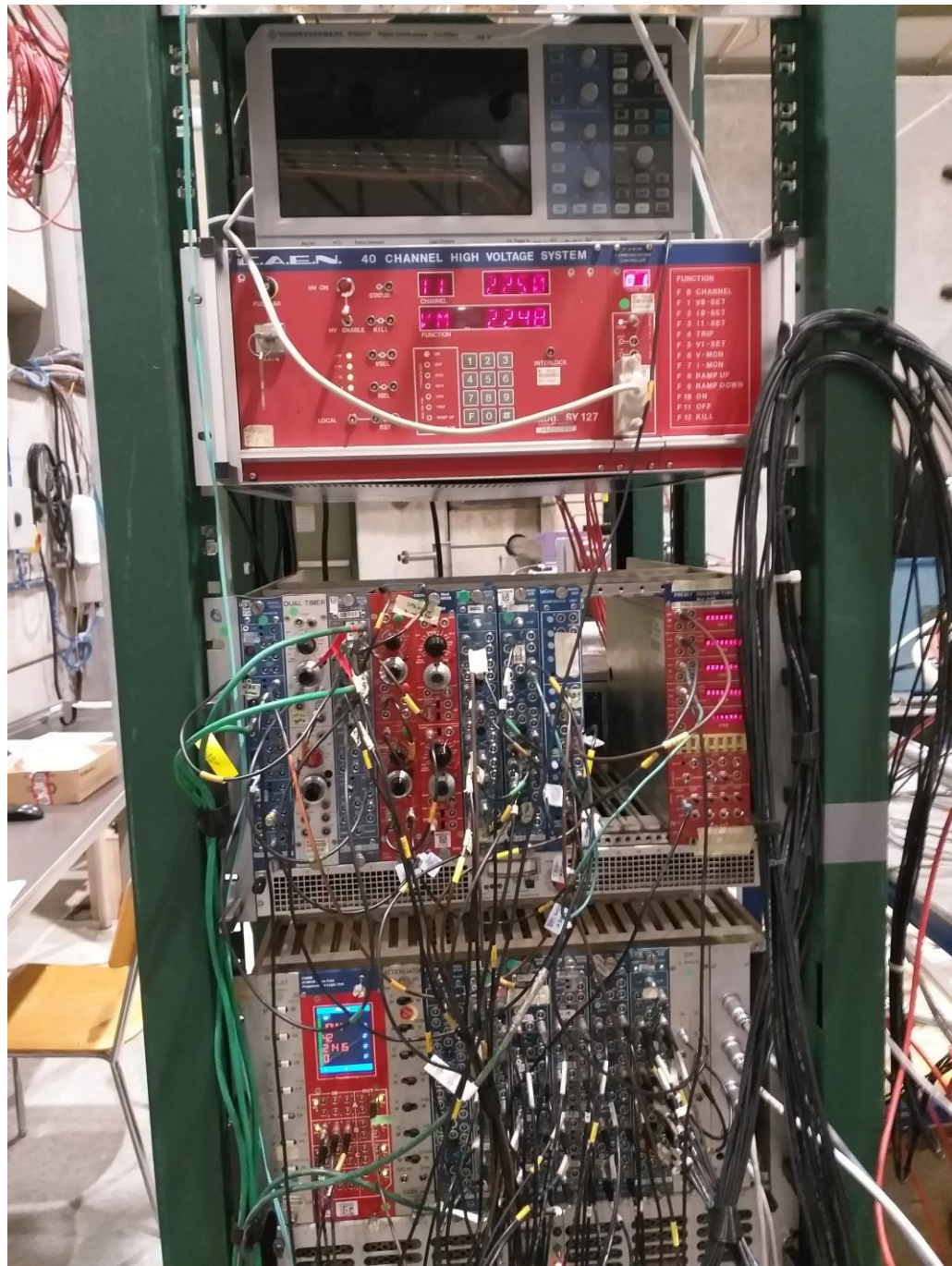
FCal and Shower Cal



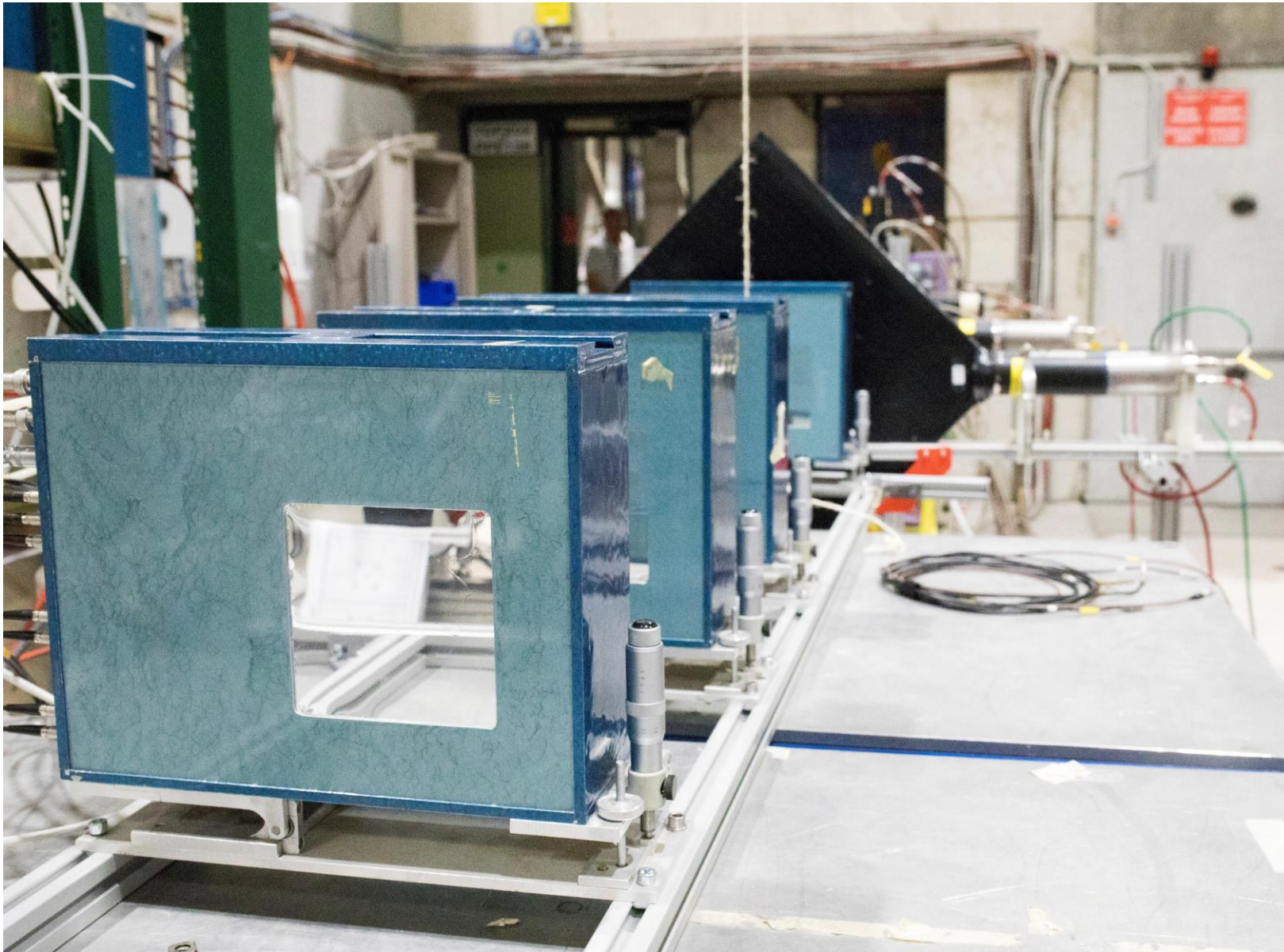








Digitizers



- 22 calorimeter channels
- Need 4 digitizers (8 channels)
- Record 16 channels

2022 Shift Schedule

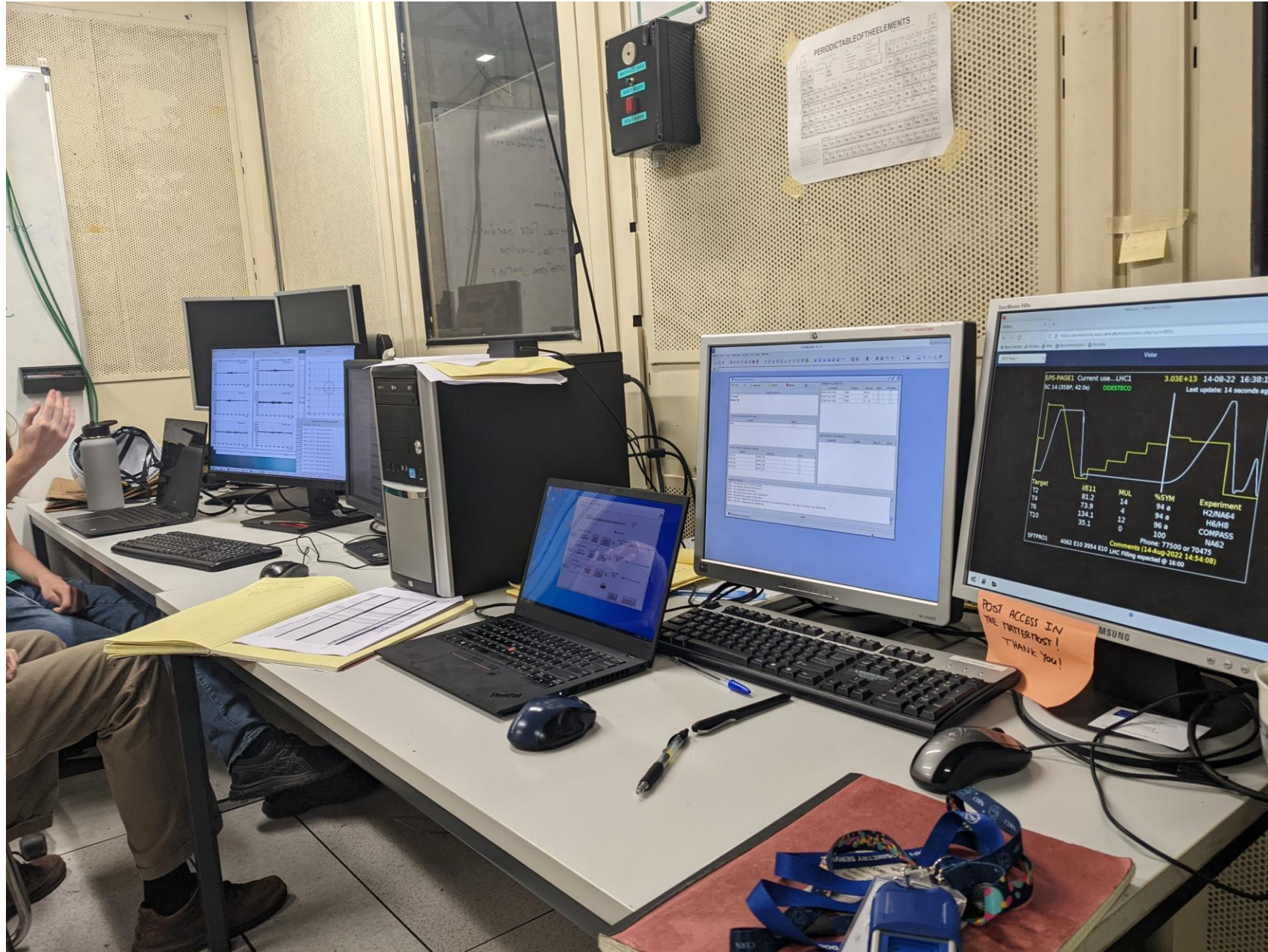
Test Beam 2022 Shift Schedule				
Day Shift (8:00 - 16:00)		Evening Shift (16:00 - 0:00)		Night Shift (0:00 - 8:00)
John		Erich		Grace
Graham		Sasha		Faig
Anindya				Munira
	Rob		Billie	
	8:00-20:00		20:00-8:00	

Petr is responsible for beam Chambers (BPC) digitizers.

Night shift crew



Control room



Run control, DAQ

The image shows a terminal window on a Linux system. The terminal output includes a warning about extra data from the BPC, system logs for digitizers, and a detailed log for FCP_DAQ 2.0.3. The log shows the connection of four CAEN digitizers and the BPC, with their respective release and build information. A DAQ control window is overlaid on the terminal, displaying 'Run 677 in progress: 787 triggers recorded' and various control buttons and options.

```
Warning: Extra data from BPC found at end of spill
Fri Aug 12 06:07:51 2022
Creating softll
ll18.root /home/
shifter@fcpdaq:/home/varnes/FCaIPulse/2022/production/fcalpulse/FCP_DAQ/src
shifter@fcpdaq:~$ [1]+ Done
shifter@fcpdaq:~$ [shifter@fcpdaq src]$ $(RUNDIR)/FCP_DAQ/src/FCP_DAQ
shifter@fcpdaq:~$ [shifter@fcpdaq src]$ [shifter@fcpdaq src]$
shifter@fcpdaq:~$ [shifter@fcpdaq src]$ start_FCP_DAQ
shifter@fcpdaq:~$ [shifter@fcpdaq src]$ Started spsSpill.py
shifter@fcpdaq:~$ [shifter@fcpdaq src]$ nopenhup: appending output to '/home/shifter/nopenhup.out'
shifter@fcpdaq:~$ [shifter@fcpdaq src]$ ControlHost dispatcher started OK
shifter@fcpdaq:~$ [shifter@fcpdaq src]$ spsSpill.py started OK
