

INTT Commissioning Review

G. Nukazuka (RIKEN/RBRC)



Commissioning and Run 23

Commissioning Phase-III
Cosmic ray



Mar. 1st INTT Installation

Commissioning Phase-I
Calibration



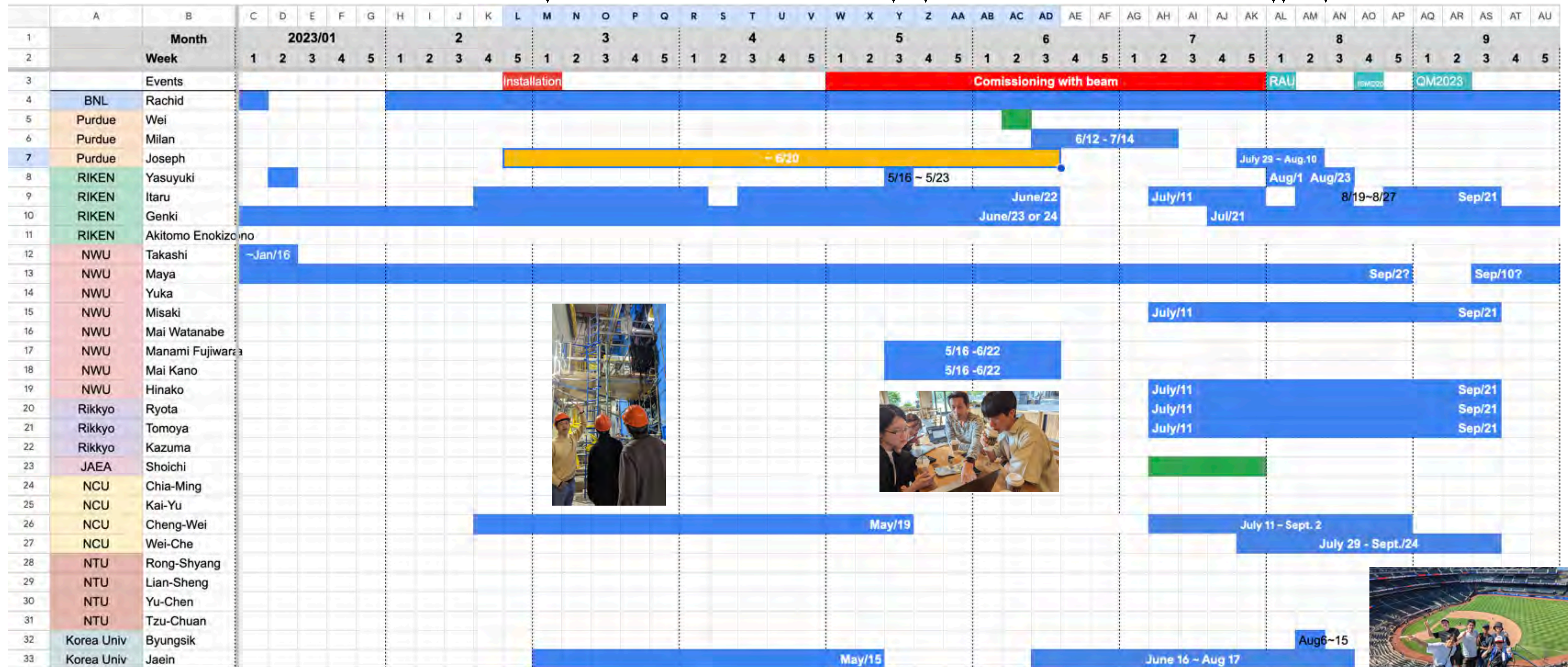
May 16 The first collision

May 25 Commissioning Phase-II
Beam

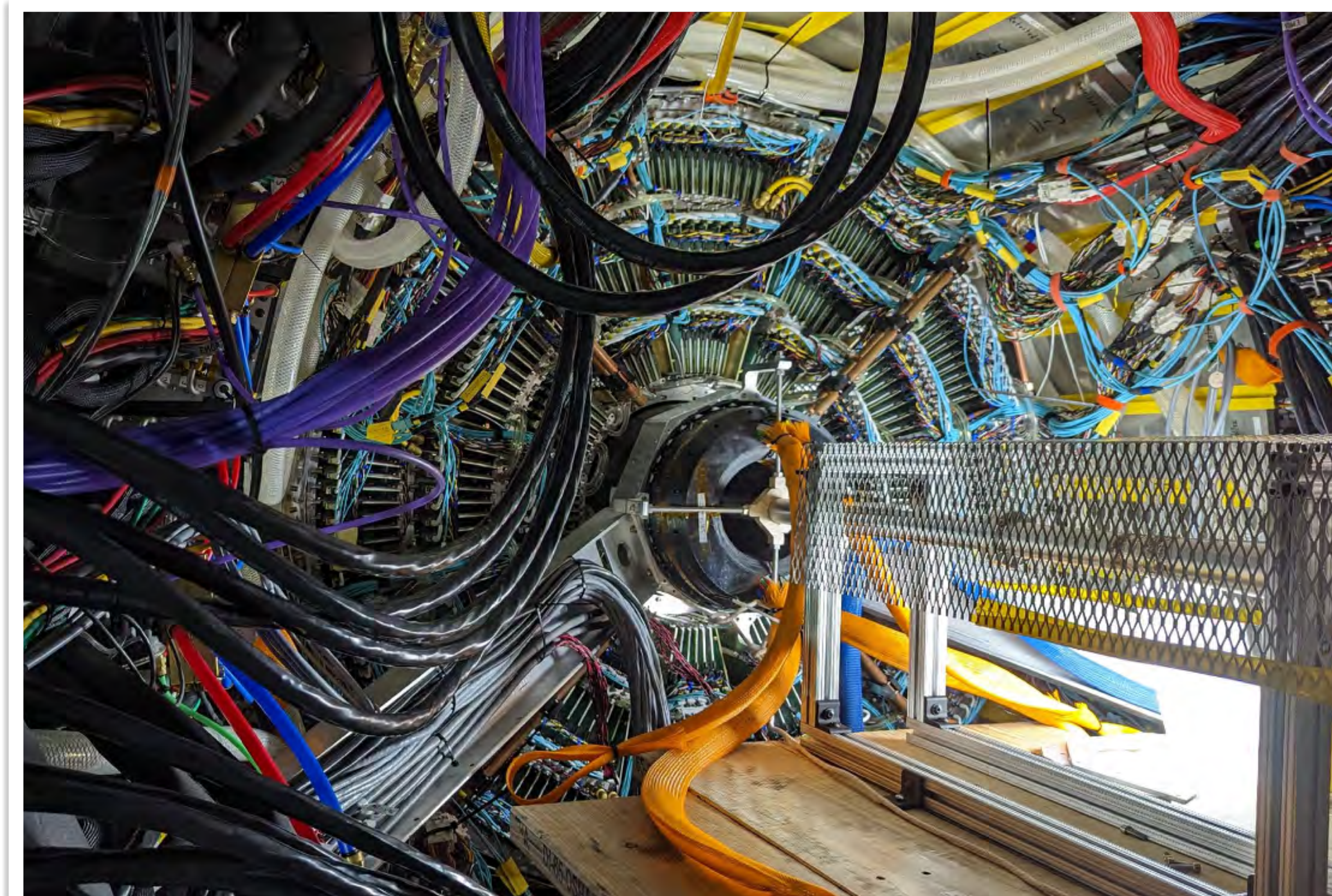


RHIC accident happen

Cosmic ray measurements started
sPHENIX magnet stopped (tbc)



Phase-I: View just after the installation



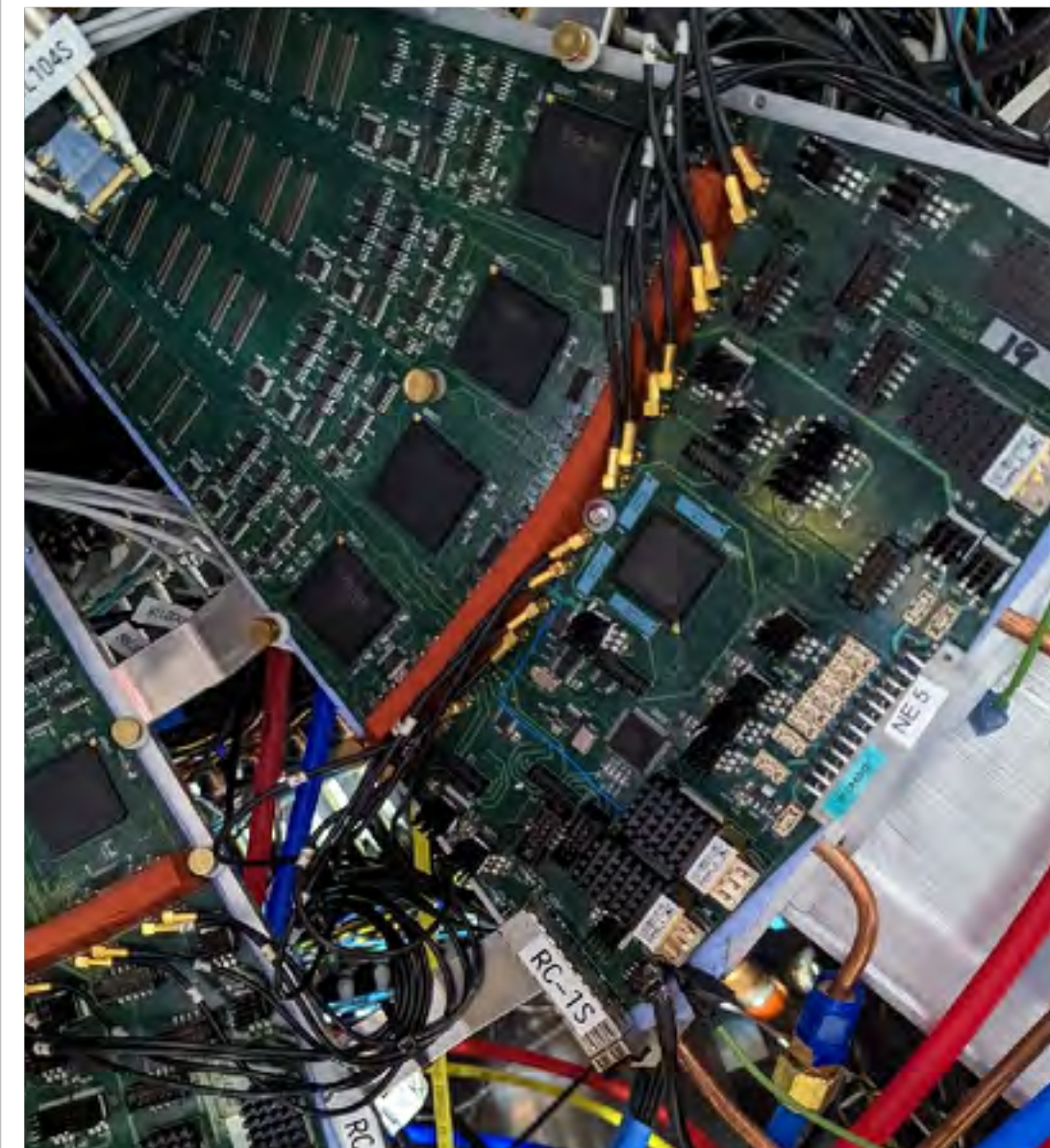
North just after installation

taken on Mar/1

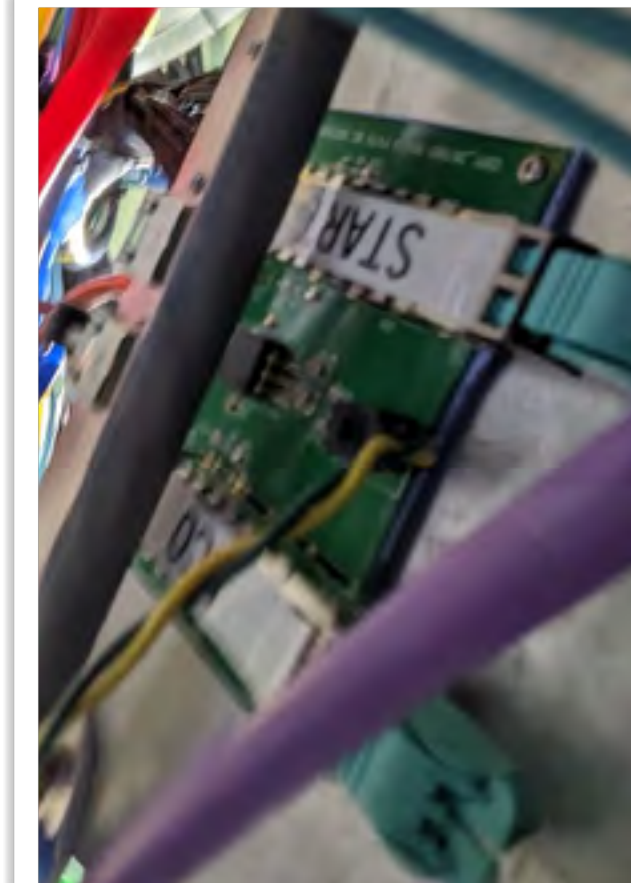
Phase-I: Cable Connections...