shifter@fcpdaq:~$ [shifter@fcpdaq src]$ Started spsSpill.py
shifter@fcpdaq:~$ [shifter@fcpdaq src]$ nopenhup: appending output to '/home/shifter/nopenhup.out'
shifter@fcpdaq:~$ [shifter@fcpdaq src]$ ControlHost dispatcher started OK
shifter@fcpdaq:~$ [shifter@fcpdaq src]$ spsSpill.py started OK
Pattern not found
.....
FCP_DAQ 2.0.3
.....
(FCP_DAQ:28458): Glib-GIO-CRITICAL **: 06:23:31.647: g_dbus_proxy
rtion 'G_IS_DBUS_CONNECTION (connection)' failed
handle = 0
Connected to CAEN Digitizer Model DT5730B
ROC FPGA Release is 04.11 - Build 0512
AMC FPGA Release is 00.06 - Build 0401
Serial Number is 1502
handle = 1
Connected to CAEN Digitizer Model DT5730B
ROC FPGA Release is 04.16 - Build 1720
AMC FPGA Release is 00.07 - Build 1901
Serial Number is 1756
handle = 2
Connected to CAEN Digitizer Model DT5730SB
ROC FPGA Release is 04.23 - Build 4806
AMC FPGA Release is 00.02 - Build 4922
Serial Number is 14028
handle = 3
Connected to CAEN Digitizer Model DT5730SB
ROC FPGA Release is 04.23 - Build 4806
AMC FPGA Release is 00.02 - Build 4922
Serial Number is 14018
ACK from BPC received: BPC SoR 677
```

The image shows the FCP_DAQ control window. It displays the status of Run 1204, which has ended with 17986 triggers recorded. The beam status is off, and the disk space available is 167.74 Gb. The window includes buttons for Start run, Pause run, End run, and Exit. It also shows options for trigger scintillators (Small or Large) and ShCal HV polarity (Positive or Negative). A checkbox for 'Include tail veto in trigger' is checked. Below these options, there are seven horizontal bar charts showing the number of events in the last spill for digitizers 1, 2, 3, and 4, and for BPC events. Each chart shows a value of 1024 events.

FCP_DAQ (on fcpdaq.cern.ch)

Run 1204 ended: 17986 triggers recorded
Beam status: off
Sr90 in beam: no
Disk space available: 167.74 Gb

Start run Pause run End run Exit

Trigger scintillators to use: Small Large
What is the ShCal HV polarity? Positive Negative

Include tail veto in trigger

Events in last spill for digitizer 1 (SN 1502): 1024

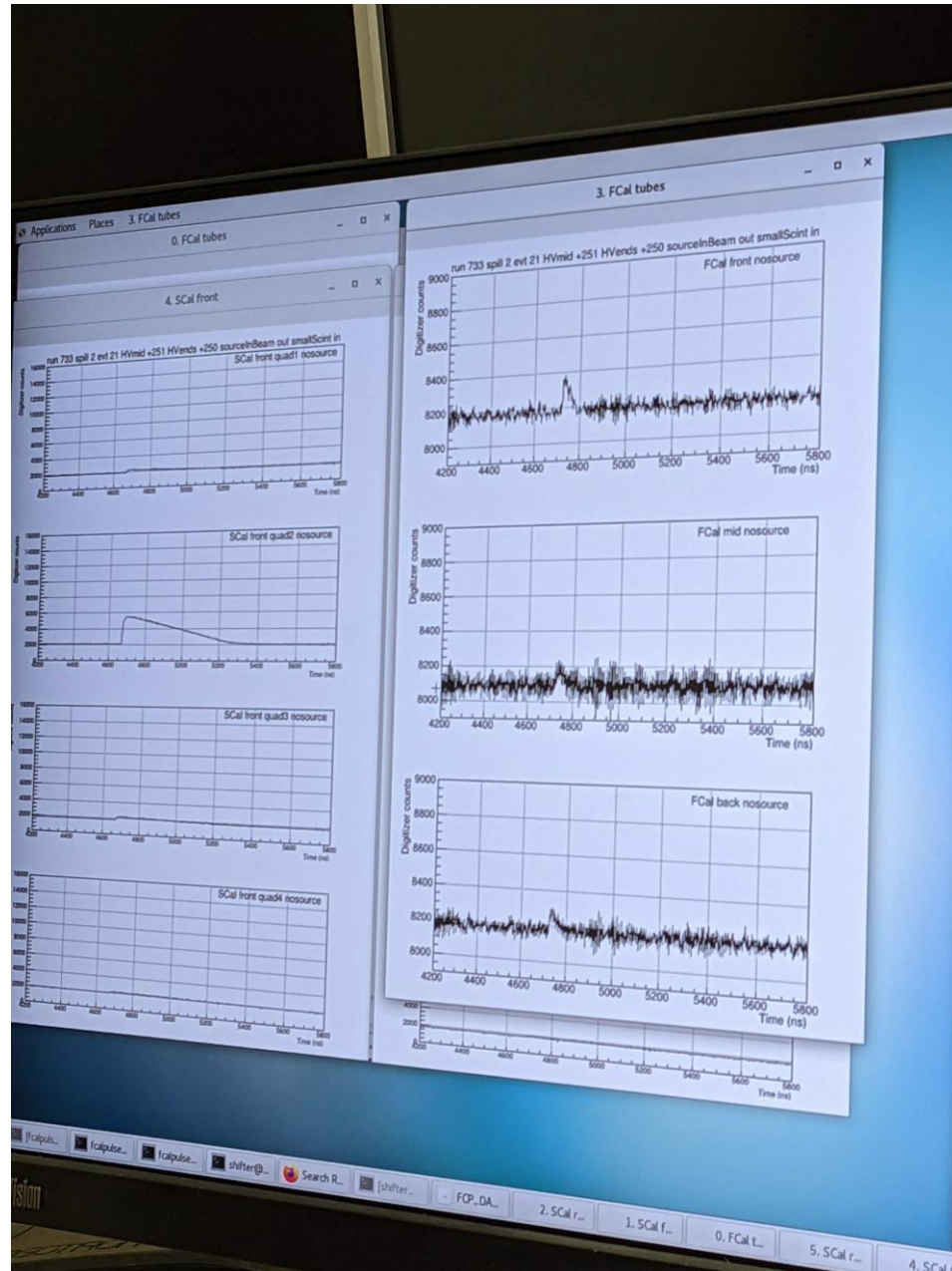
Events in last spill for digitizer 2 (SN 1756): 1024