ROC power
16 cables



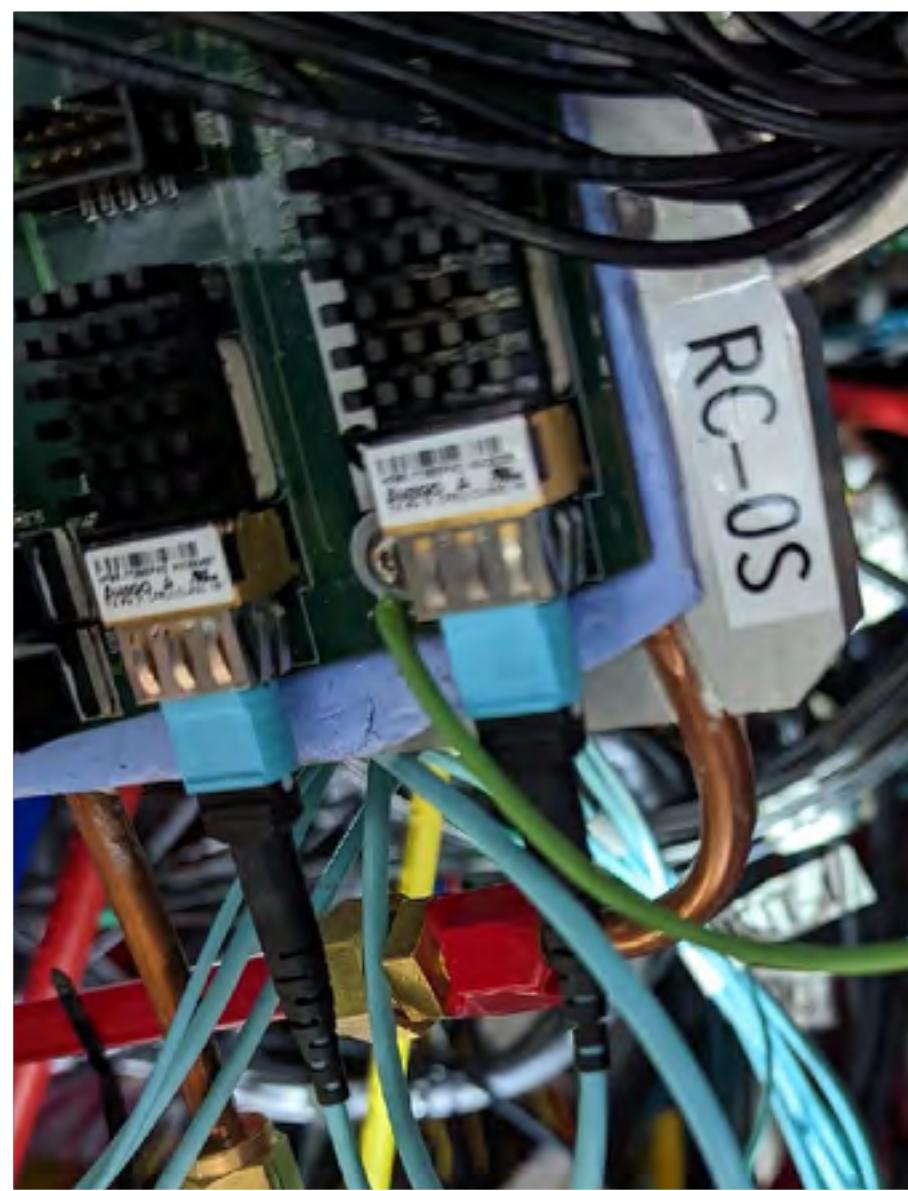
HV cables
 $112 \times 2 = 224$ cables



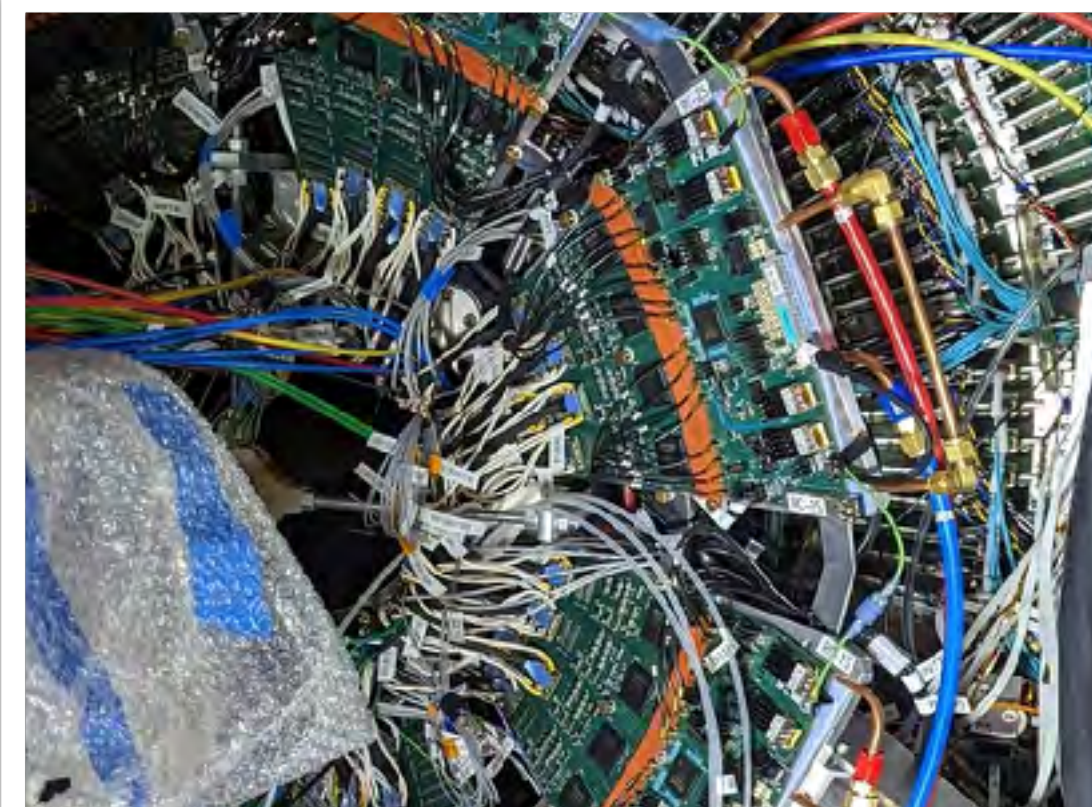
Clock fibers
 $3 \times 16 = 48$ cables



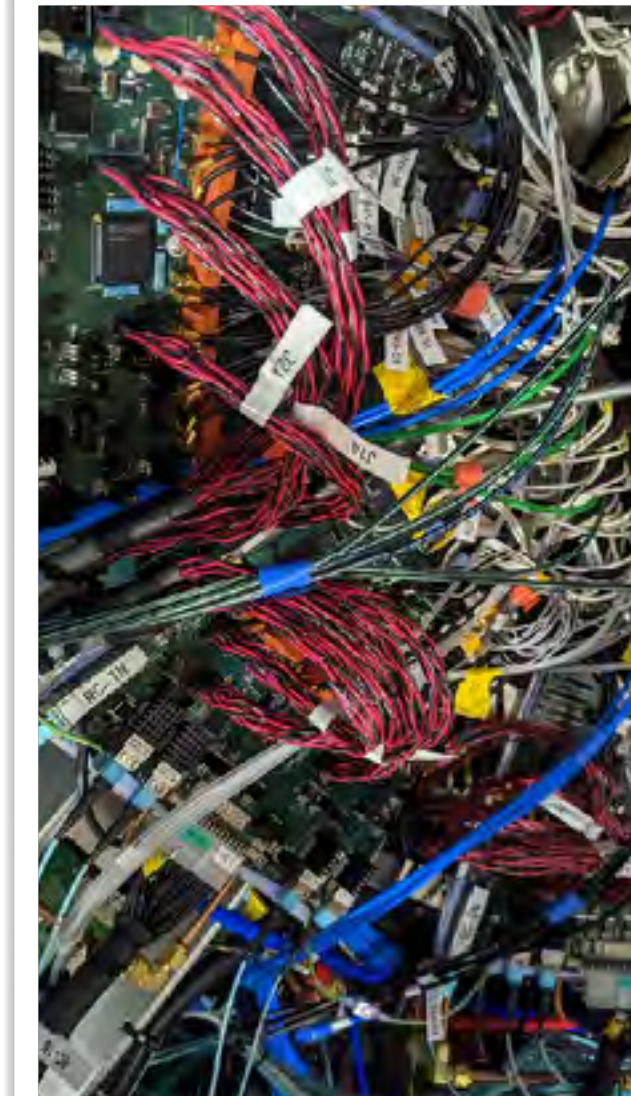
Thermistors
 $112 + 16 = 128$ cables



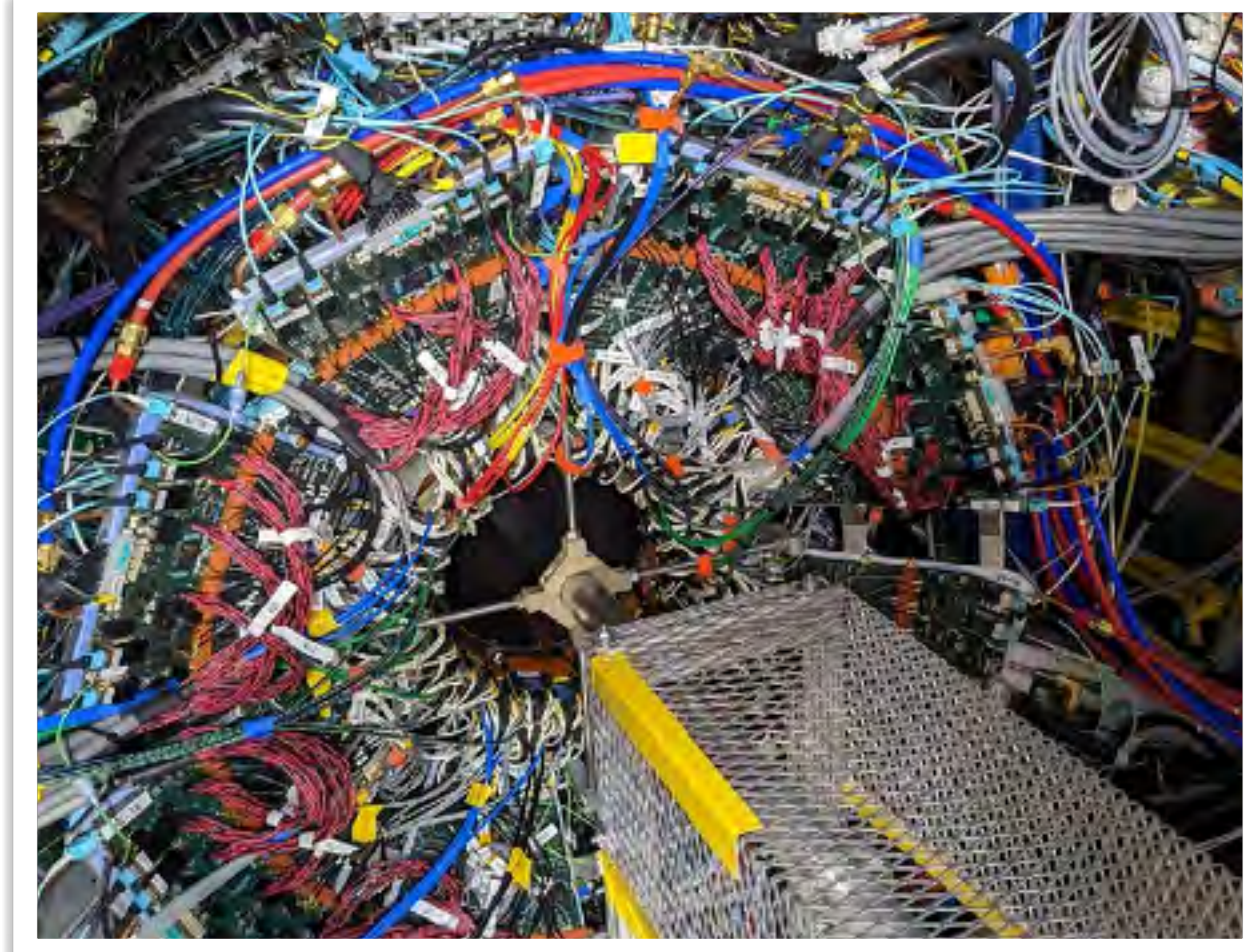
Slow Control
& Data fibers
 $(1 + 4) \times 16 = 80$ cables



Conversion Cables
112 cables



Ladder FPHX power
 $4 \times 16 = 64$ cables

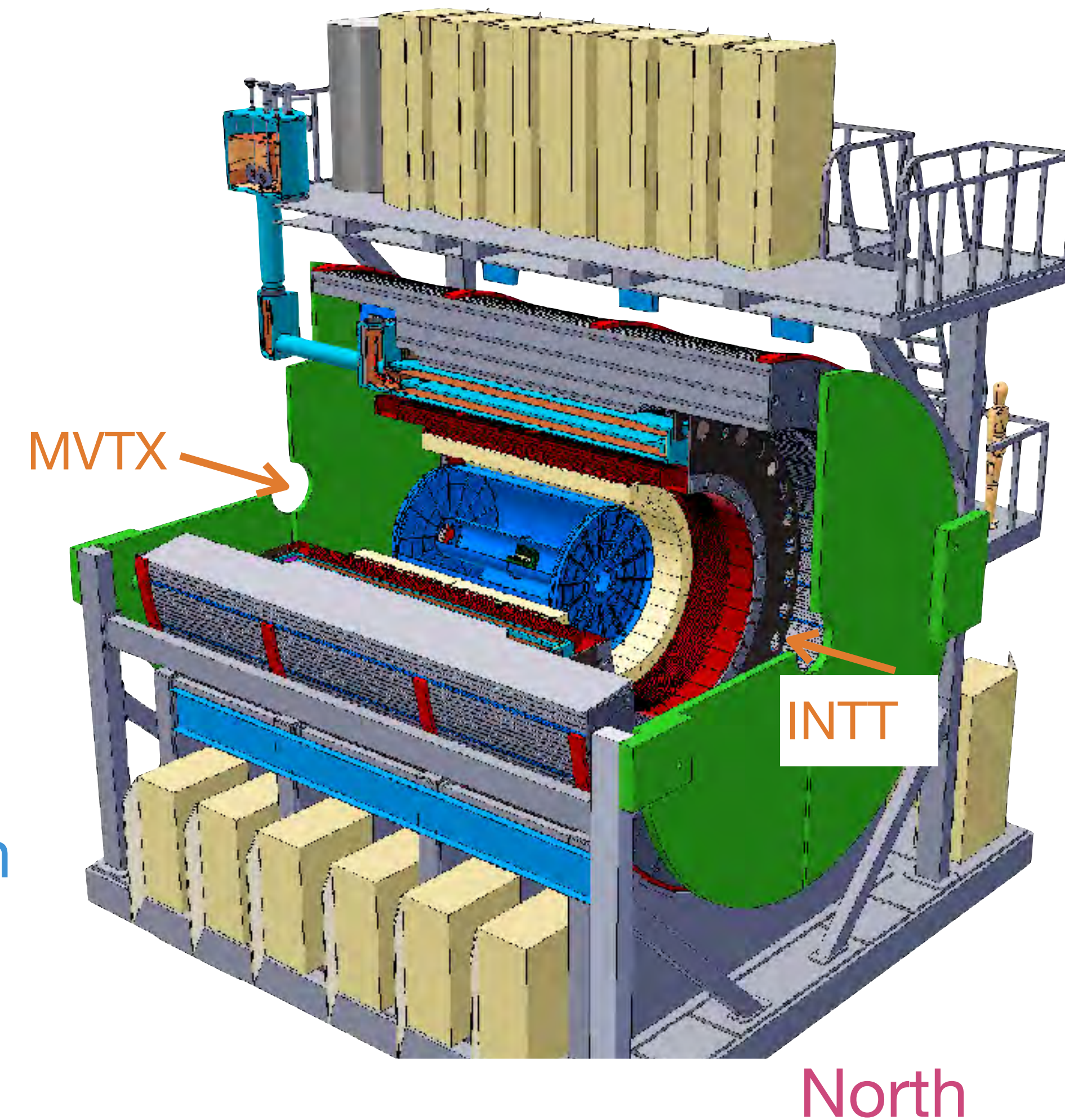


Cooling, Nitrogen, etc.

More than 700 connection points

Phase-I: The 1st Commissioning (—Mar. 31st)

- Calibration measurements of all ladders were started:
 - with **temporary equipment (ladder cooling, ROC cooling, DAQ)**
 - The final cooling systems for the ladder and ROC were installed.
 - from the South side for MVTX installation and testing on the North.
- Softwares for the commissioning were:
 - **Felix (Raul)**
: the developments were not completed, but it works well for the 1st commissioning.
 - **Low Voltage GUIs for ROC/ladder power (Mai, Maya, Wei-Che, and Jaein)**
: It worked well.
 - **High Voltage GUI for bias (Joseph)**
: It worked well. The mapping issues confused us but eventually solved.
 - **Felix DAQ GUI (Genki)**
: It worked well. Some more features are needed.
 - **Calibration database (Cheng-Wei)**
: It worked well if CW's hard care.
 - **Map generator (Cheng-Wei)**
: It worked well.



Phase-II: Commissioning With Beam

We started **commissioning with the beam on May 25**. Measurements were done **by RCDAQ with MBD trigger**. Detector configuration procedures were essentially the same as the current ones but done manually.

FPHX parameters were almost fixed. A higher DAC0 value of 23 was used in the beginning but 15 was used normally.

What we did in Phase-II was

- time-in (timing tune to measure particles from the collisions)
- parameter optimizations (L1Delay, n_collisions, modebits, open_time)
- DAC0 scan, DAC scan

Before the accident on the RHIC magnet, **we achieved stable operation of INTT** except for the chillers.

FPHX parameters

Parameter	Value	Parameter	Value
Vref	1	N1sel	6
DAC0	15 or 23	N2sel	4
DAC1	30	FB1sel	4
DAC2	60	Leaksel	0
DAC3	90	P3sel	0
DAC4	120	P2sel	4
DAC5	150	Gsel	2
DAC6	180	BWsel	8
DAC7	210	P1sel	5
		Injsel	0
		LVDS	63

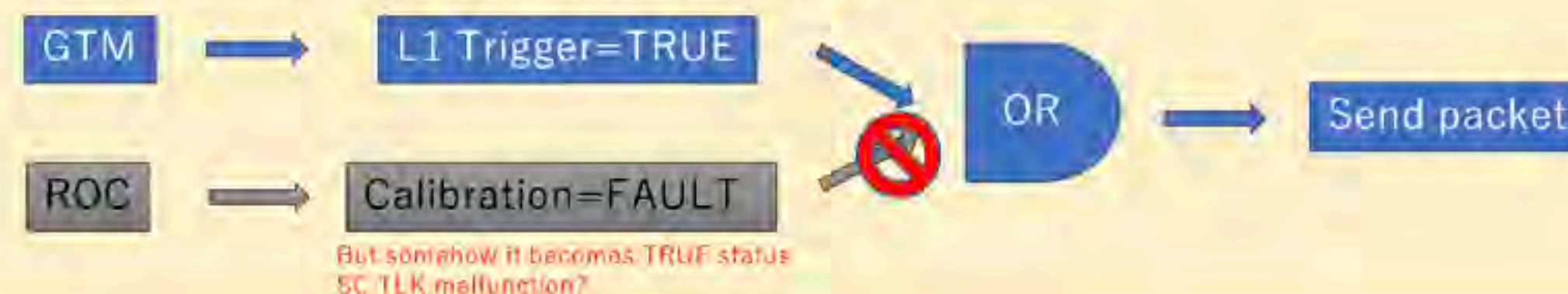
Phase-II: Commissioning With Beam

A) Triggerless Symptom Issue

Raul

- Intt1 has been barely operational since it tends to become triggerless (see below flow chart). Noisy condition of intt1 server has been a suspect, but no obvious abnormal grounding was found by Rachid within 6/21 access.
- The same symptom appeared to intt0 on 6/22 and all ROCs in 6/29 owl shift.
- Raul implemented new firmware which disables the trigger thru SC link from ROC in intt1 on June 29th around 23o'clock.
- We should watch if intt1 won't gets exploded with the new firmware.
- The trade off is no calibration capability for these servers.

"Triggerless Mechanism" in the present felix firmware



[Link](#)

The feature of calibration measurement was disabled. We have to get it back.

Phase-III: Commissioning With Cosmic Ray

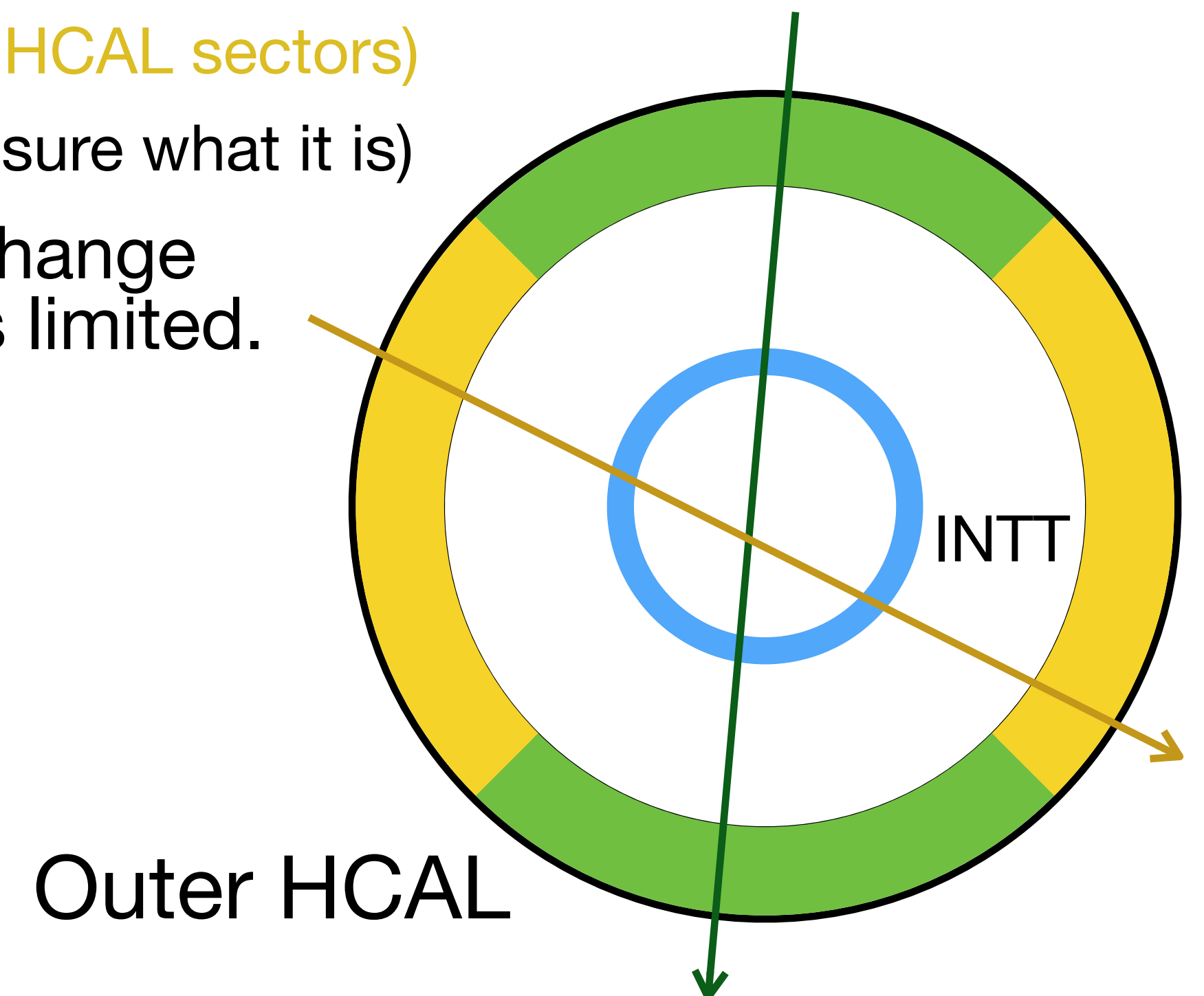
The trouble happened to the RHIC magnet on Aug. 1st. Since then, we have lost the beam.

sPHENIX decided to switch to proceed with commissioning with cosmic rays. Some cosmic ray triggers using HCAL were implemented:

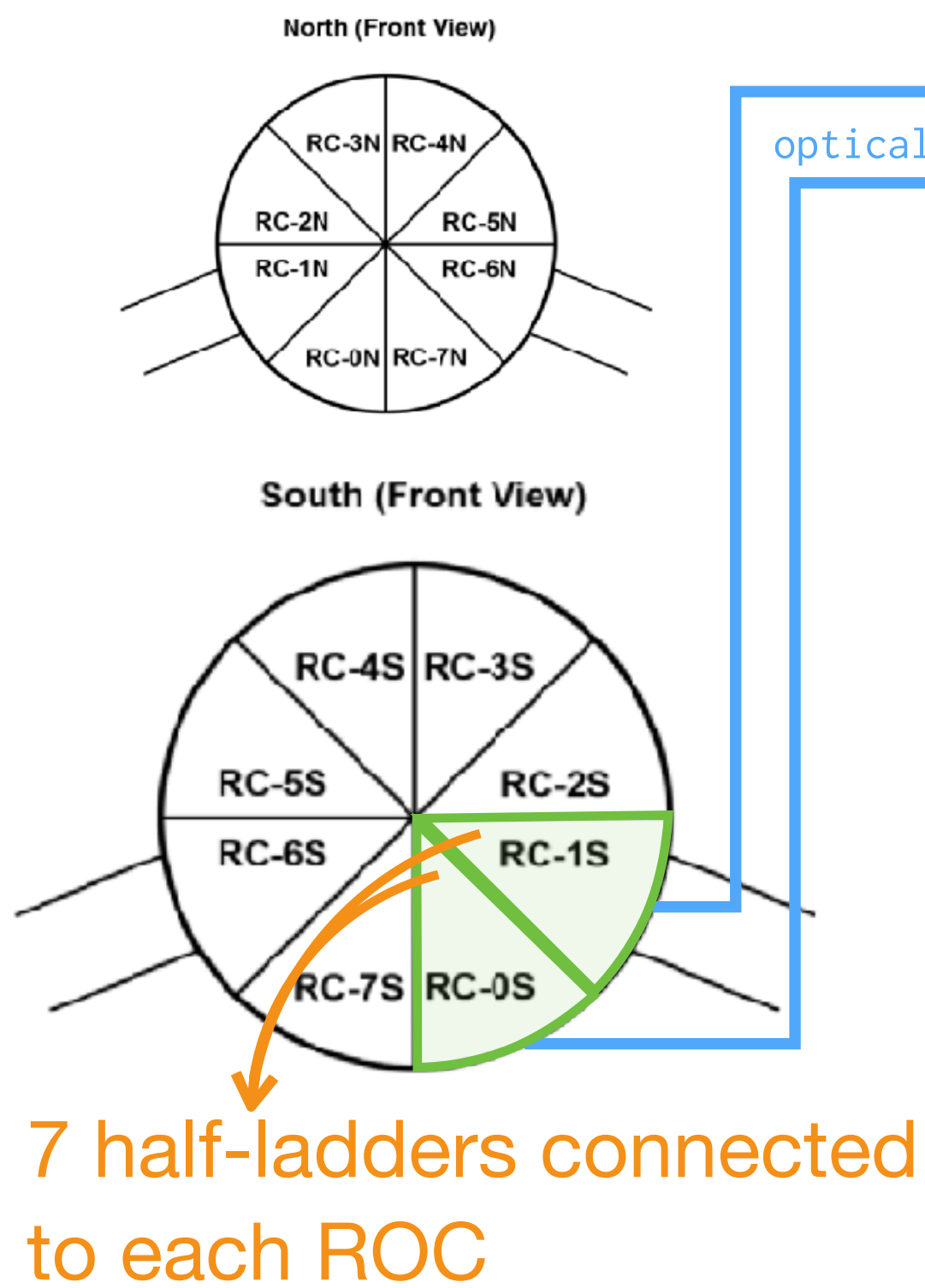
- HCAL cosmic (high ADC in a single tour for HCAL calibration)
- Vertical trigger (coincidence of top and bottom quadrant of HCAL sectors, z-range was optimized for TPC)
- Horizontal trigger (same as the vertical but with left and right half of HCAL sectors)
- Vertical trigger with z-crossing (implemented at some point, I'm not sure what it is)

The sPHENIX magnet was on for the first 2 weeks. We didn't change the INTT configuration much and just took data since time was limited.

After the end of the sPHENIX magnet operation, the list of mask channels was updated, and tests of the streaming readout, periodical pedestal measurements, and tests of the ExpertGUI were also conducted.



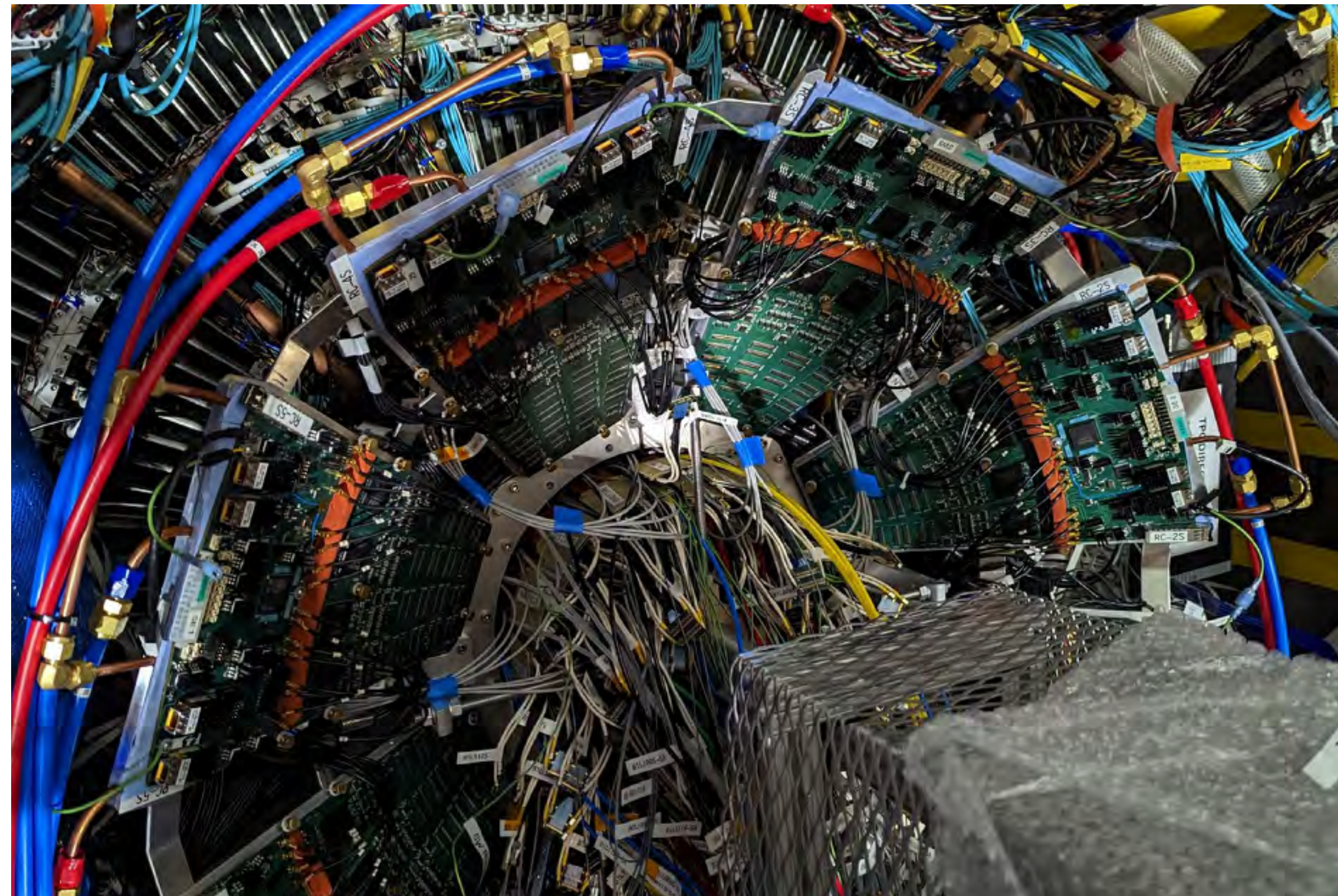
Phase-II & III: Operation Overview



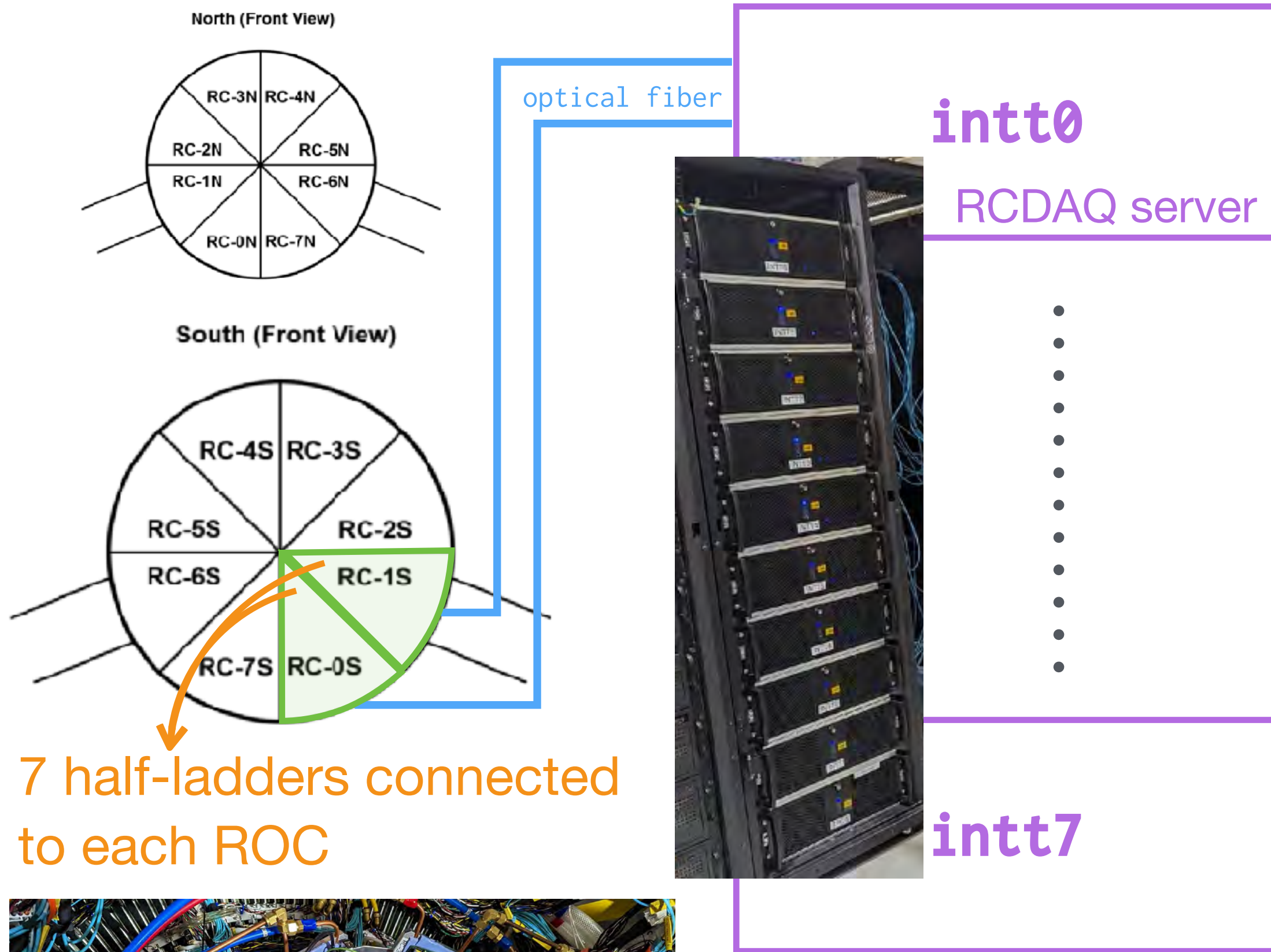
optical fiber

intt0

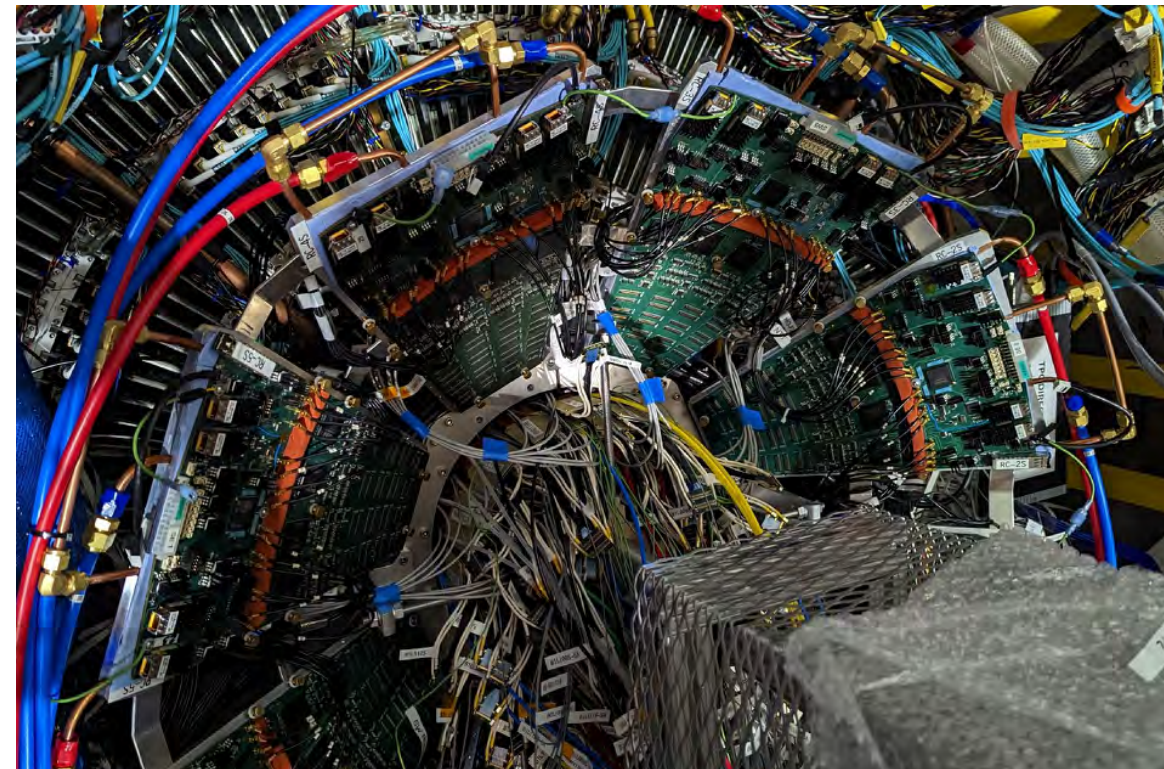
RCDAQ server



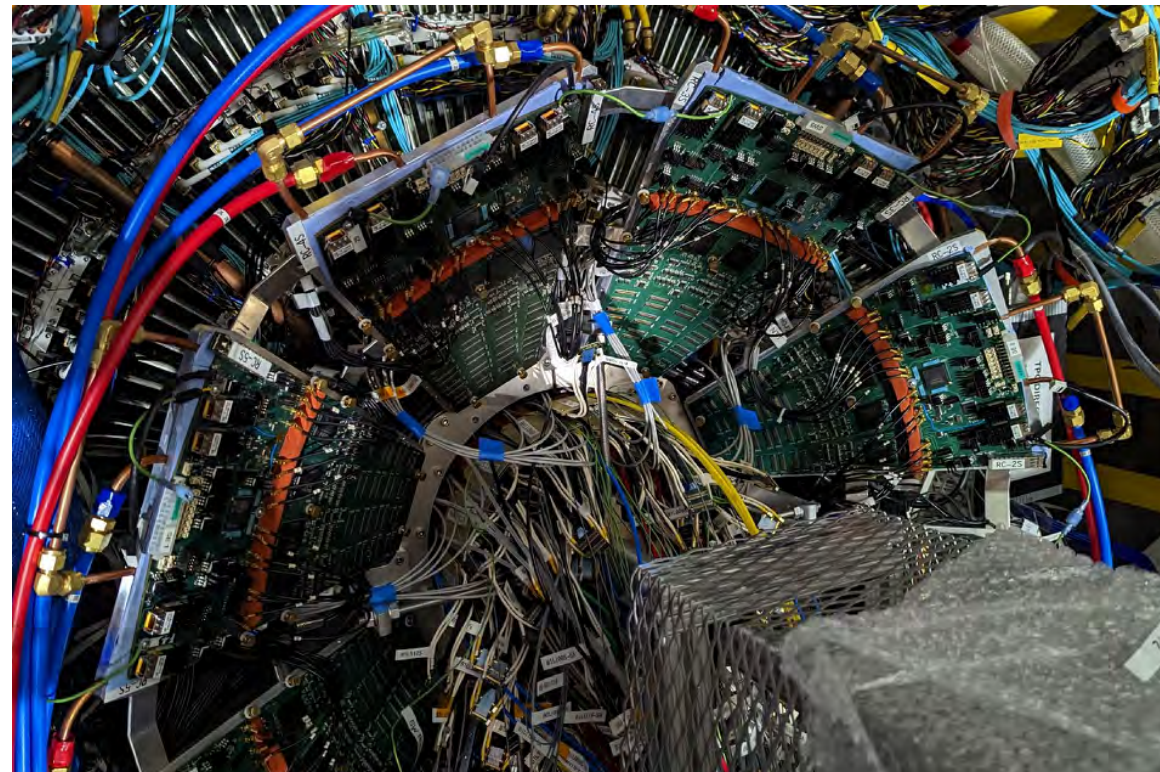
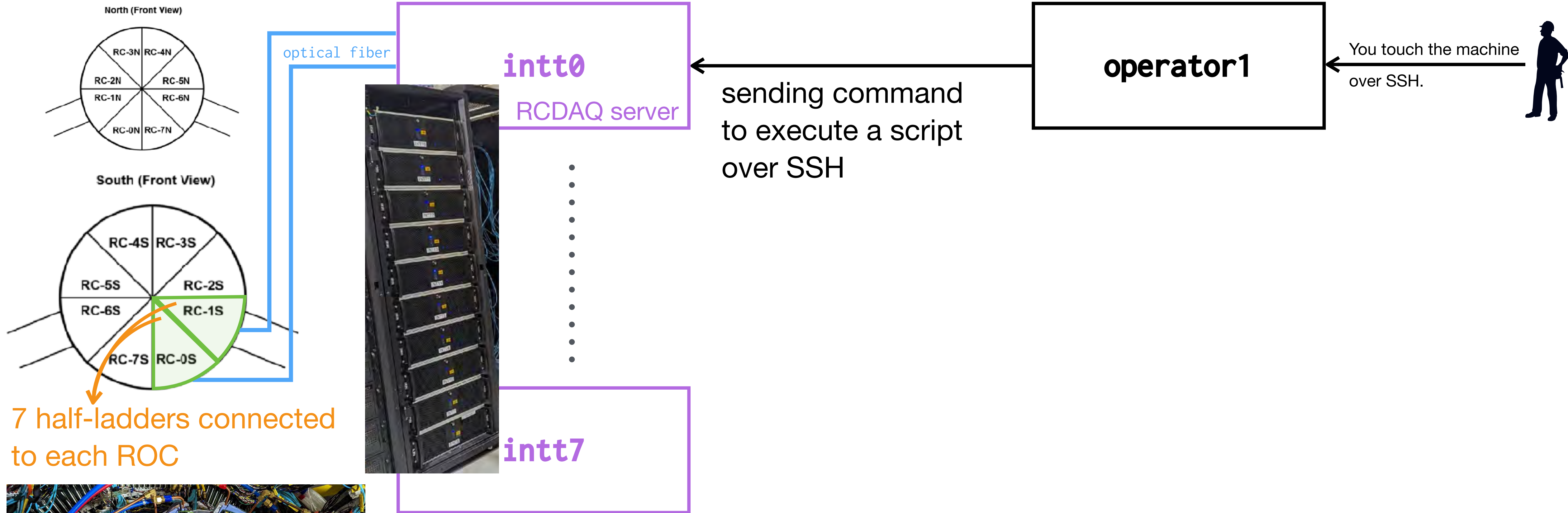
Phase-II & III: Operation Overview