Events in last spill for digitizer 3 (SN 14028): 1024

Events in last spill for digitizer 4 (SN 14018): 1024

BPC events in last spill: 1024

Check data



Run information

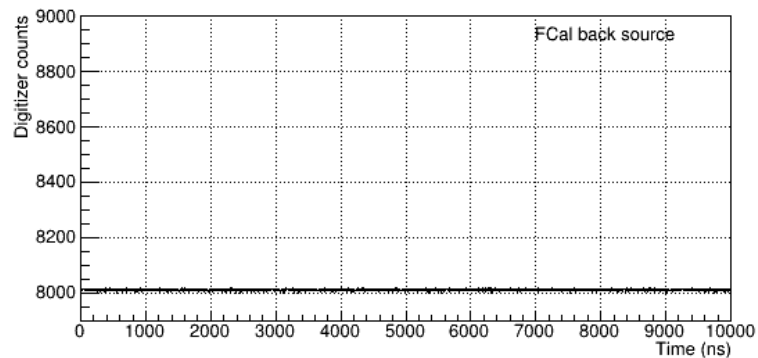
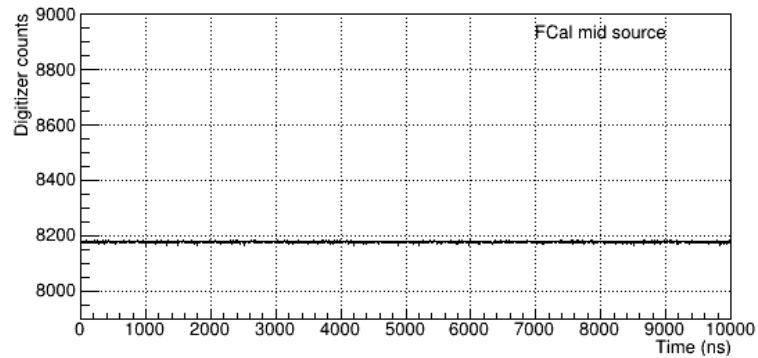
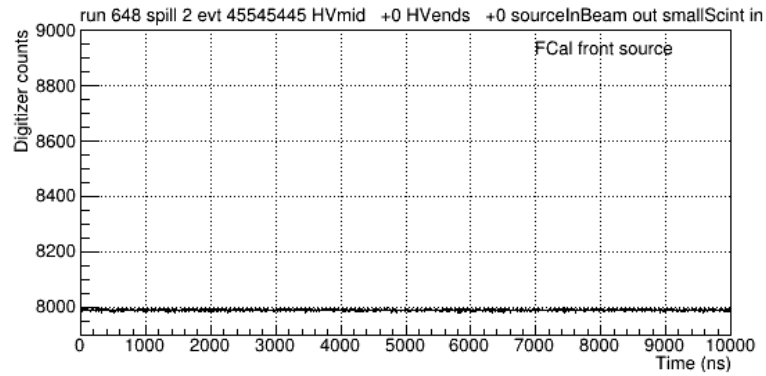
```
shifter@fcpdaq:/home/varnes/FCaIPulse/2022/production/fcalpulse/FCP_DAQ/src - □ ×
File Edit View Search Terminal Help
Error: HV settings changed during run. Was 19, now 20
Error: HV settings changed during run. Was 20, now 19
ACK from BPC received: BPC EoR 1024
ACK from BPC received: BPC SoR 1025
ACK from BPC received: BPC EoR 1025
ACK from BPC received: BPC SoR 1026
ACK from BPC received: BPC EoR 1026
ACK from BPC received: BPC SoR 1027
ACK from BPC received: BPC EoR 1027
ACK from BPC received: BPC SoR 1028
ACK from BPC received: BPC EoR 1028
ACK from BPC received: BPC SoR 1029
ACK from BPC received: BPC EoR 1029
ACK from BPC received: BPC SoR 1030
ACK from BPC received: BPC EoR 1030
ACK from BPC received: BPC SoR 1031
ACK from BPC received: BPC EoR 1031
ACK from BPC received: BPC SoR 1032
Warning: different numbers of events in BPC (1023) and digitizers (1024)
ACK from BPC received: BPC EoR 1032
ACK from BPC received: BPC SoR 1033
Warning: different numbers of events in BPC (1023) and digitizers (1024)
ACK from BPC received: BPC EoR 1033
ACK from BPC received: BPC SoR 1034
ACK from BPC received: BPC EoR 1034
ACK from BPC received: BPC SoR 1035
ACK from BPC received: BPC EoR 1035
ACK from BPC received: BPC SoR 1036
ACK from BPC received: BPC EoR 1036
ACK from BPC received: BPC SoR 1037
ACK from BPC received: BPC EoR 1037
ACK from BPC received: BPC SoR 1038
Warning: different numbers of events in BPC (1023) and digitizers (1024)
Warning: different numbers of events in BPC (1023) and digitizers (1024)
ACK from BPC received: BPC EoR 1038
ACK from BPC received: BPC SoR 1039
[shifter@fcpdaq src]$ ACK from BPC received: BPC EoR 1039
ACK from BPC received: BPC SoR 1040
ACK from BPC received: BPC EoR 1040
ACK from BPC received: BPC SoR 1041
ACK from BPC received: BPC EoR 1041
ACK from BPC received: BPC SoR 1042
Warning: different numbers of events in BPC (1025) and digitizers (1024)
ACK from BPC received: BPC EoR 1042
ACK from BPC received: BPC SoR 1043
Error: HV settings changed during run. Was 20, now 19
Error: HV settings changed during run. Was 19, now 20
Error: HV settings changed during run. Was 20, now 19
Error: HV settings changed during run. Was 19, now 20
ACK from BPC received: BPC EoR 1043
ACK from BPC received: BPC SoR 1044
```

```
BPC_DAQ with logging □ ×
File Edit View Search Terminal Help
main End spill 72 arrived, 543 triggers recorded
main Begin spill 73 arrived
main End spill 73 arrived, 0 triggers recorded
main Begin spill 74 arrived
Total of 1029.15s, 31000 events, 24212 trg, 6788 calib, 0 ped
main End spill 74 arrived, 562 triggers recorded
main Begin spill 75 arrived
main End spill 75 arrived, 0 triggers recorded
main Begin spill 76 arrived
Total of 1059.70s, 32000 events, 25022 trg, 6978 calib, 0 ped
main End spill 76 arrived, 569 triggers recorded
main Begin spill 77 arrived
main End spill 77 arrived, 0 triggers recorded
main Begin spill 78 arrived
Total of 1088.82s, 33000 events, 25834 trg, 7166 calib, 0 ped
main End spill 78 arrived, 807 triggers recorded
main Begin spill 79 arrived
main End spill 79 arrived, 0 triggers recorded
main Begin spill 80 arrived
Total of 1117.85s, 34000 events, 26645 trg, 7355 calib, 0 ped
main End spill 80 arrived, 838 triggers recorded
main Begin spill 81 arrived
main End spill 81 arrived, 0 triggers recorded

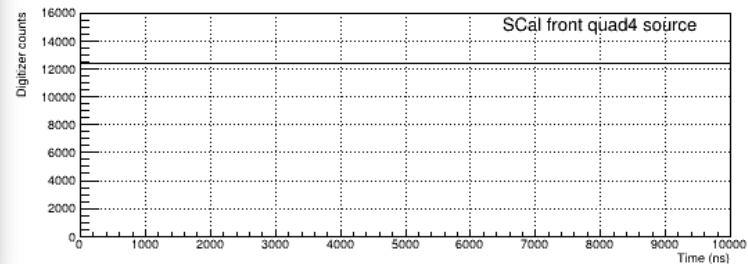
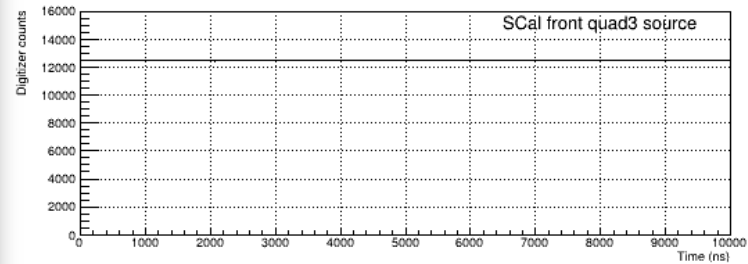
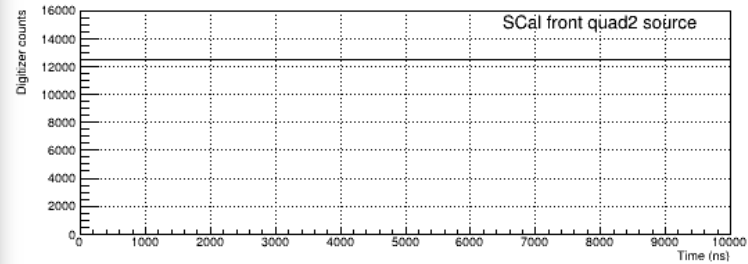
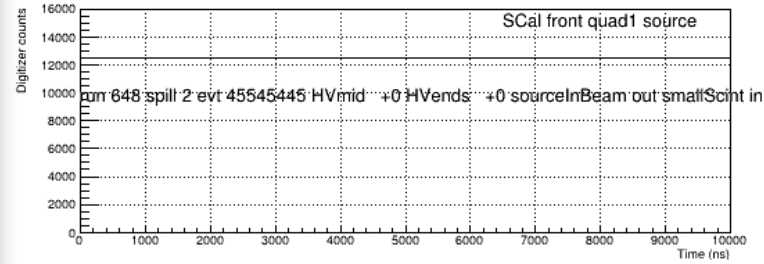
spy with logging □ ×
File Edit View Search Terminal Tabs Help
Recorder with logging × spy with logging × □ ×
15-Aug 01:02:23 received data tg=BPCDATA len=96 (2 frames)
15-Aug 01:02:38 received data tg=BPCDATA len=41232 (859 frames)
15-Aug 01:02:52 received data tg=BPCDATA len=96 (2 frames)
15-Aug 01:03:07 received data tg=BPCDATA len=39120 (815 frames)
15-Aug 01:03:21 received data tg=BPCDATA len=96 (2 frames)
15-Aug 01:03:35 received data tg=BPCDATA len=34368 (716 frames)
15-Aug 01:03:50 received data tg=BPCDATA len=96 (2 frames)
15-Aug 01:04:04 received data tg=BPCDATA len=28944 (603 frames)
15-Aug 01:04:19 received data tg=BPCDATA len=96 (2 frames)
15-Aug 01:04:33 received data tg=BPCDATA len=23808 (496 frames)
15-Aug 01:04:47 received data tg=BPCDATA len=96 (2 frames)
15-Aug 01:05:02 received data tg=BPCDATA len=22944 (478 frames)
15-Aug 01:05:16 received data tg=BPCDATA len=96 (2 frames)
15-Aug 01:05:31 received data tg=BPCDATA len=26160 (545 frames)
15-Aug 01:05:45 received data tg=BPCDATA len=96 (2 frames)
15-Aug 01:05:59 received data tg=BPCDATA len=27072 (564 frames)
15-Aug 01:06:14 received data tg=BPCDATA len=96 (2 frames)
15-Aug 01:06:28 received data tg=BPCDATA len=27408 (571 frames)
15-Aug 01:06:43 received data tg=BPCDATA len=96 (2 frames)
15-Aug 01:06:57 received data tg=BPCDATA len=38832 (809 frames)
15-Aug 01:07:11 received data tg=BPCDATA len=96 (2 frames)
15-Aug 01:07:26 received data tg=BPCDATA len=40320 (840 frames)
15-Aug 01:07:40 received data tg=BPCDATA len=96 (2 frames)
```


Some control plots (for Cal w/ source)