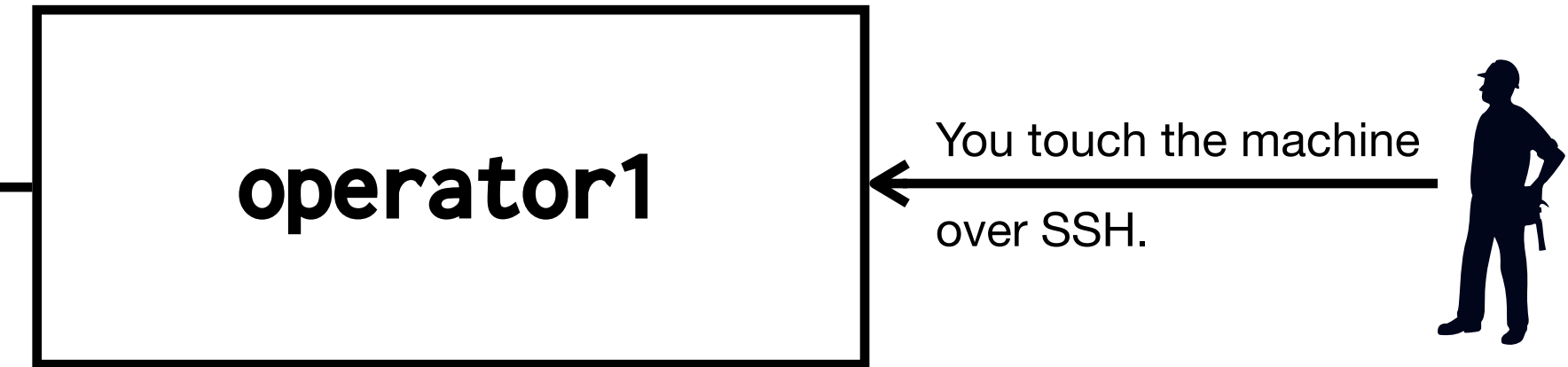
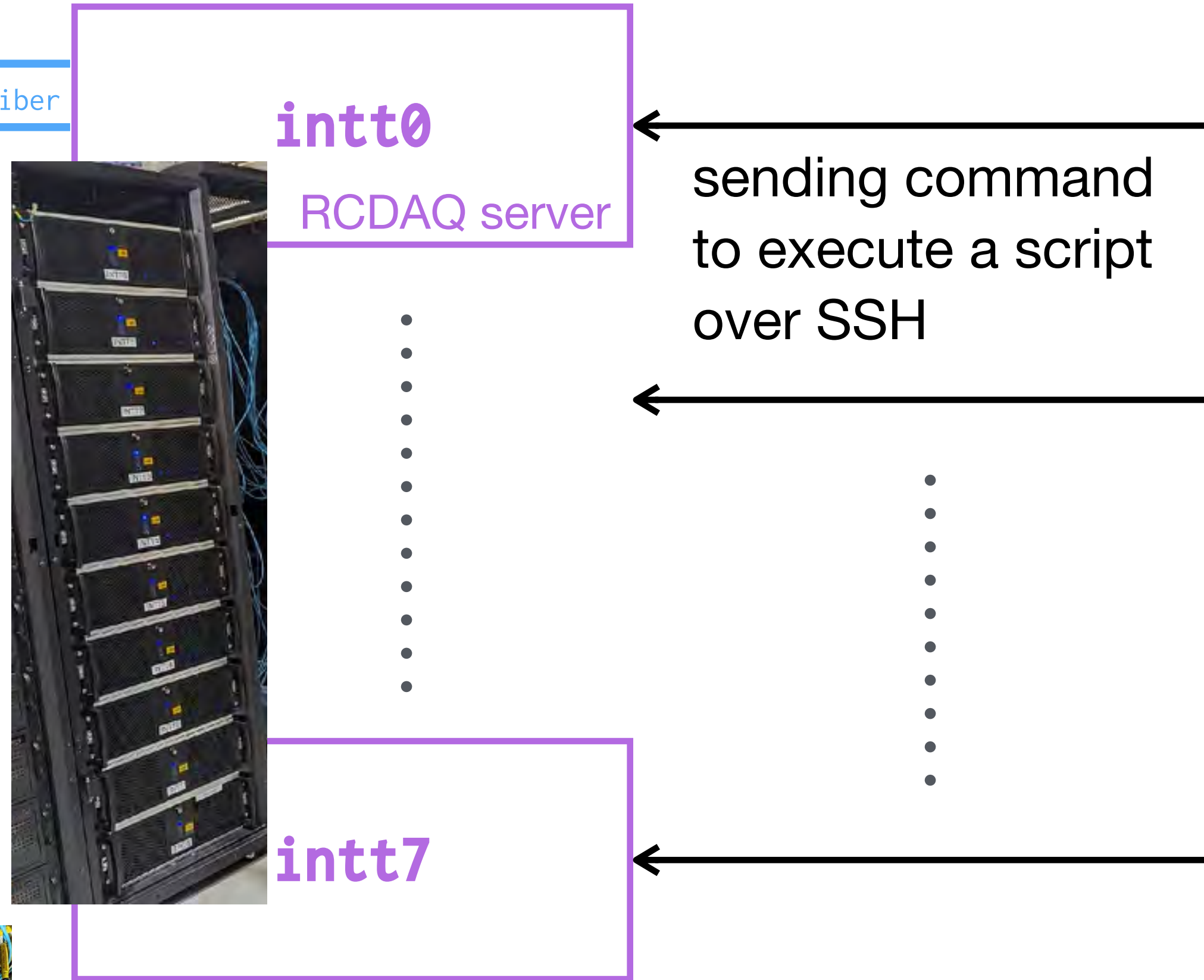
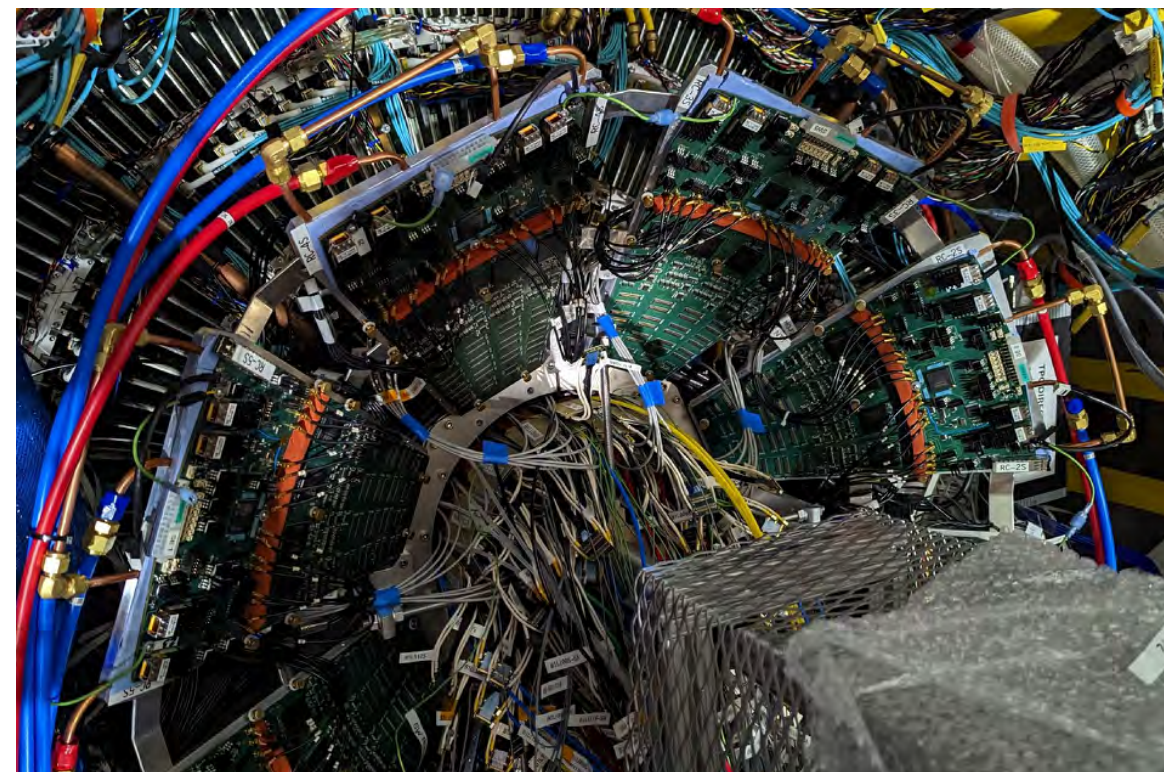
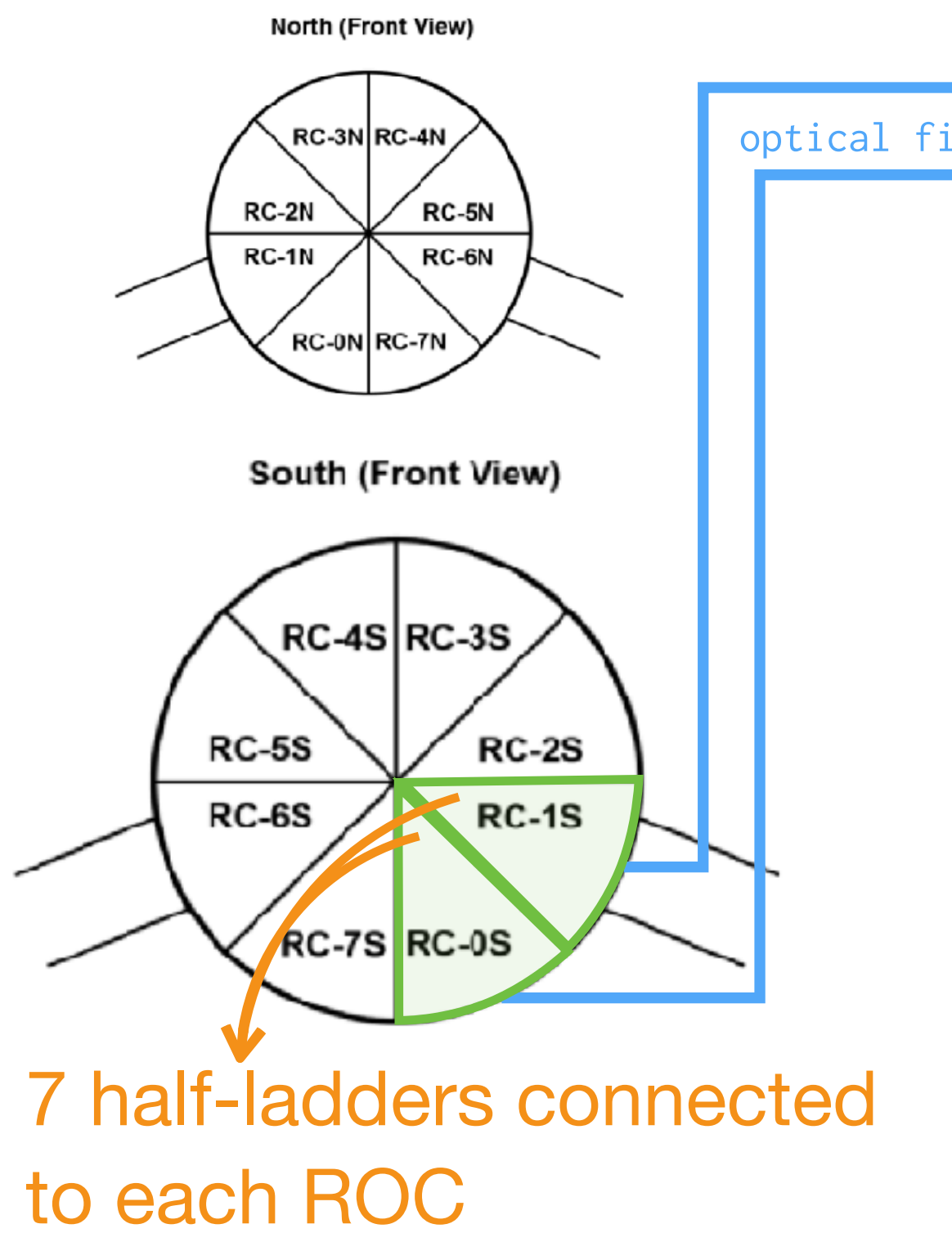
7 half-ladders connected to each ROC



Phase-II & III: Operation Overview



Phase-II & III: Operation Overview

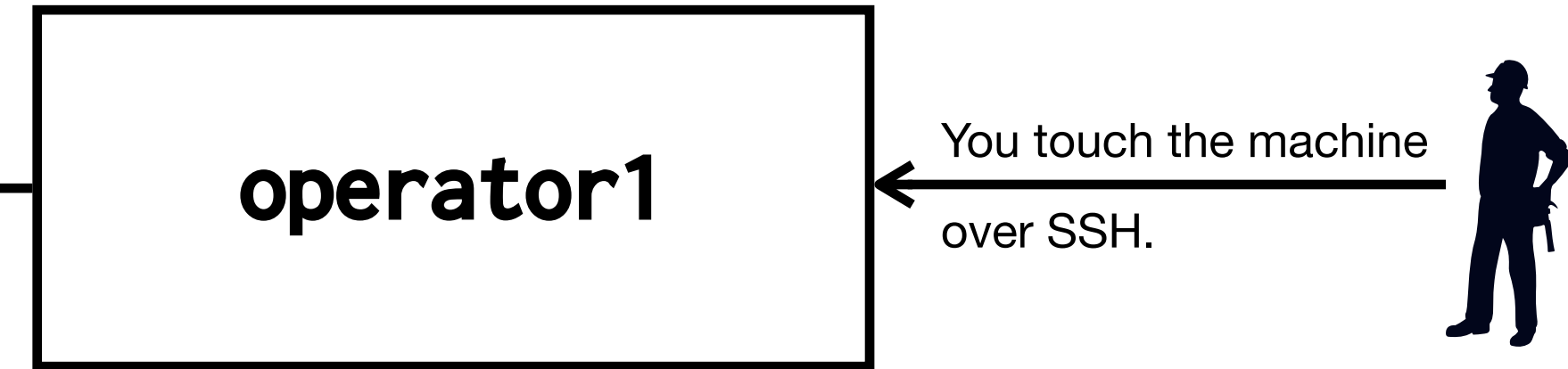
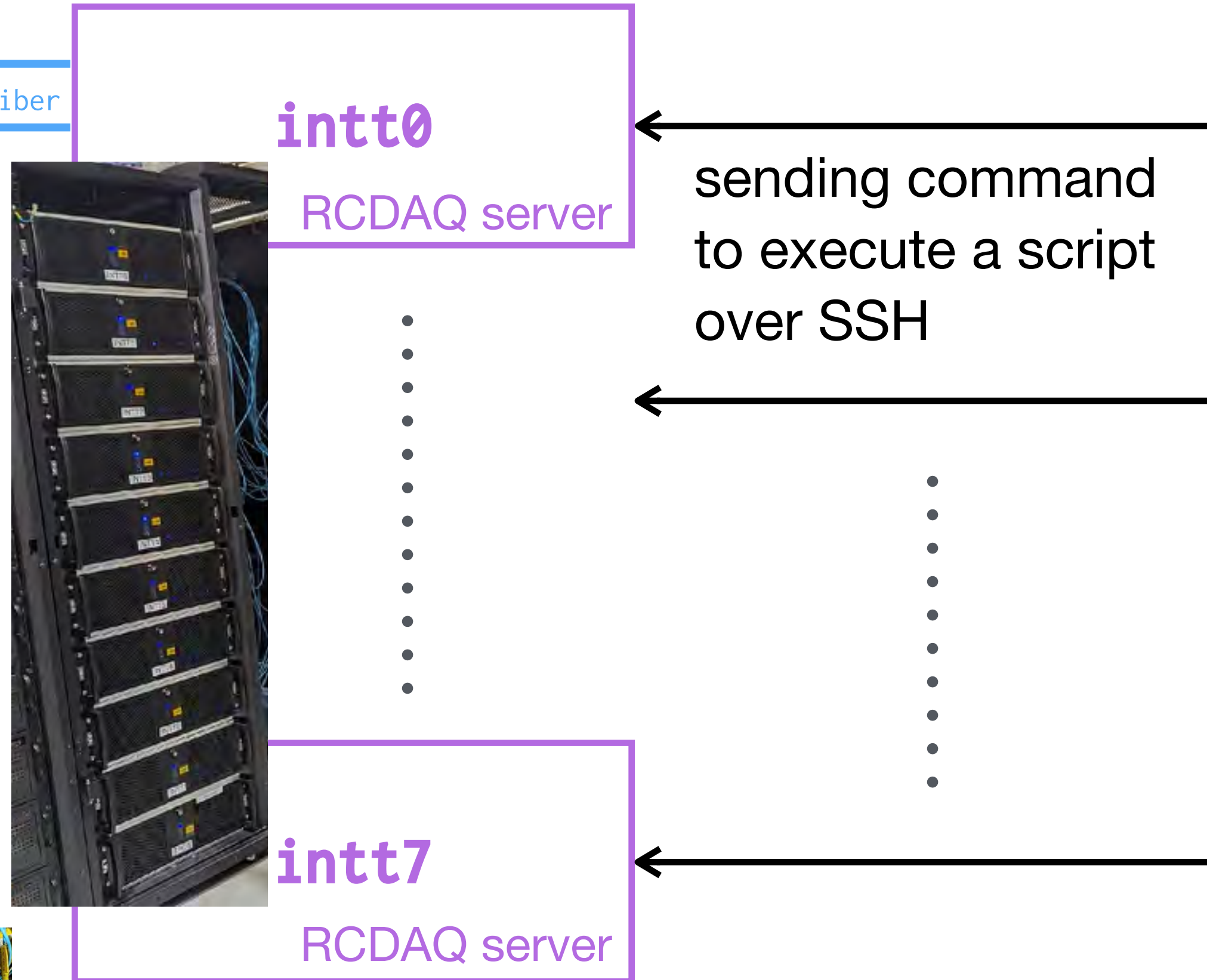
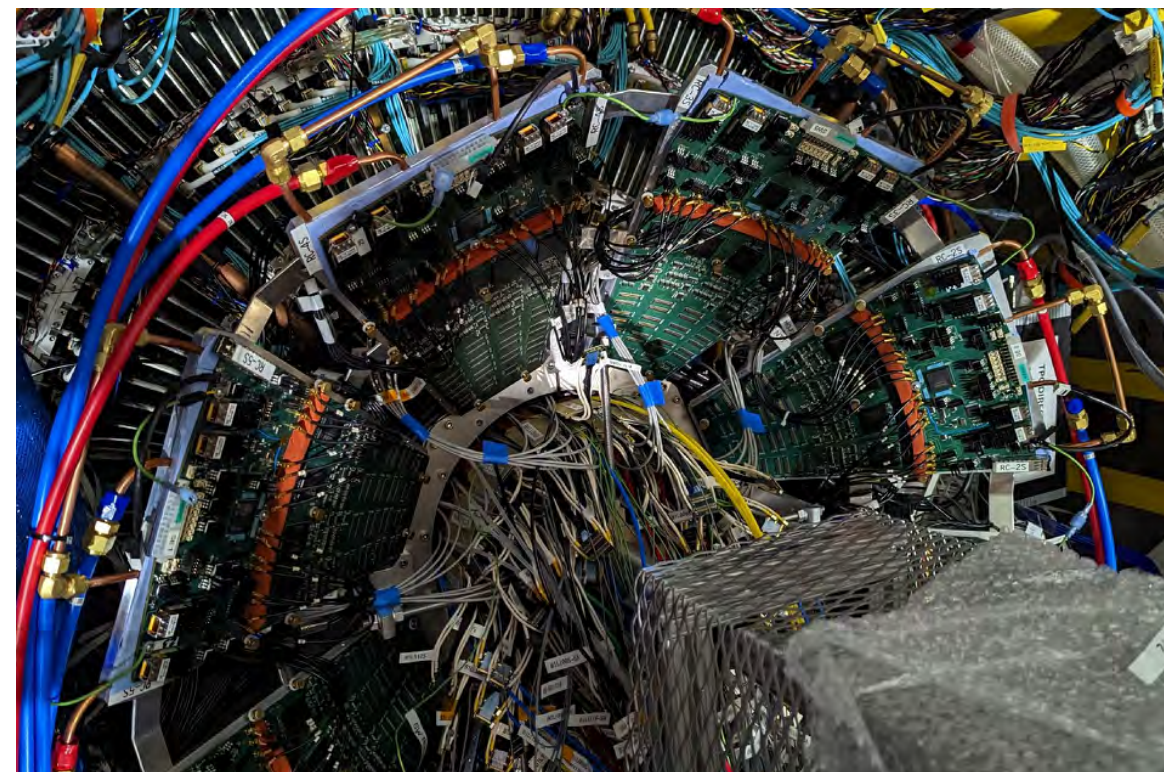
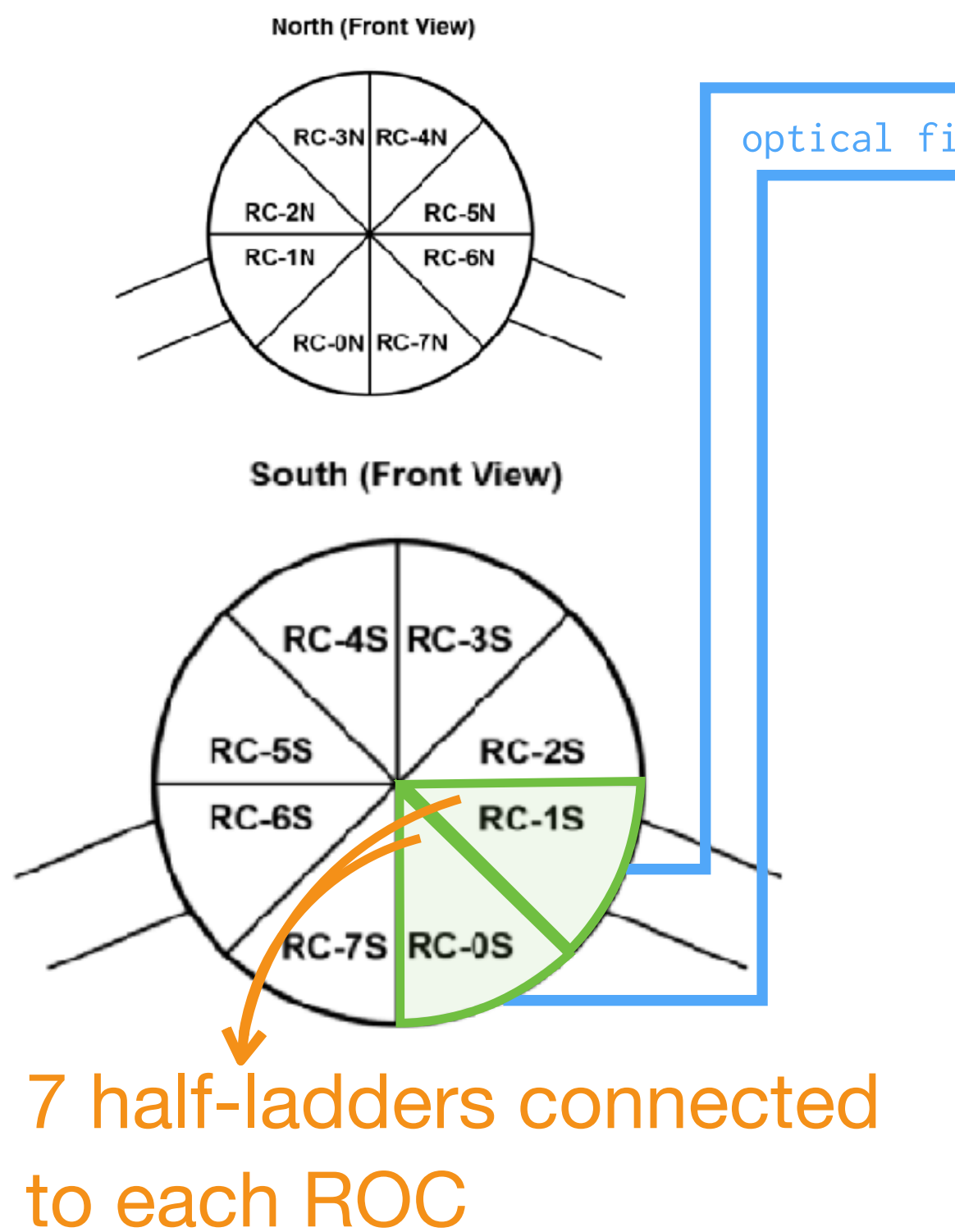


What is done in operator1 machine is quite simple:

```
for i in {0..7} ; do
  export ... # env. variable config
  ssh intt${i} python3 /home/.../aaa.py
done
```

Note: It's better to learn ShellScript a bit to understand it if you don't.