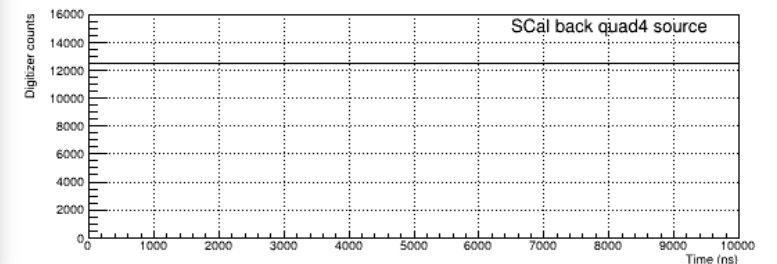
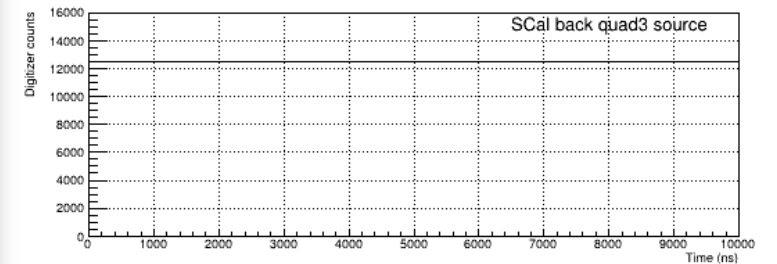
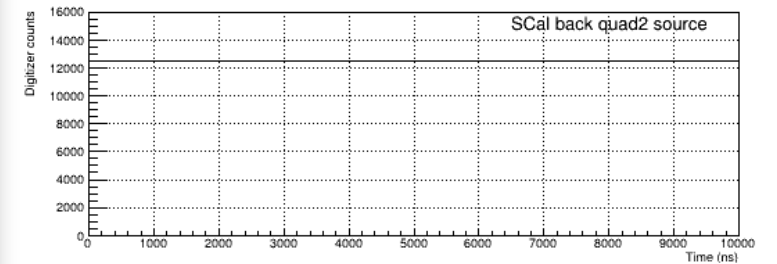
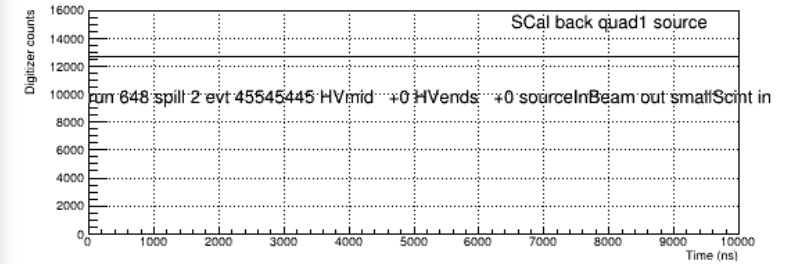
0. FCal tubes



1. SCal front

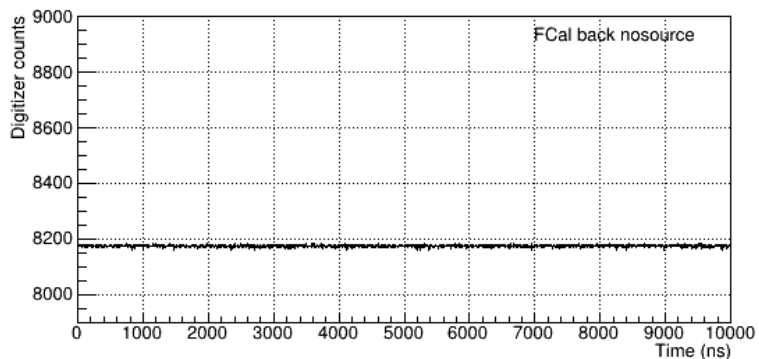
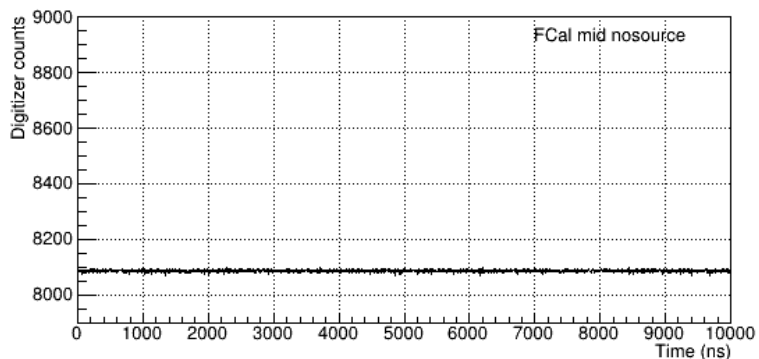
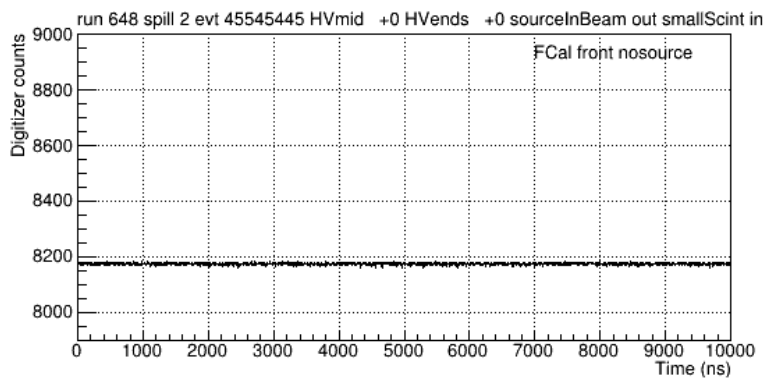


2. SCal rear

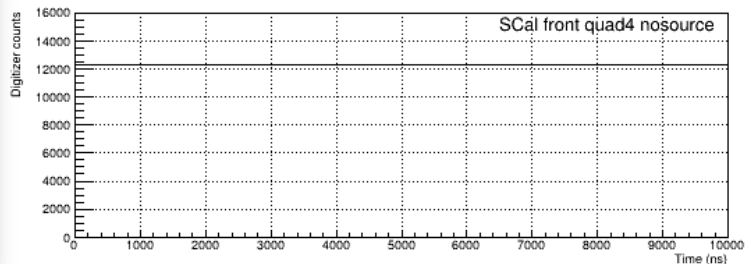
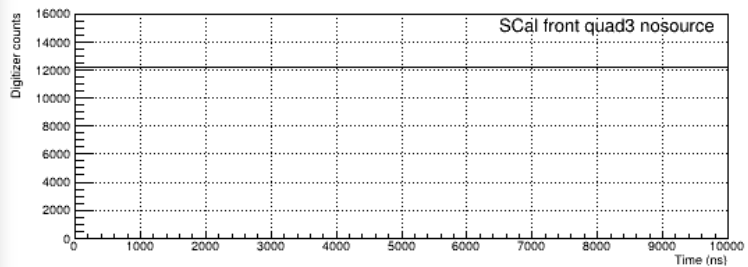
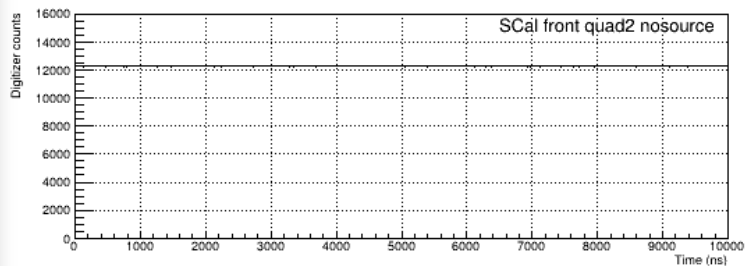
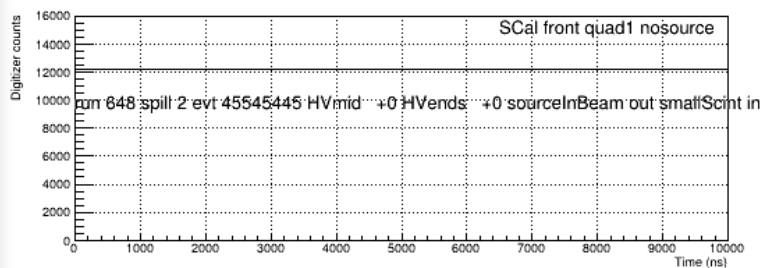


Some control plots (for Cal w/ no source)

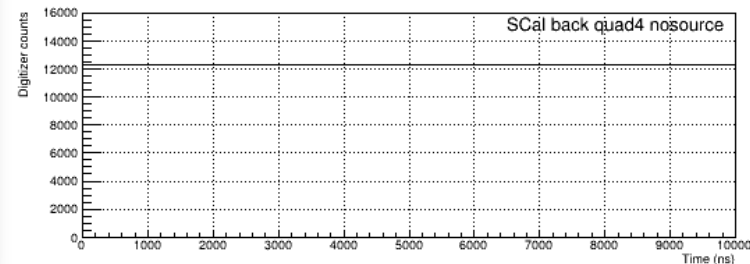
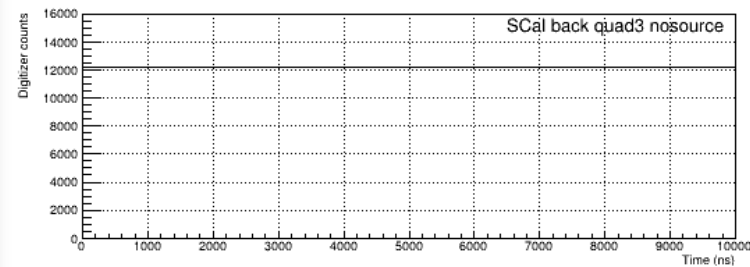
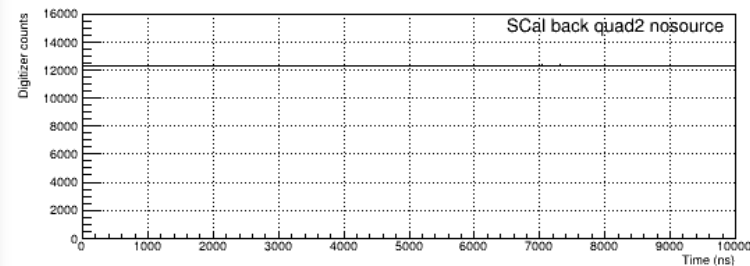
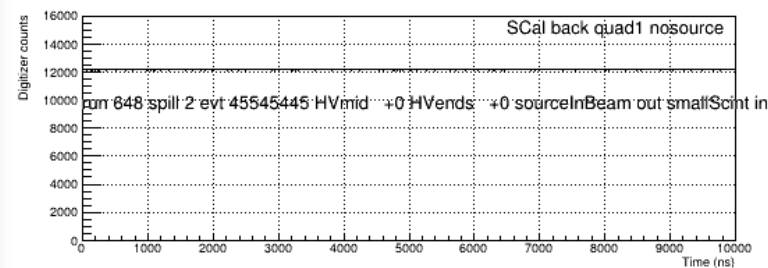
3. FCal tubes