Phase-II & III: Operation Overview



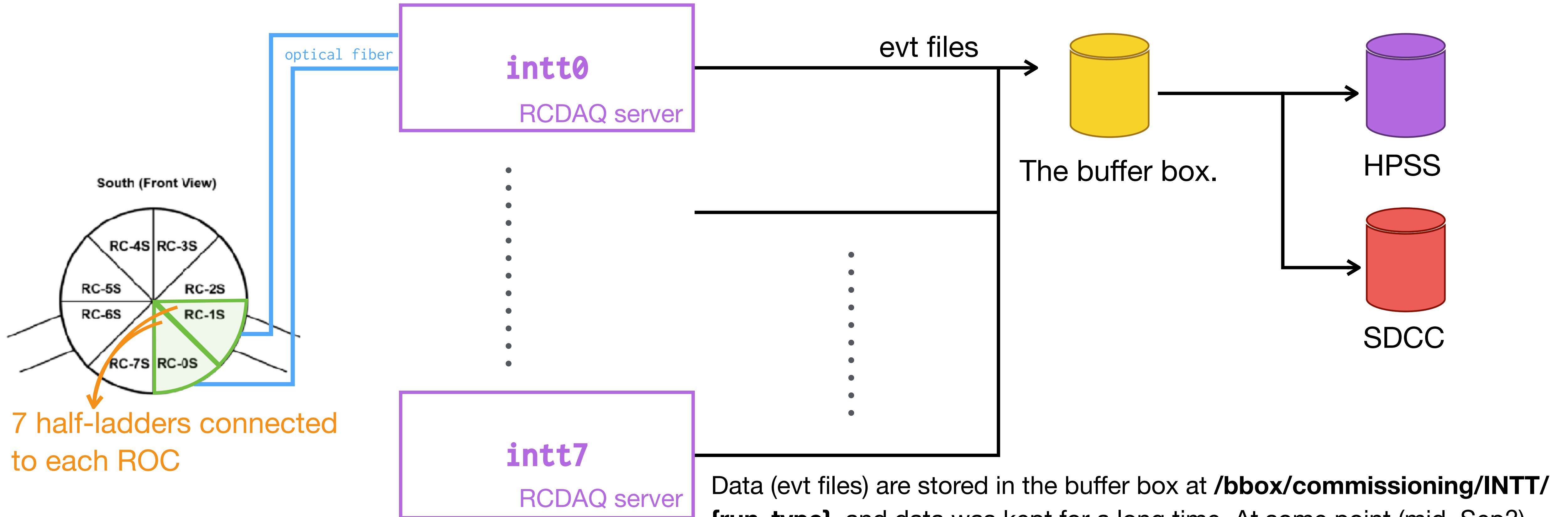
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for i in {0..7} ; do
  export ... # env. variable config
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done
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Note: It's better to learn ShellScript a bit to understand it if you don't.

A configuration script is executed in each INTT FELIX server.
 The same commands are issued except for channel masks.
 Parameter values such as DAC0 are written in a text file. These can be stored in the sPHENIX PostgreSQL for better usage, and such databases can be shared with INTT ExpertGUI.

Phase-II & III: Operation Overview



7 half-ladders connected to each ROC

Data (evt files) are stored in the buffer box at `/bbox/commissioning/INTT/{run_type}`, and data was kept for a long time. At some point (mid. Sep?), the directory was changed to `/bbox/{bbox_server}/INTT/{run_type}`.

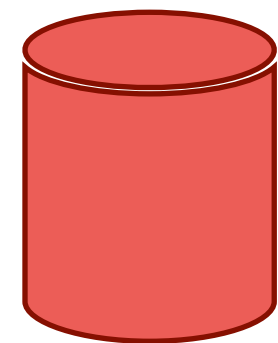
The situation is not clear yet (to me). Probably, in Run24,

- data is stored at `/bbox/{bbox_server}/INTT/{run_type}`
- data is transferred to HPSS, which is our mass storage.
- data may be transferred to SDCC at the same time.
- the buffer box is cleaned periodically.

Phase-II & III: Operation Overview



SSH from
your PC



SDCC

evt: `/sphenix/lustre01/sphnxpro/commissioning/INTT/`

sPHENIX decoder (soon)

It may be changed to `/sphenix/lustre01/sphnxpro/{bbox_server}/INTT/`

↓
Joseph's decoder & Takashi's decoder

ROOT files: `/sphenix/tg/tg01/commissioning/INTT/root_files/`

↓
Takashi and Mai's merging program

Merged ROOT files: `/sphenix/tg/tg01/commissioning/INTT/merged_root_files/`

It's better to maintain our decoders and merge program for debugging (I think).

↓
DST

Where are they stored?
Who work on production?

Commissioning: What We Did in This Year

- **Operation**

- LV (Mai W., Wei-Che, Maya)
- HV (Joseph)
- Power for the clock boards (a part of LV)
- Cooling (Rob, Rachid)
- FELIX firmware (Raul)
- FPHX slow control (Raul, Genki, Cheng-Wei, Jaein)
- Expert GUI (Hikaru, Genki, Tomoya, Itaru)
- things for RCDAQ (Raul, Jaein, sPHENIX DAQ experts)
- Thermistor monitors (Cheng-Wei)

- **Calibration measurements**

- Raul DAQ and Genki's GUI (obsolete)
- Measurements with up to 13 ladders with inttdaq
- Measurements with FEM

- **Measurements with beam**

- Time-in
- Parameter optimizations
- Correlations in the INTT barrel
- Correlations with MBD/TPOT
- Track/Vertex reconstructions
- DAC0 scan
- DAC scan

- Hot/Dead channels analysis
- Event mix-up study
- $dN/d\eta$ analysis
- v_2 analysis

- **Measurements with cosmic triggers**

- Measurements under 1.4T
- Measurements without magnetic field with 4 types of HCAL cosmic triggers

- **Pedestal measurements**

- Few trials when RHIC was working
- Weekly measurements after the RHIC trouble

- **Streaming readout**

- Cosmic ray measurement
- Operation at various operation frequencies

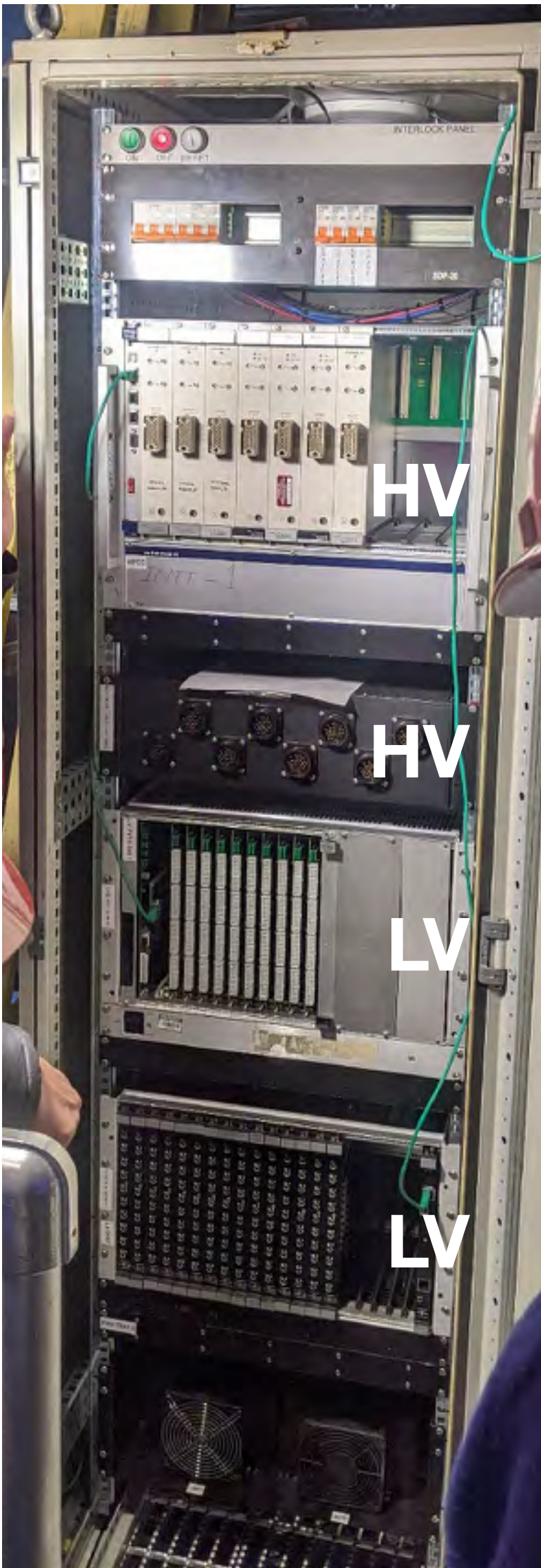
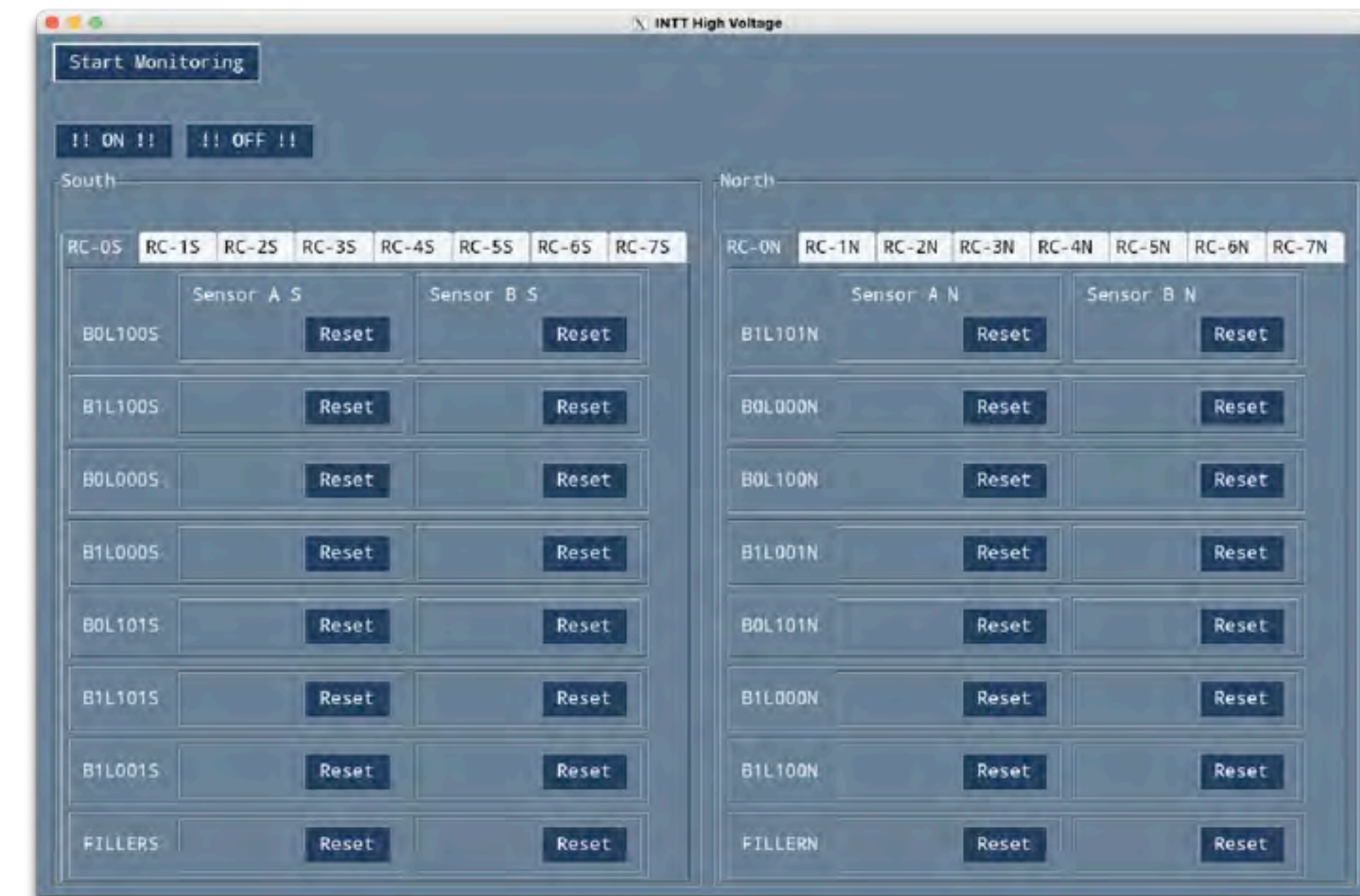
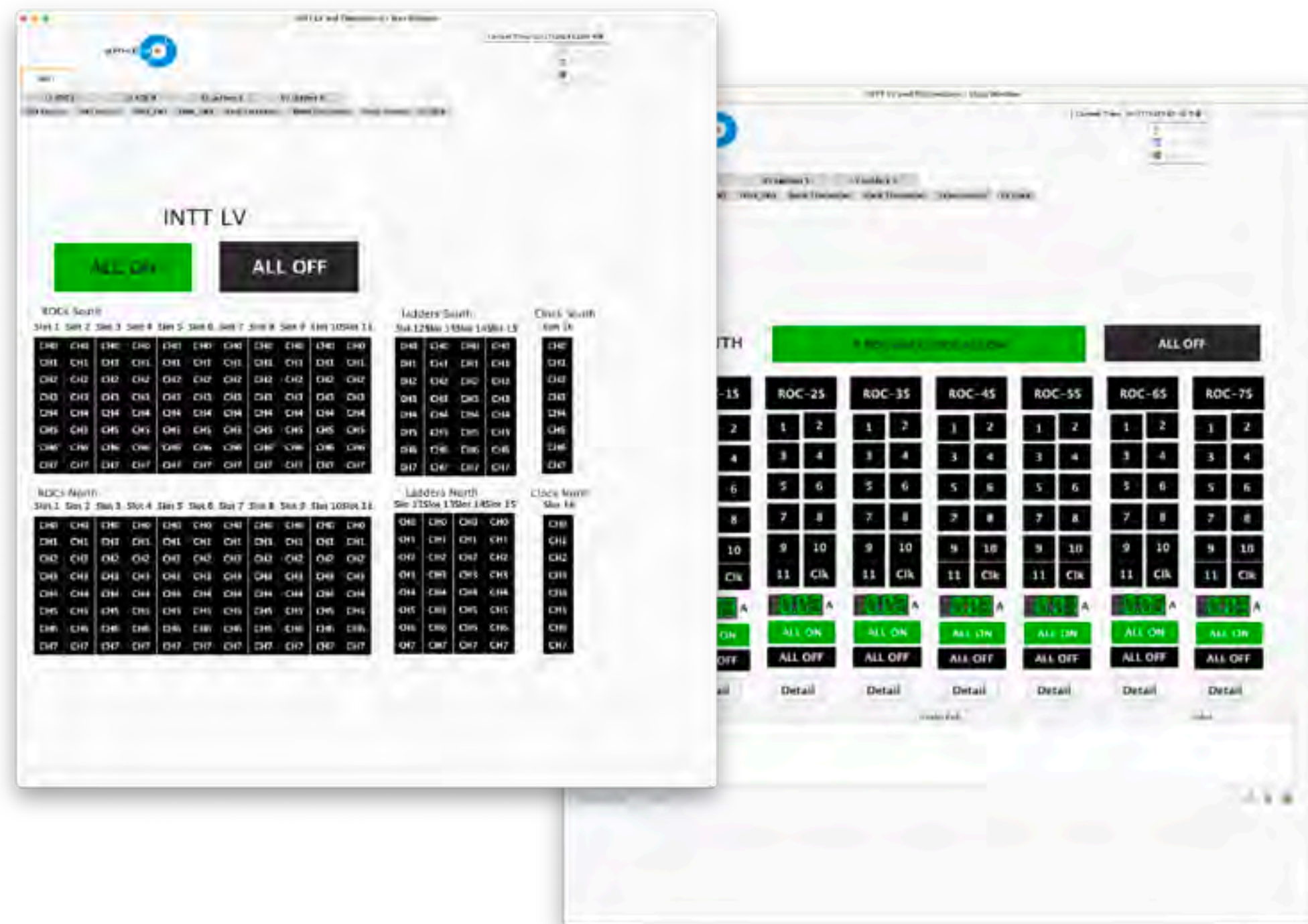
- **Software**

- Decoder (Joseph, Takashi, Chris)
- Online monitor (Joseph)
- Event display (Manami)
- Stability monitor (Wei-Che)
- Operation history monitors (nobody assigned)

Commissioning: INTT Operation

LV monitoring/operation GUI
(Mai W., Wei-Che, Maya)

HV monitoring/operation GUI
(Joseph)



The hardware is not completely stable...

The operation can be done well.
The recent bug fix will be tested in 2024.
The commissioning was completed.
An operation history viewer is needed.

The operation can be done well.
The commissioning was completed.
An operation history viewer is needed.