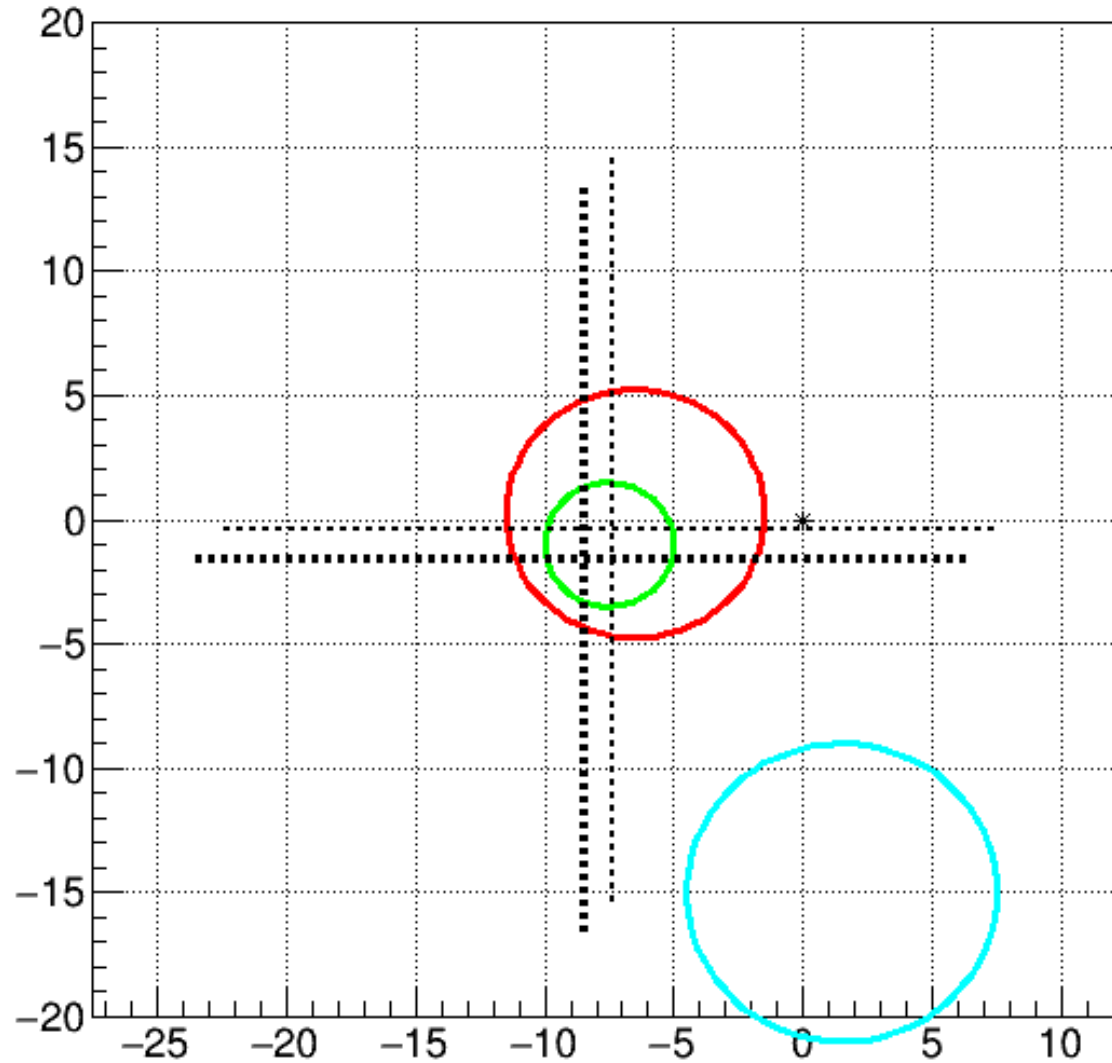
4. SCal front



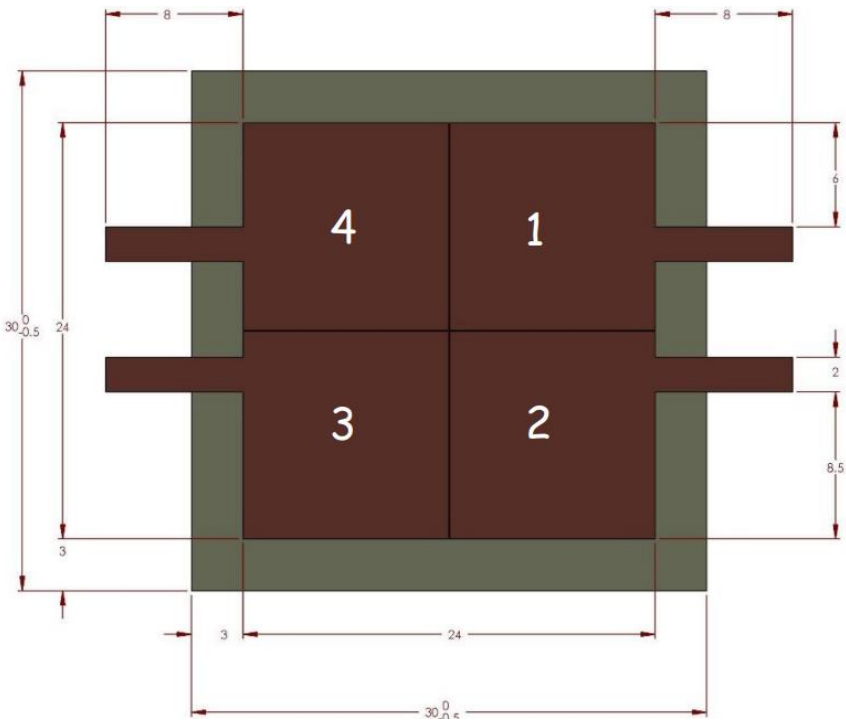
5. SCal rear



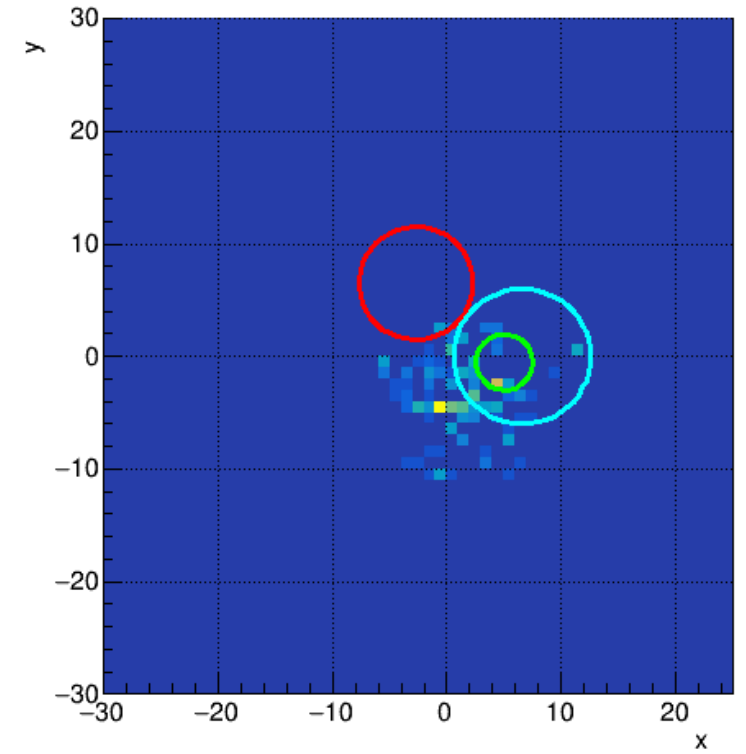
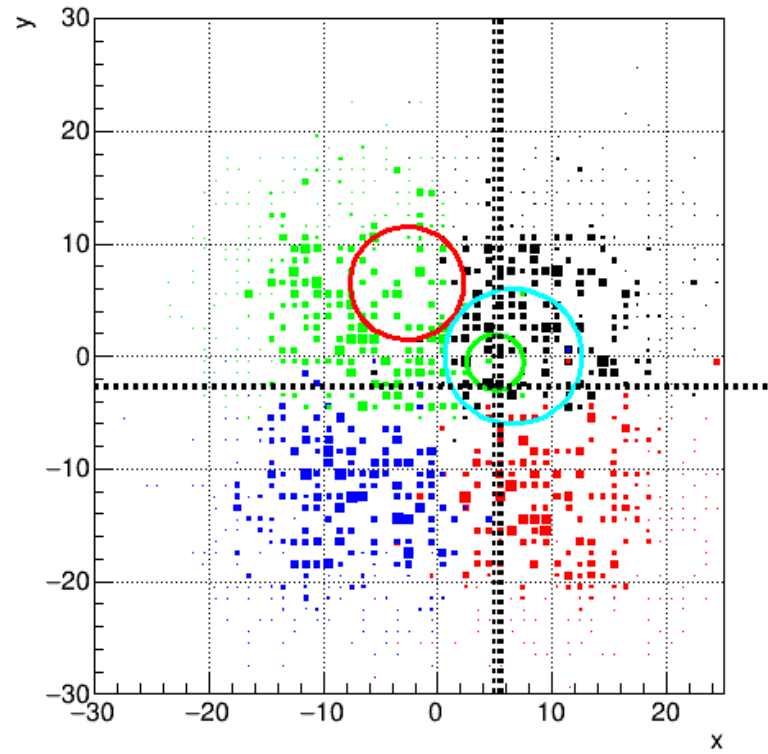
- Fcal sig.
- Shower Cal sig.
- Trigger sig.
- Hole Counter sig.



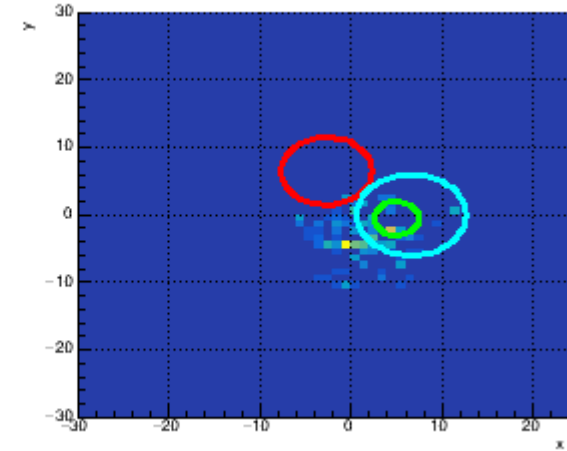
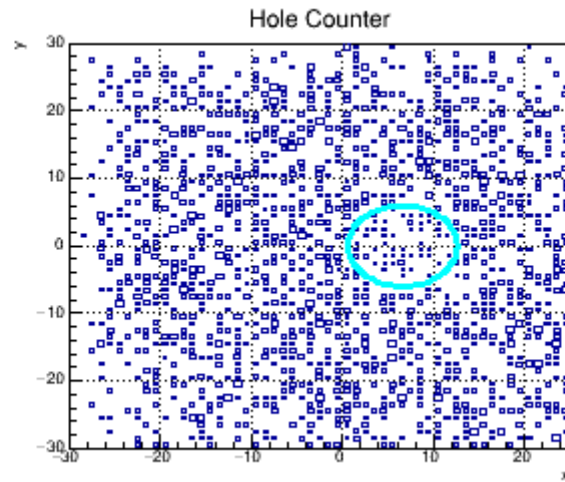
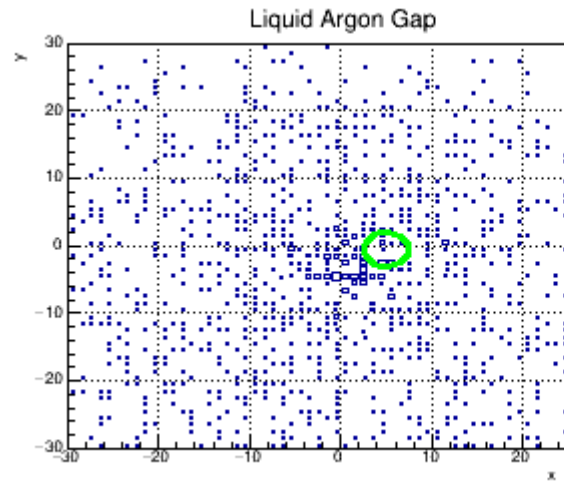
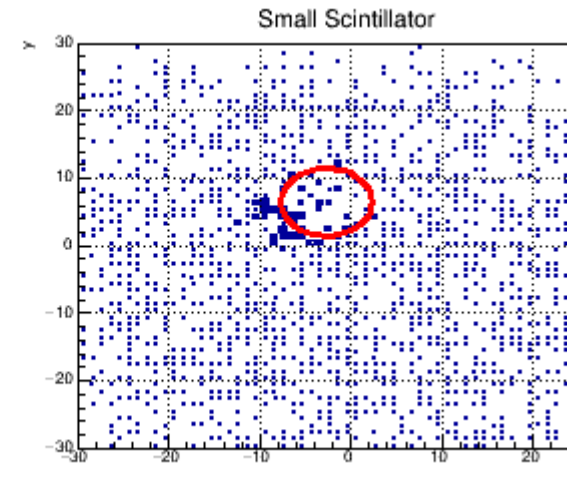
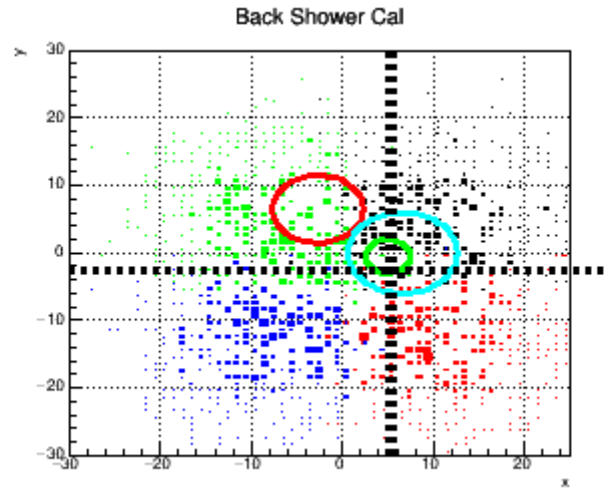
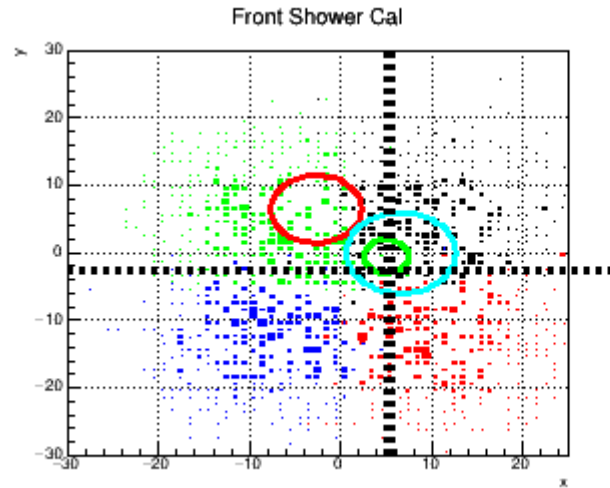
Shower Calorimeter Quadrants