Commissioning: INTT Operation

- **FPHX slow control**

- Slow control signals are sent by Python scripts in the sPHENIX common home directory at 1008 (~/INTT/sphenix_inttpty).
- When we ran with Raul DAQ, each script was executed in a terminal. **They work well.** Those configurations are embedded in the sPHENIX detector configuration processes when RCDAQ takes data.
- The directory is messy now. **We need to clean it up before Run 24.**

- **RCDAQ scripts**

- Scripts in ~/operations/INTT do lots of configurations not only for INTT but also for RCDAQ servers.
- We don't have enough knowledge of the scripts. **Who is the main developer (Raul? JaeBeom?)?**
- The directory is also getting messy due to files which are almost identical to the original, but only tiny things are different. **We need to clean it up too.**

- **Operation instruction**

- Jaein has the best knowledge and experience on RCDAQ operation in the INTT collaboration thanks to his efforts in June and July.
- **His instruction slides are now written in the sPHENIX wiki.** Ryota, who has rich experience due to many pedestal measurements, reviewed it.

```
phnxrc@opc0:~/INTT$ ls sphenix_inttpty/
README.md          felix_readout_pedestal.py      intt_ext.py          test.py
__pycache__        felix_readout_pedestal_cw_temp.py  intt_setup.sh       testbench_intt_clocks.sh
bitstream_loader  felix_readout_sandbox.py       inttdev@inttdaq     venv
dam.py             felix_readout_sanity_check.py    mask_slowcontrol.py  vivado.jou
daq_tst           felix_readout_unpacker_v5.py     pygtm_client         vivado.log
data              felix_readout_unpacker_v6.py     raul_decoder         vivado_40613.backup.jou
disable_FELIX_channels.py  flush_intt.sh                  reprogram_intt_fw.sh  vivado_40613.backup.log
enable_FELIX_channels.py  fphx_command_check.py          reset_intt_clocks.sh  vivado_66722.backup.jou
felix_readout_calib_packv5.py  gtm_setup_calibration.py       reverse_pol.py        vivado_66722.backup.log
felix_readout_check_register.py  gtm_setup_example.py          run.py
felix_readout_clk_init.py      gtm_setup_idle.py              run_20230523_standalone.py
felix_readout_cold_start.py    gtm_setup_pedestal.py          run_20230724.py
felix_readout_flush.py         gtm_setup_trigger.py           run_scripts
felix_readout_lv11_testing.py  intt.py                          sandbox
```

```
phnxrc@opc0:~$ ls operations/INTT/
L1FineDelay.log      intt6_setup.sh                intt_cosmics_streamed_75KHz  modebits.sh
L1FineDelay.sh      intt7_setup.sh                .scheduler                  rc.log
README.md            intt_FA.scheduler             intt_gtm_setup.sh           rc_setup.sh
bkp                  intt_cosmics_streamed.scheduler  intt_gtm_setup_local.sh    rc_setup_local.sh
hostlist_intt.dat   uler                          intt_noise_500Hz.scheduler  rc_setup_local_cosmics.sh
intt.scheduler       intt_cosmics_streamed_15KHz    intt_noise_5KHz.scheduler   setup_all_rcdaqs.sh
intt.scheduler.backup  .scheduler                    intt_raul.scheduler         stop_run.sh
intt0_setup.sh      intt_cosmics_streamed_18_KHz  intt_reset_clks.scheduler   test.sh
intt1_setup.sh      z.scheduler                   intt_setup.sh               vivado.jou
intt2_setup.sh      intt_cosmics_streamed_25_KHz  intt_take_data.sh          vivado.log
intt3_setup.sh      z.scheduler                    l1delay.log
intt4_setup.sh      intt_cosmics_streamed_37KHz   l1delay.sh
intt5_setup.sh      .scheduler                     modebits.log
```


Commissioning: INTT Operation

The screenshot shows the SPHENIX website with the page title "INTT Felix DAQ". The page contains a table of contents with five items: 1. Felix rc_server instructions, 2. What is rc_server? (Run Control server), 3. Data taking in LOCAL MODE (with sub-items 3.1 Setup rc_server and 3.2 Data taking), 4. How to set up INTT, and 5. How to mask Felix or RCDAQ server. The main content area is currently displaying the "Felix rc_server instructions" section, which includes a note that the file is temporary and users should use the latest version. It also provides information about the rc_server and how to control multiple RCDAQ servers.

This document provides step-by-step instructions for setting up and masking the INTT system. It is divided into two main sections: "How to set up INTT" and "How to mask Felix or RCDAQ server".

How to set up INTT:

- 1) rc_collision, open_time:** Involves editing `/home/phenix/INTT/sphenix_intpy/run.py` to change `n_collision` and `open_time`. A terminal screenshot shows the file being edited.
- 2) FPFX chip parameters (FAC, LVDS...):** Involves editing `/home/phenix/INTT/sphenix_intpy/hungry.py` to check and change file names of "fpfx_parameters". A terminal screenshot shows the file being edited.
- 3) modBit:** Involves editing `/home/phenix/operations/INTT/int_scheduler` to change the modbit setting. A terminal screenshot shows the file being edited.
- 4) L1delay:** Involves editing `/home/phenix/operations/INTT/int_gtm_setup.sh` to change the L1DELAY_VALUE. A terminal screenshot shows the file being edited.

How to mask Felix or RCDAQ server:

- Felix channel:** Involves editing `/home/phenix/INTT/sphenix_intpy/scripts/rtos_fc_gtc.tbl` to add the FC tabs you want to mask.
- RCDAQ server (int0,1,...7):** Involves editing `/home/phenix/operations/INTT/hostlist_int.dat` to remove RCDAQ servers you want to mask. A note states: "Do not use # or * for masking. We should remove the servers you wanted to mask in the file." A terminal screenshot shows the file being edited.

Both sections conclude with instructions to run `/home/phenix/INTT/rcdaq/setup_intt_detector.sh` and to start from "Data taking in LOCAL MODE, Setup rc_server".

Good job, Jaein and Ryota!

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- Thermistor monitors (Cheng-Wei)

- **Calibration measurements**

- Raul DAQ and Genki's GUI
- Measurements with up to 13 ladders with inttdaq
- Measurements with FEM (!!!)

- **Measurements with beam**

- Time-in
- Parameter optimizations
- Correlations in the INTT barrel
- Correlations with MBD/TPOT
- DAC0 scan
- DAC scan

- **Measurements with cosmic triggers**

- Measurements under 1.4T
- Measurements without magnetic field
- with 4 types of HCAL cosmic triggers (single-tower, vertical, horizontal, vertical with z-crossing(?))

- **Pedestal measurements**

- Few trials when RHIC was working
- Weekly measurements after the RHIC trouble

- **Streaming readout**

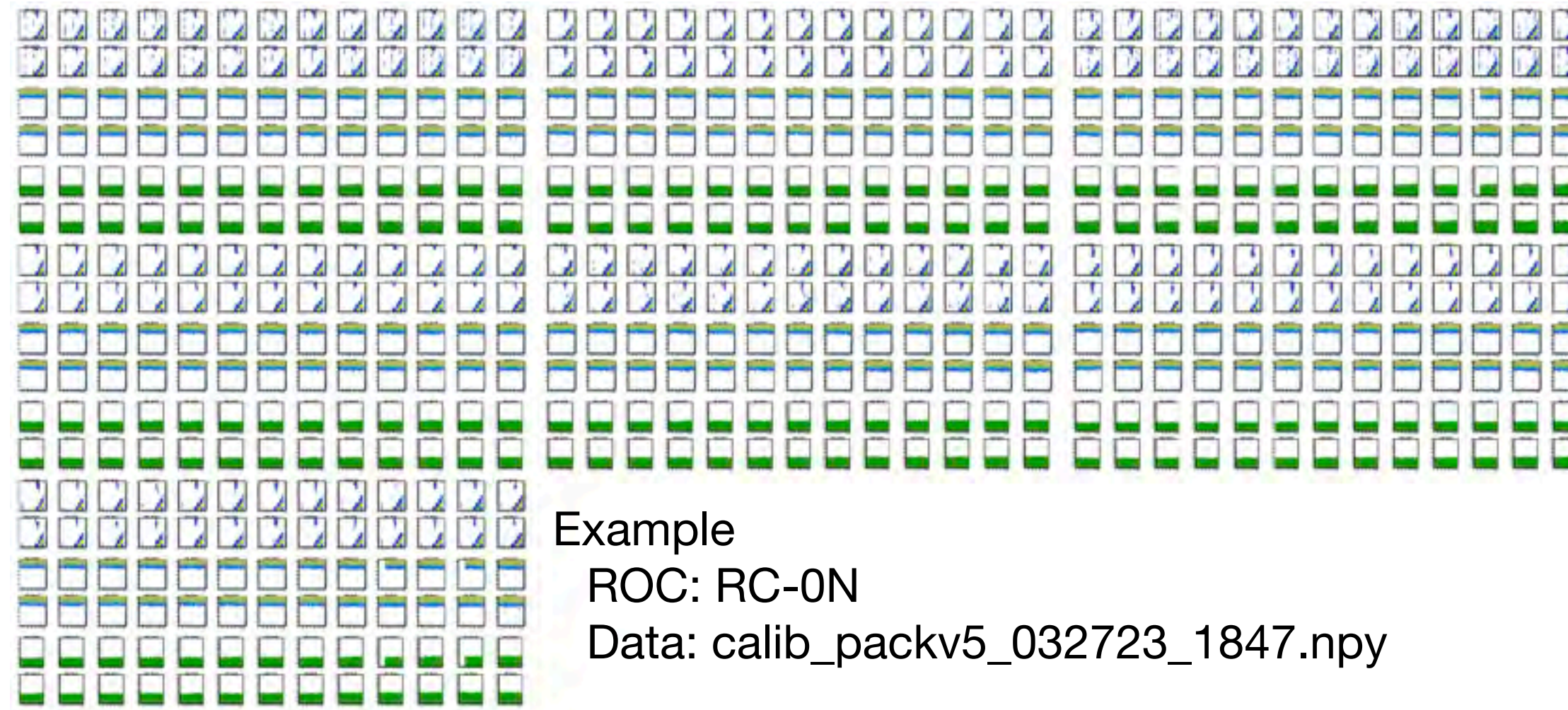
- Cosmic ray measurement
- Operation at various operation frequencies

- **Software**

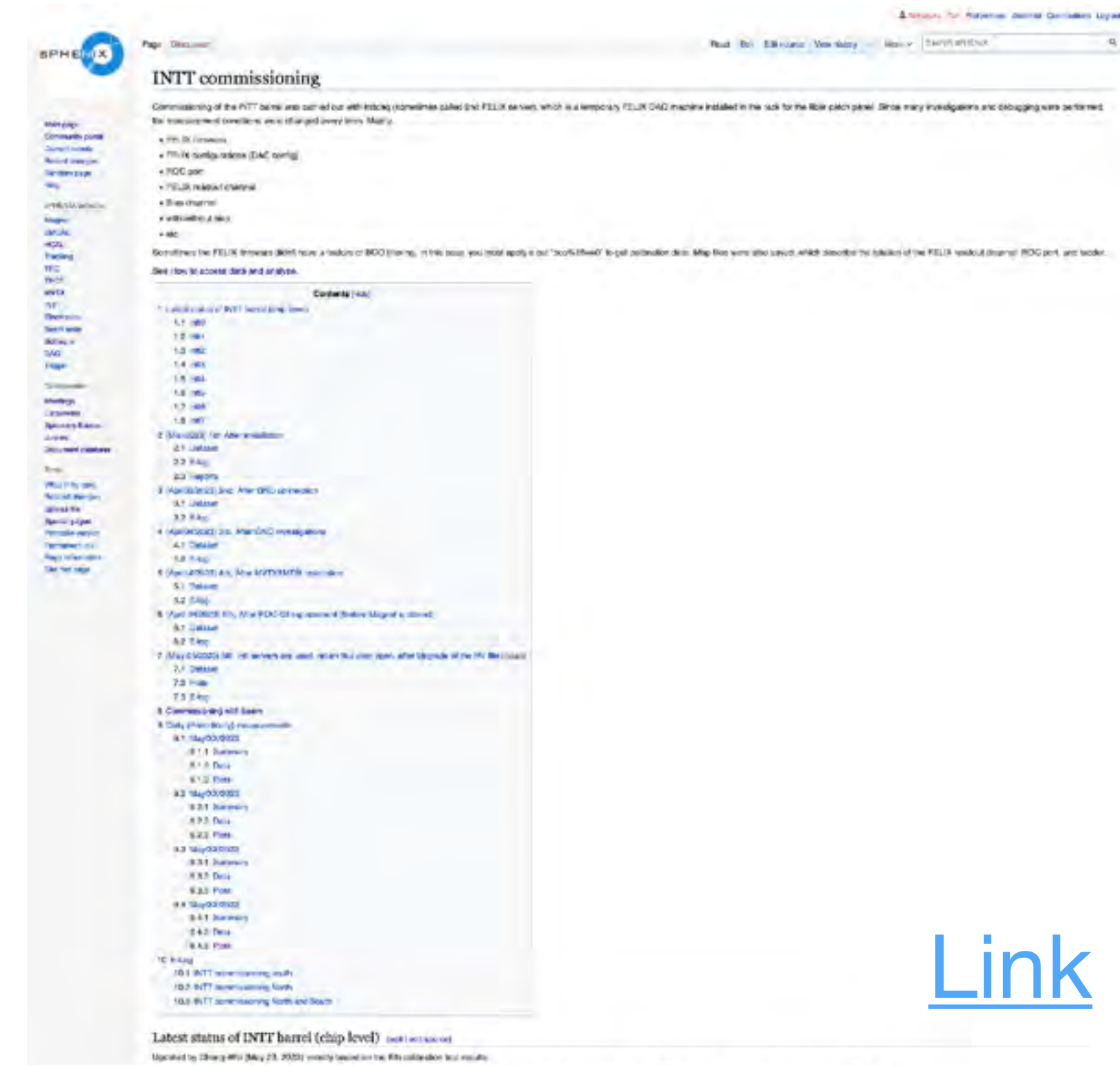
- Decoder (Joseph, Takashi, Chris)
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Calibration

More than 400 runs were performed before the beam. A brief summary of them is in the wiki.



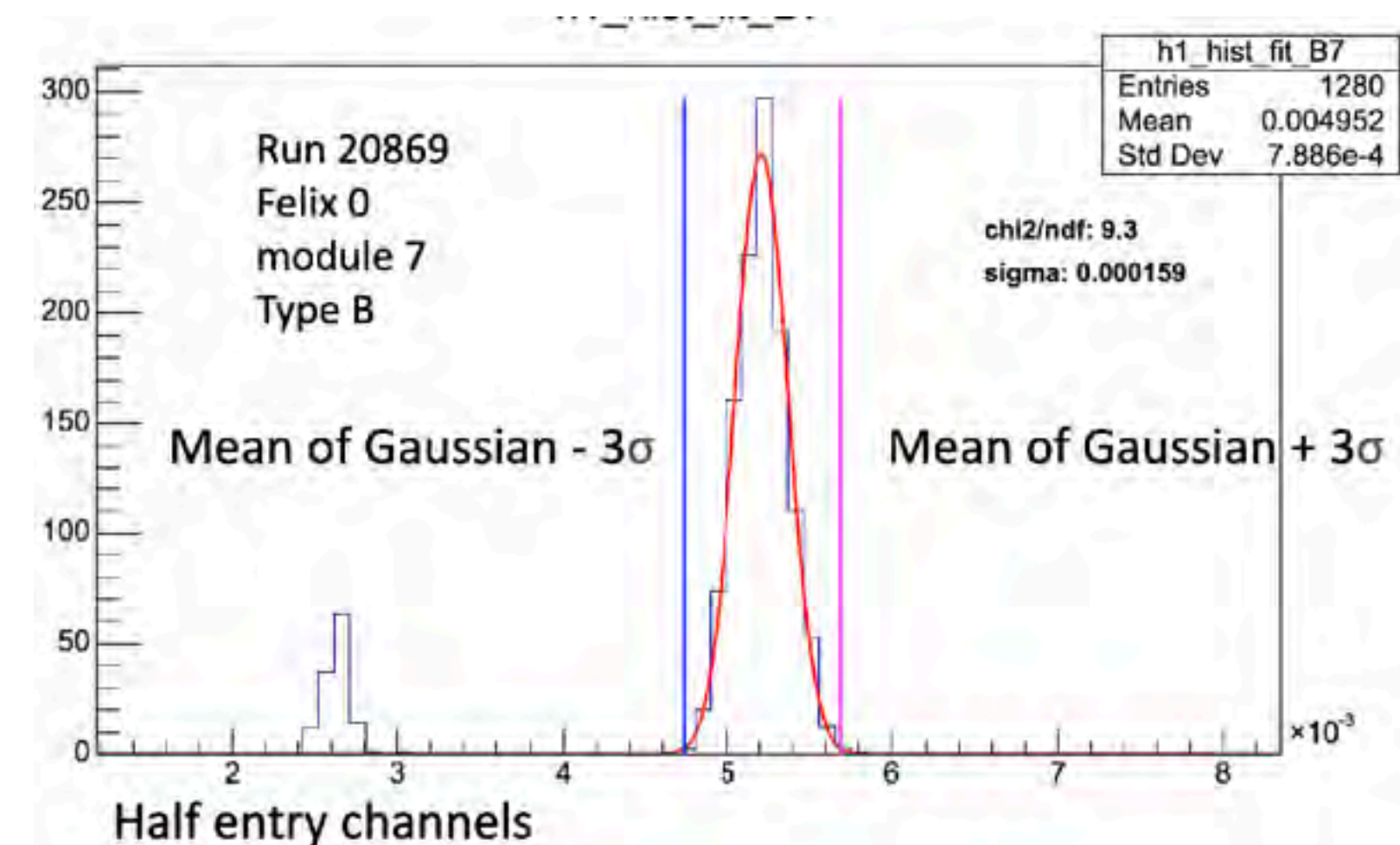
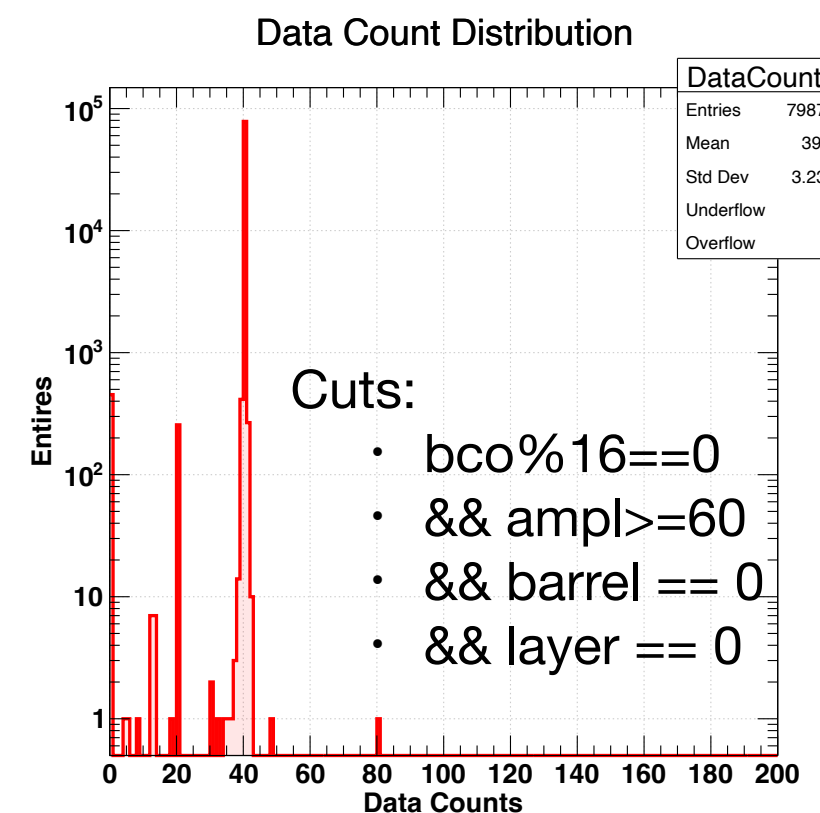
Example
 ROC: RC-0N
 Data: calib_packv5_032723_1847.npy



[Link](#)

We didn't care so much about the half-entry chips and the chips with missing ch regions at that time because we didn't have enough time for them. In the hot channel analysis by Joseph, Jaein, and Yuka, information of them is getting more important. **We need a detailed summary and/or database of them by dedicated analysis.**

→ #hits from a calibration measurement with high amplitude. Good ch should have exactly 40 hits in this condition.



[#hit of each channel](#)

Calibration

Most people don't know that we even used the FEM system for debugging. The measurements might be a good reference for some debugging purposes though it was for "debugging". Where is the data?



FEM!!!



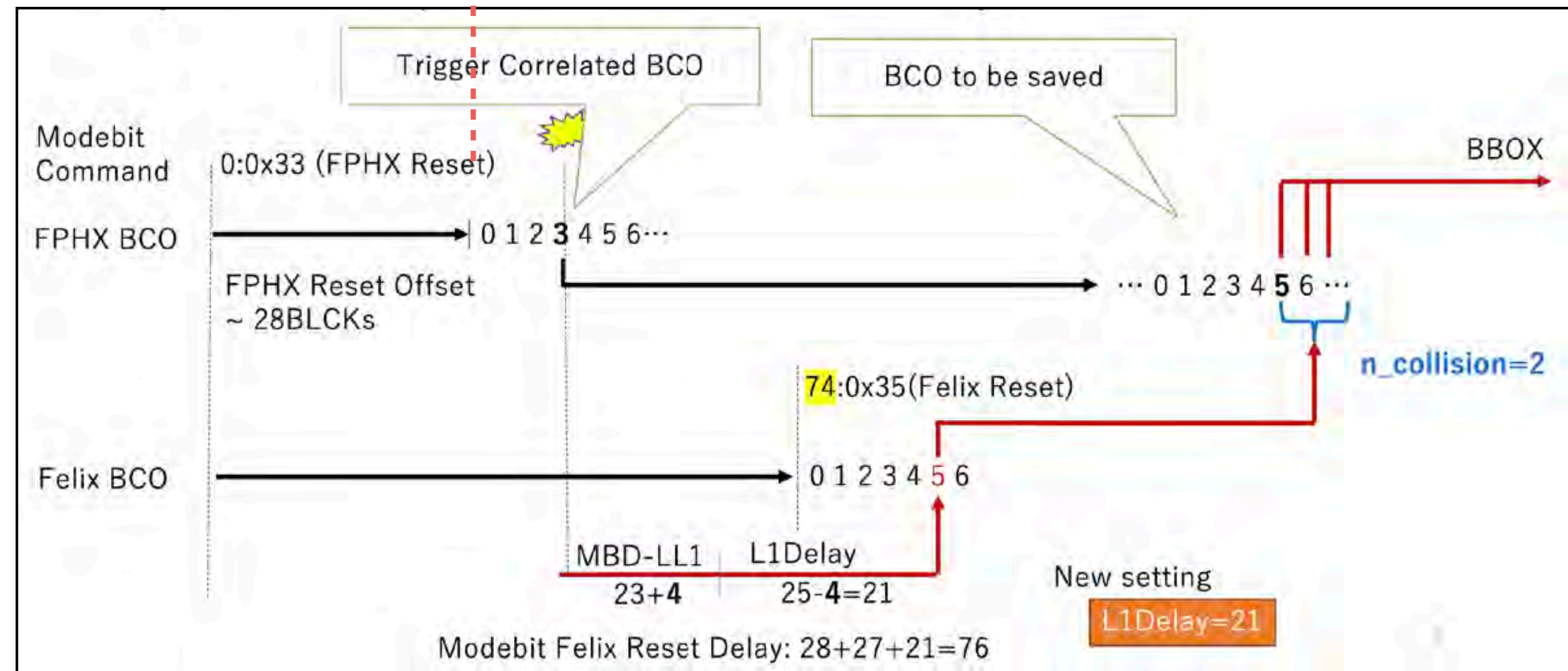
Measurements With Beam

We started commissioning the beam on May 25. Time-in was not easy for us at that time (easy now!).

The parameters we have tuned are

- L1Delay
- n_collisions
- modebits
- open_time

The timing when collision happen and hits made



Measurements With Beam

We started commissioning the beam on May 25. Time-in was not easy for us at that time (easy now!).

The parameters we have tuned are

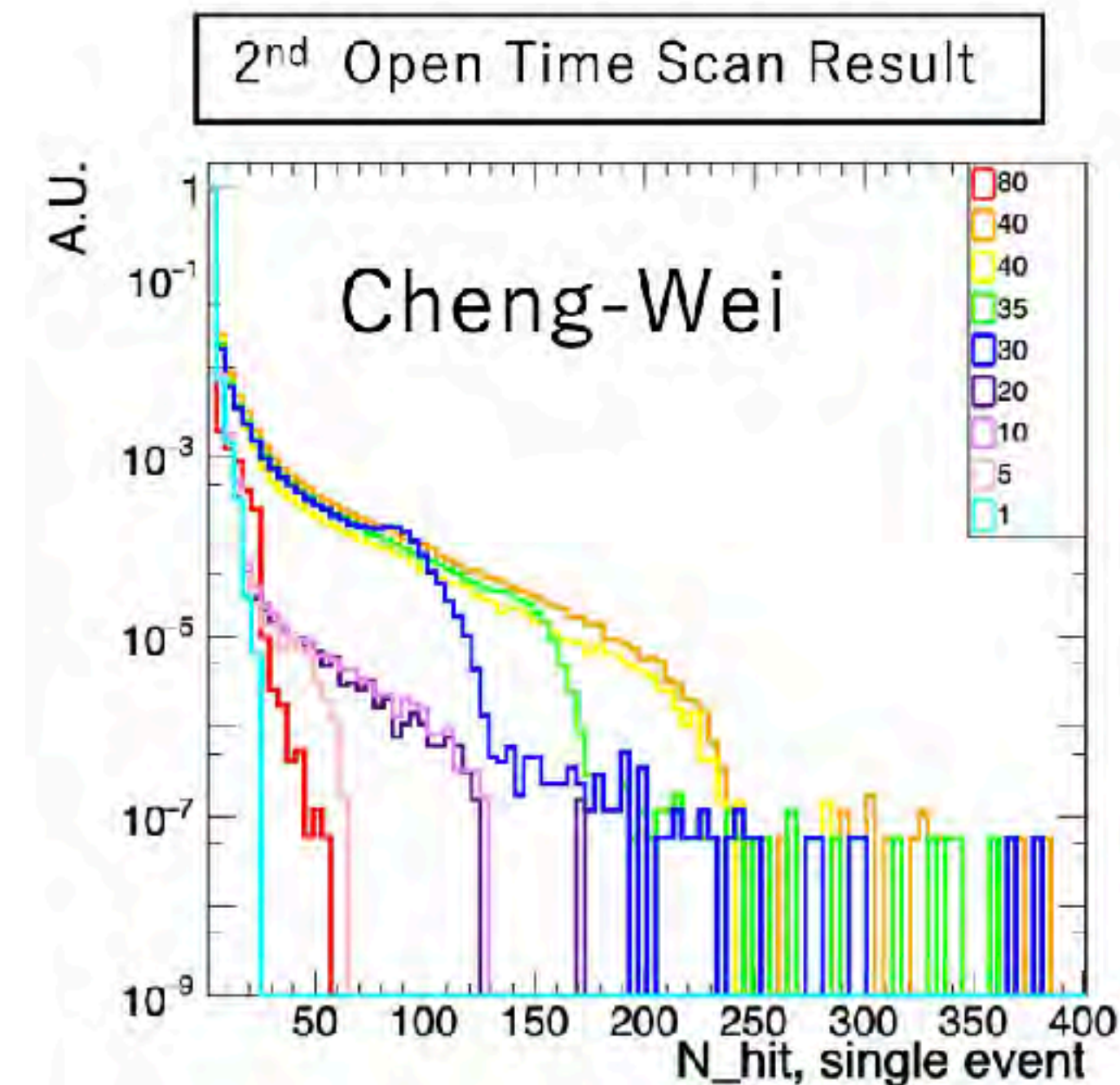
- L1Delay: Delay for the trigger input timing to FELIXs
- n_collisions: Tolerance of matching between FPHX BCO and the lower 7 bits of FELIX BCO full.
- modebits: Delay for the FELIX reset signal
- open_time: Time range to accept hits of the event

Sometimes, the parameters needed to be changed due to changes in the other subsystems (GTM and MBD).

We changed modebits, normally.

open_time 35 has been used for a long time. The value was suggested by Cheng-Wei's multiplicity analysis.

We set large values to n_collision at the beginning of the commissioning since there was timing divergence among FELIXs. Now **all FELIXs are synchronized well (up to 2 BCOs) thanks to Raul**, we can set smaller values to n_collisions, ultimately 0. But we used 3 — 8, normally.

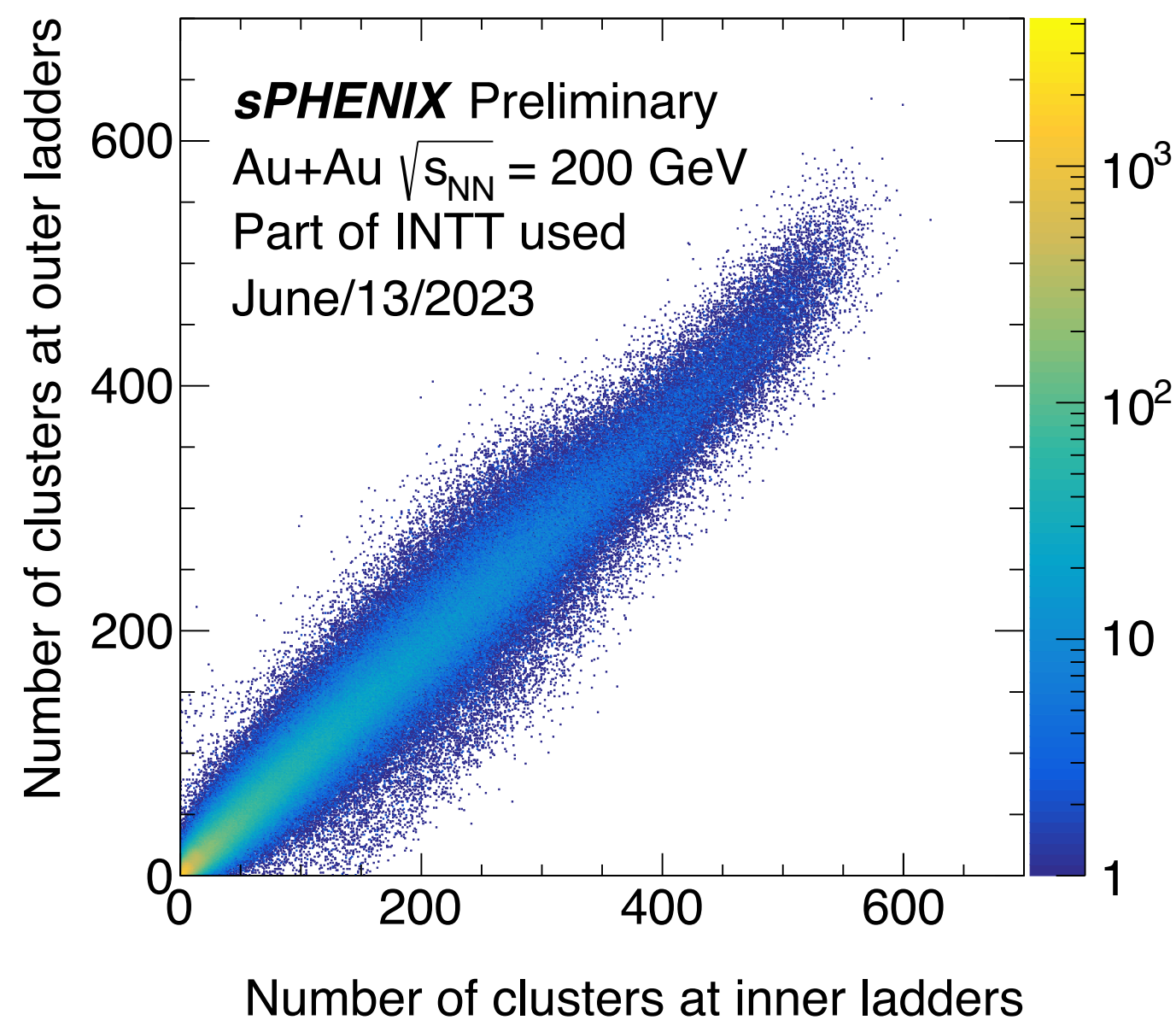
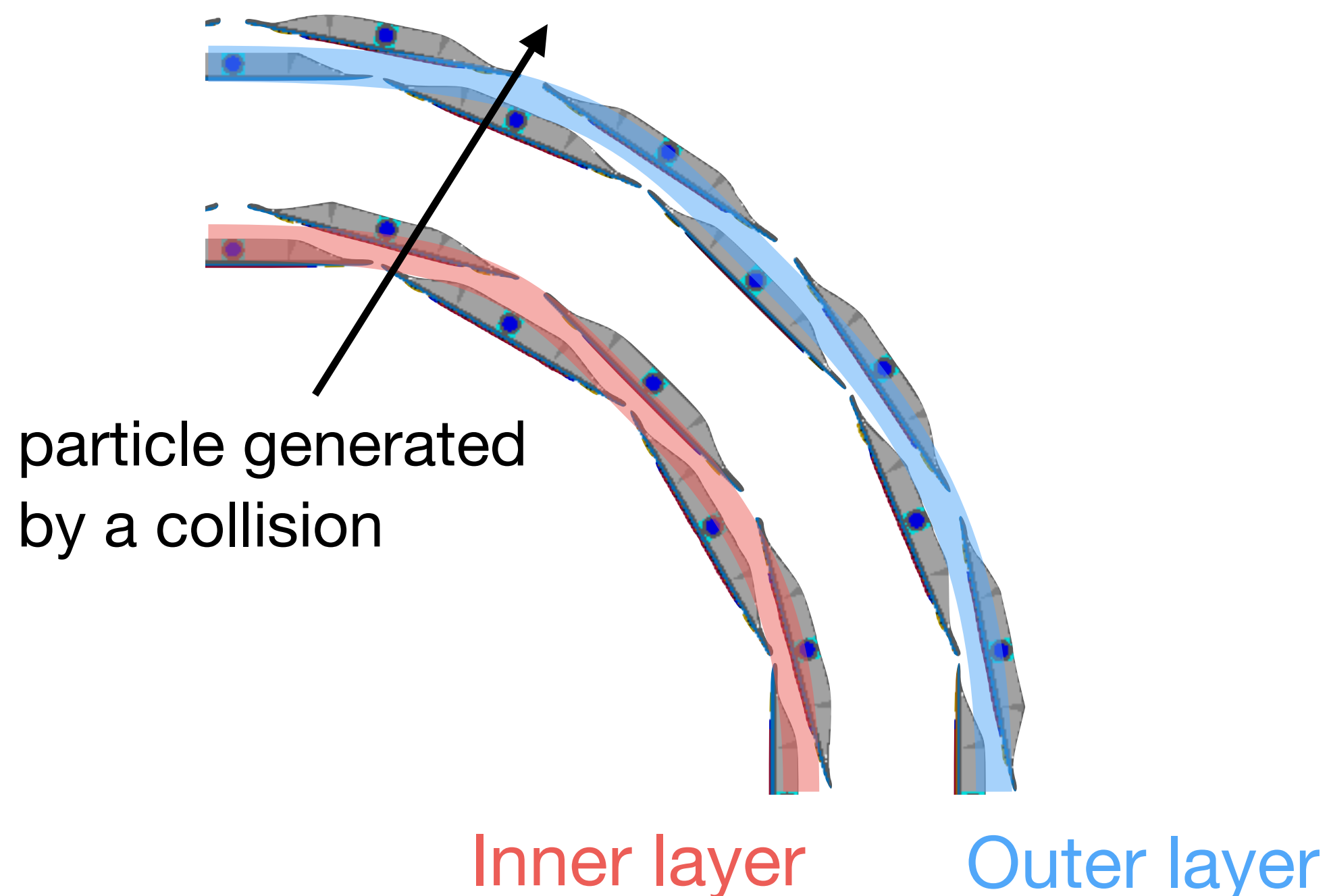


Measurements With Beam

Once INTT was timed-in, we could get good collision data. The next step was confirmation of data validation. What we did/are doing is

- checking correlations that can be more or less predicted.
- MIP peak observation
- $dN/d\eta$ analysis

One of the most straightforward tests is the correlation of the number of hits on the inner and the outer layers.



Correlations of a variety of parameters were also checked:

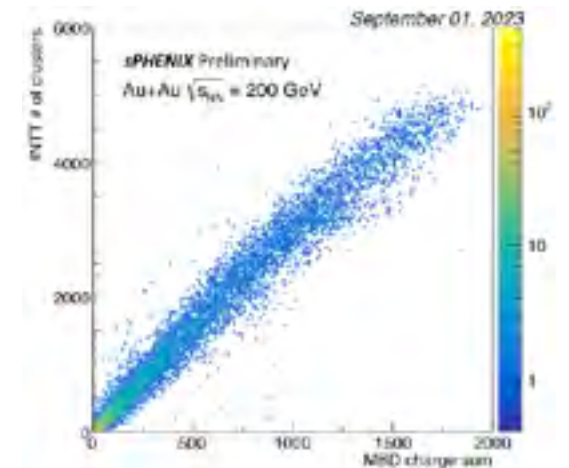
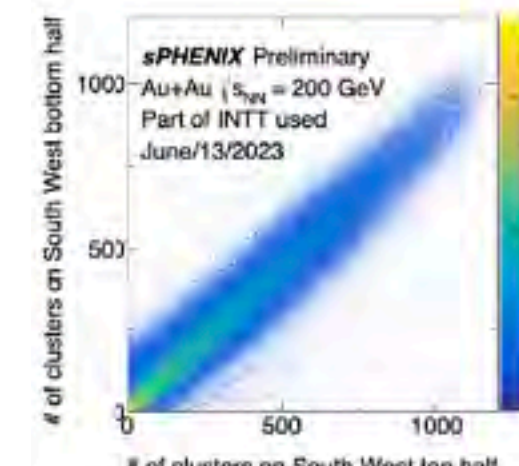
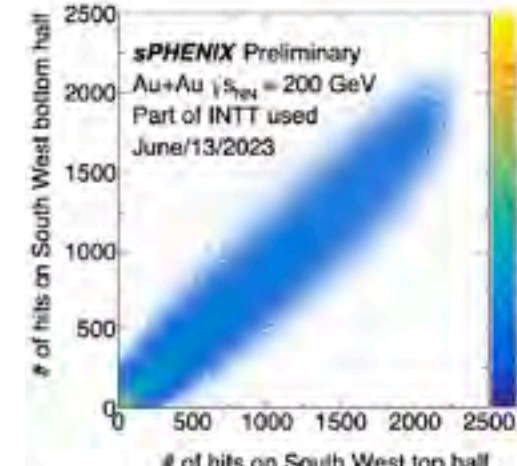
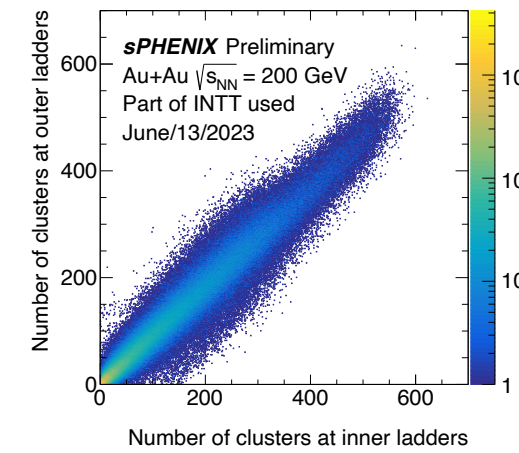
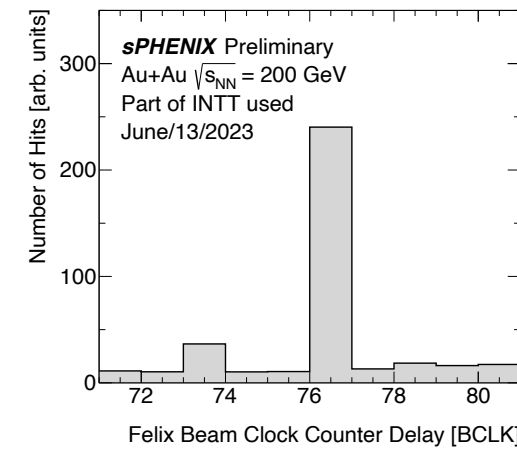
- #hits (#clusters) of a part of INTT
- #clusters in TPOT
- MBD charge
- $Z_{vtx, MBD}$ VS $Z_{vtx, INTT}$

and lots of results were released.