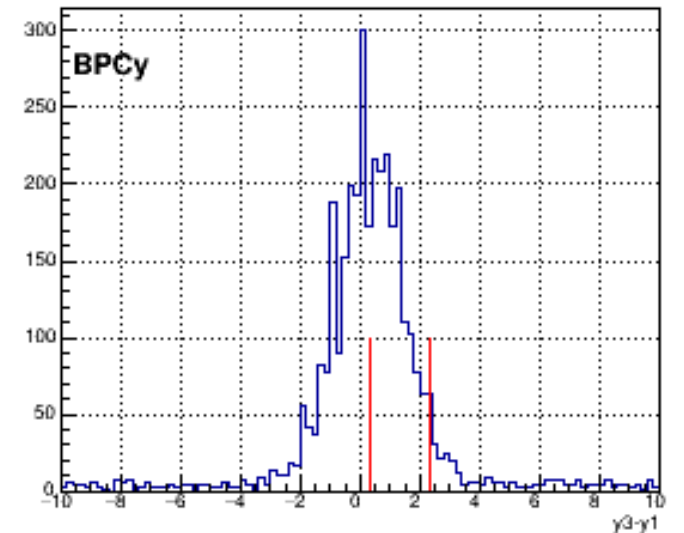
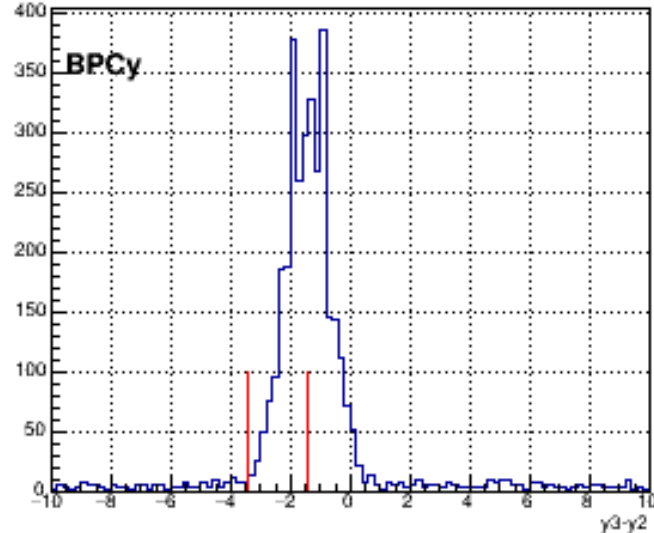
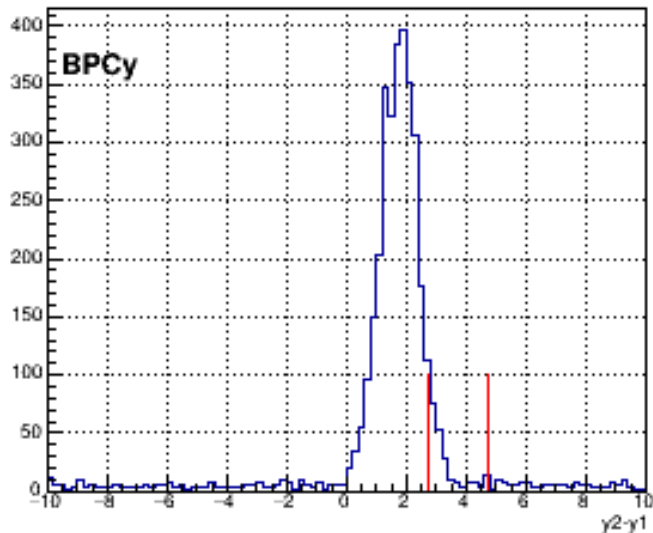
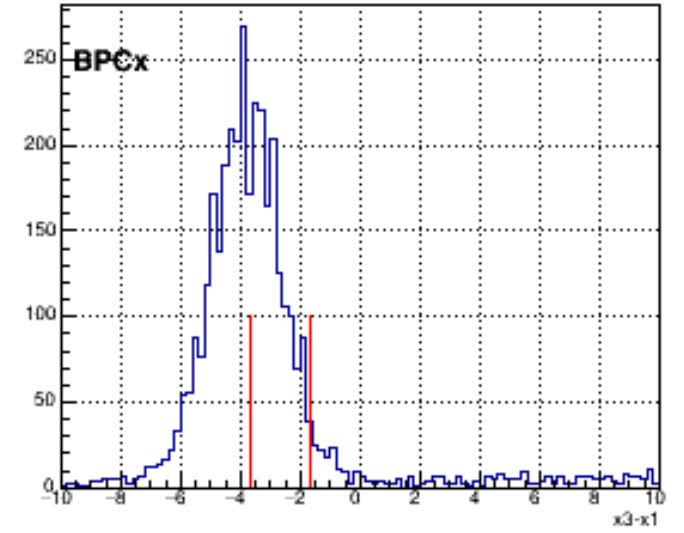
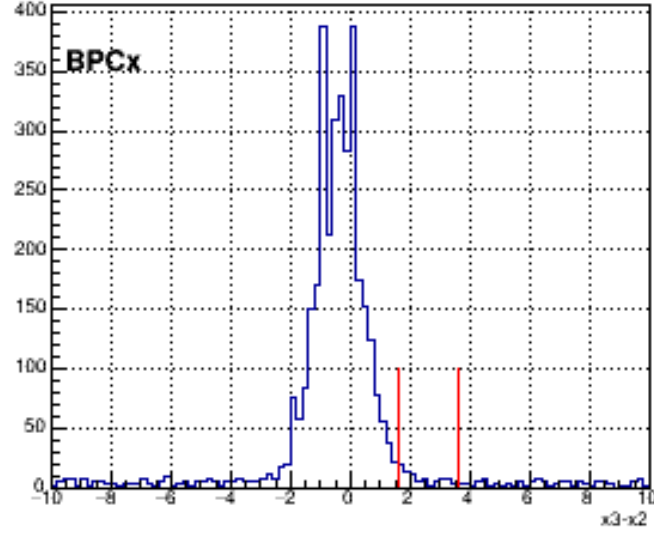
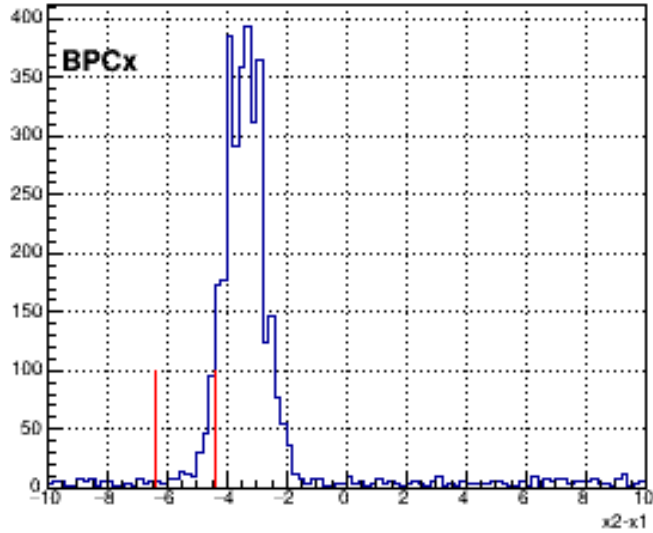
Front Shower Cal



Alignment from BPCs and digitizer data



Differences in x & y coordinates of the BPCs



Run control and data validation codes.

```
ssh -X fcalpulse@pcaz001
```

```
FCalPulse
```

```
    OnLineAnal20220724.C
```

```
gracenowak
```

```
    FCAnalysisTest4.C
```

```
monitoring (FCalPulse data)
```

```
    run648spill1.root
```

```
    run648spill2.root
```

```
.....
```