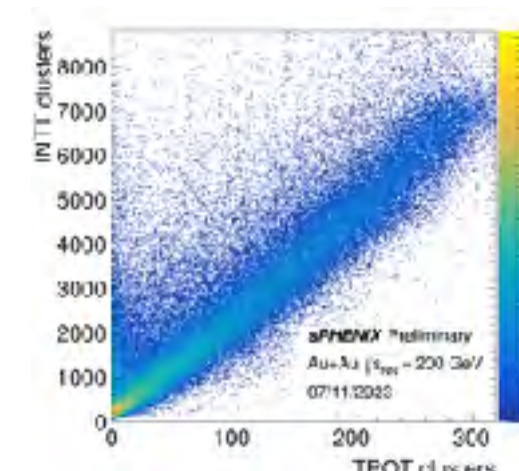
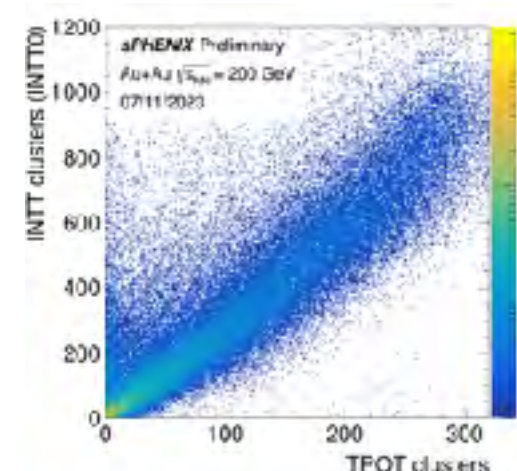
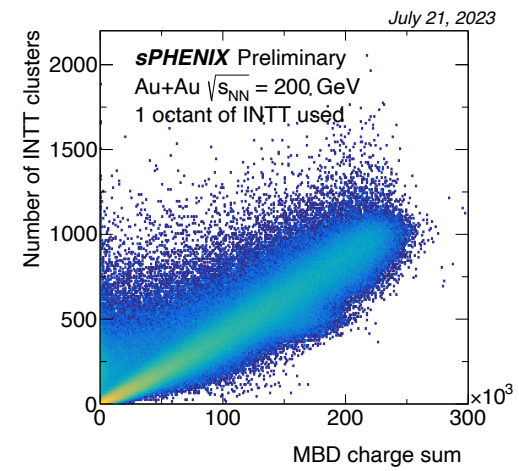
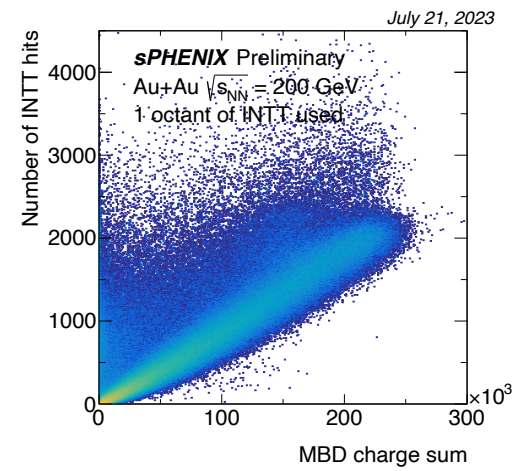
Measurements With Beam

Released plots collection with beam

June 14, 2023

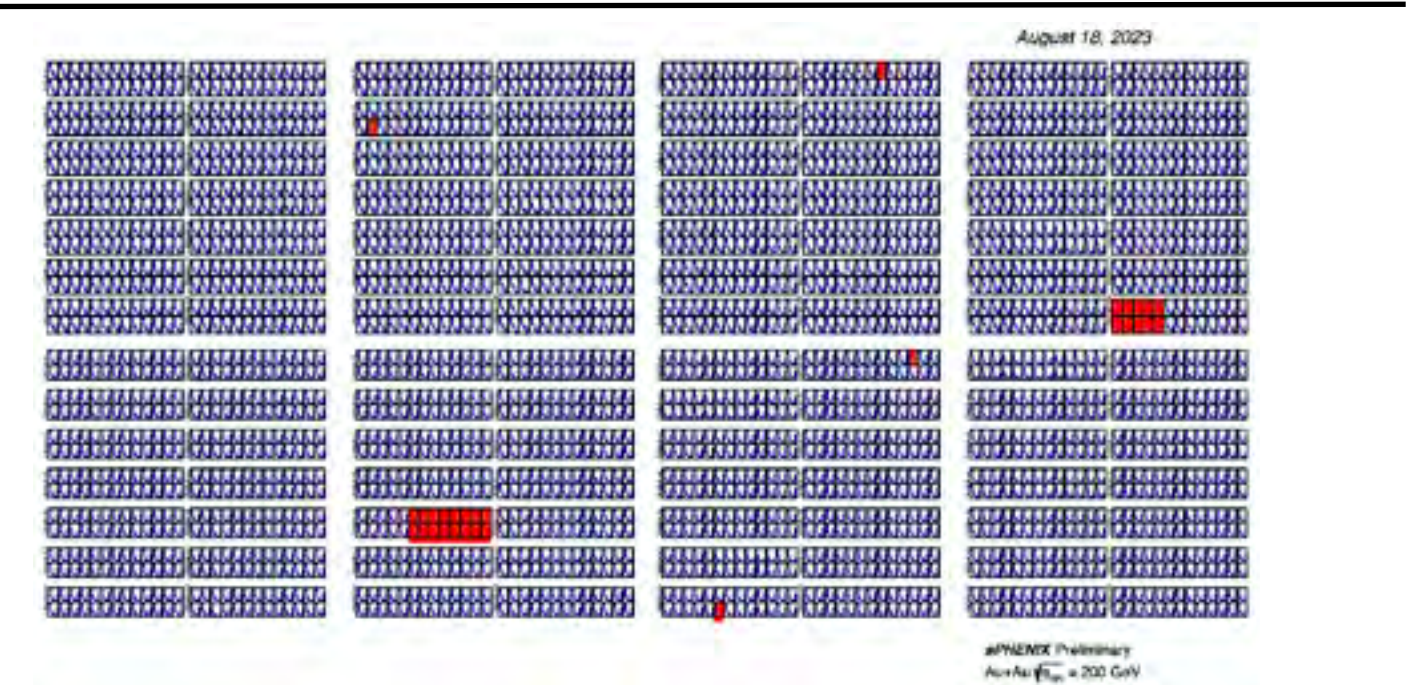
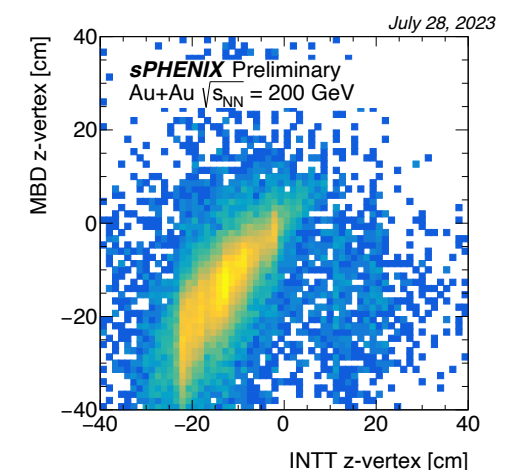
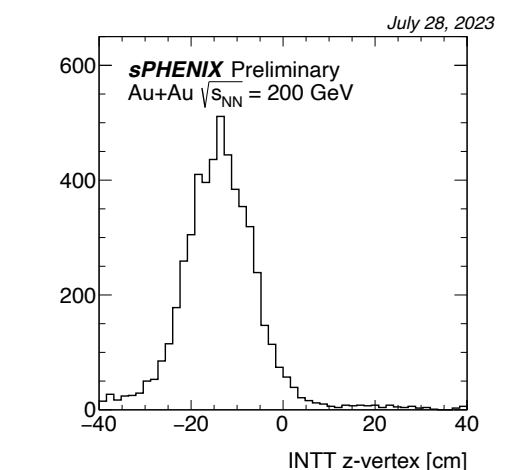


July 21, 2023

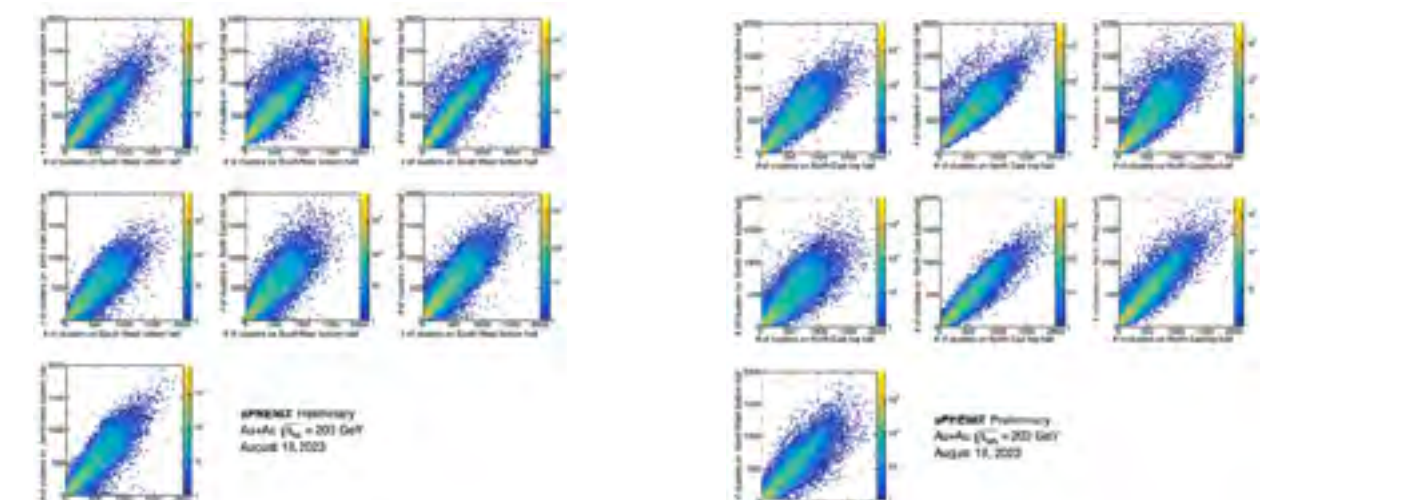
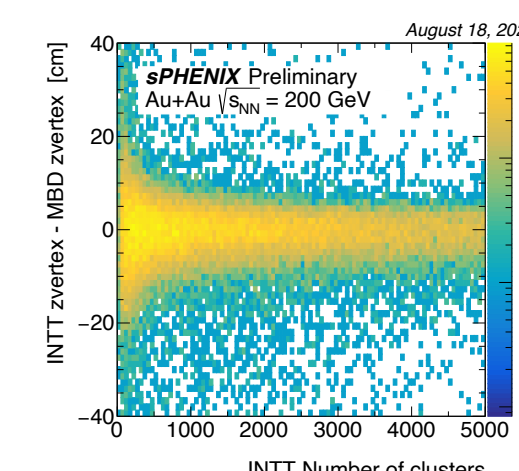
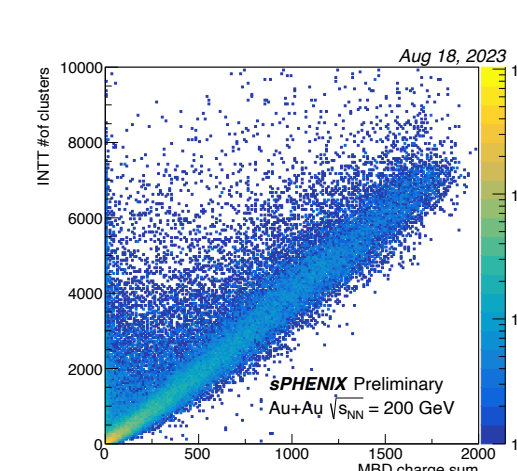
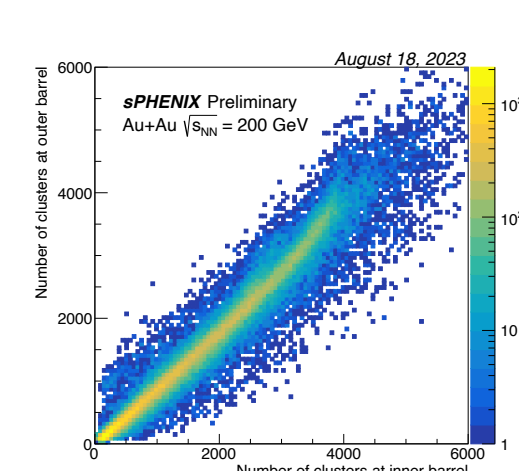
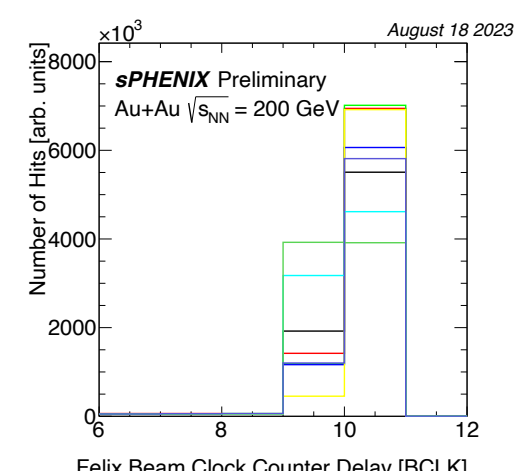


Sep. 1, 2023

July 28, 2023



Aug. 28, 2023

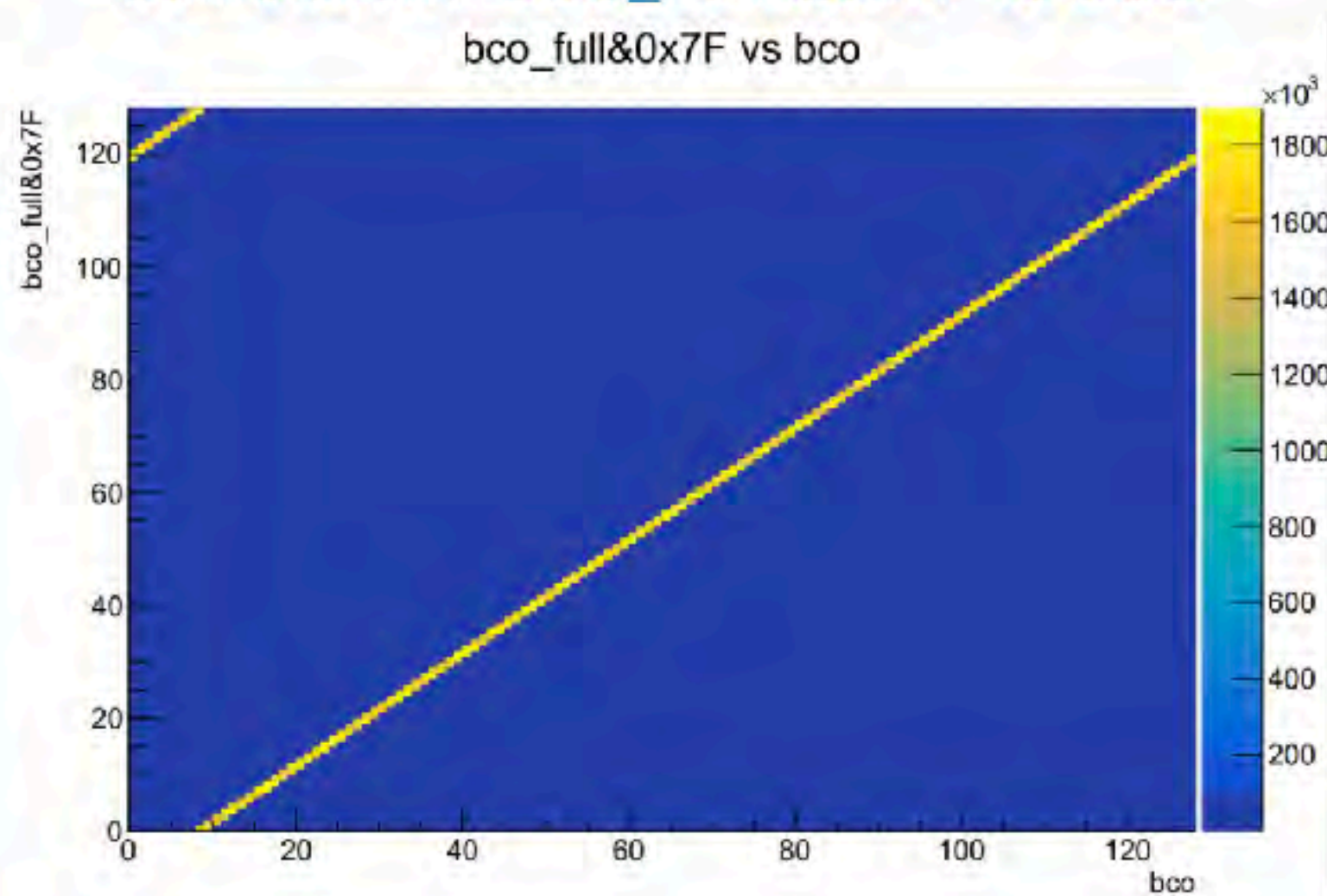


Measurements With Beam: Event Mix-Up

Mai K. reported a weak but non-zero correlation of hits between events. The mix-up event will screw up track reconstruction of INTT in offline analysis and has to be fixed.

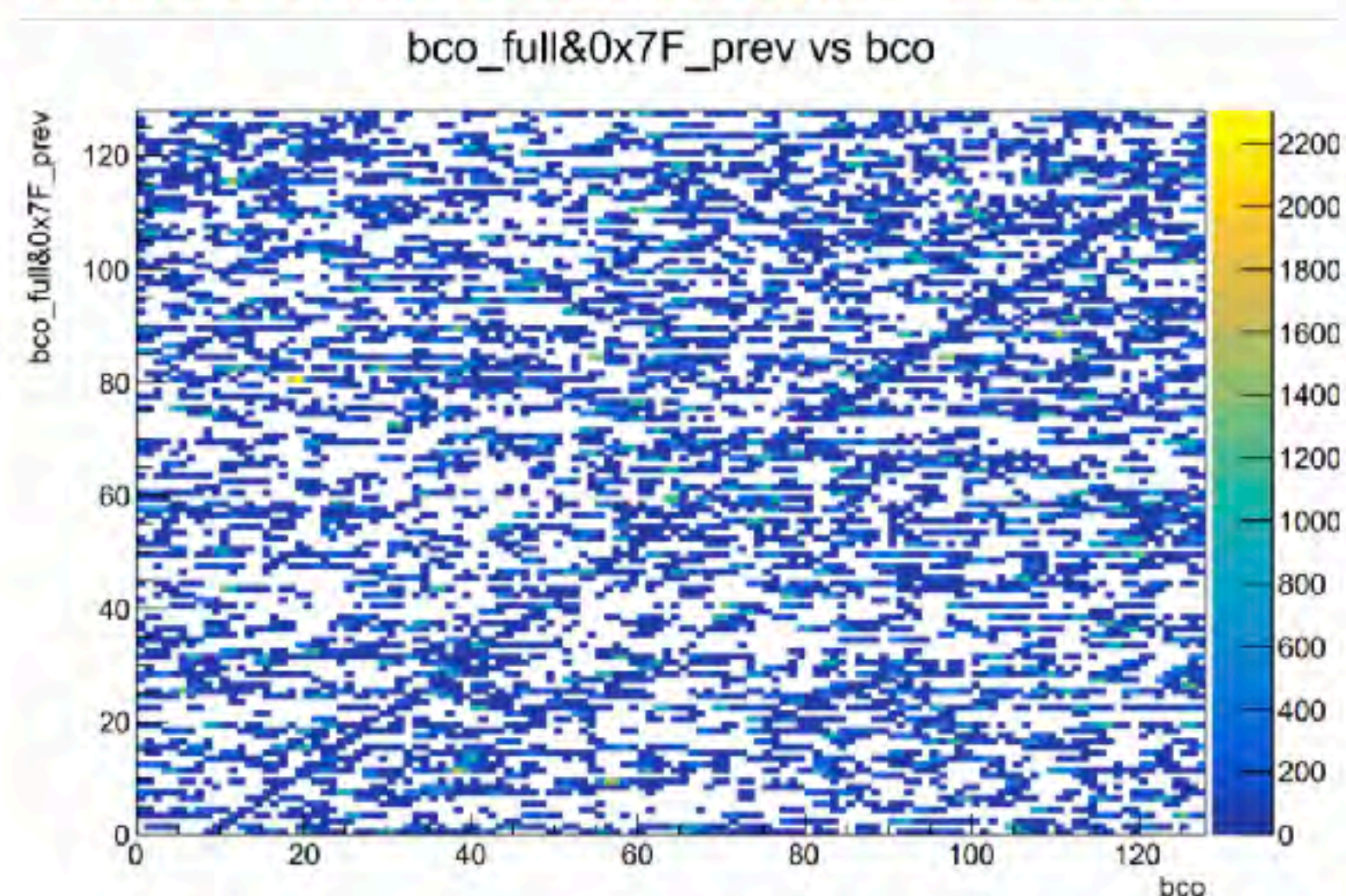
Her study proved the existence of the event mix-up issue. Now Raul is involved to solve it.

Same event BCO_Full & 0x7F vs BCO



Correlation of lower 7 bits of BCO full and BCO in the same event.
A clear correlation was found as expected.

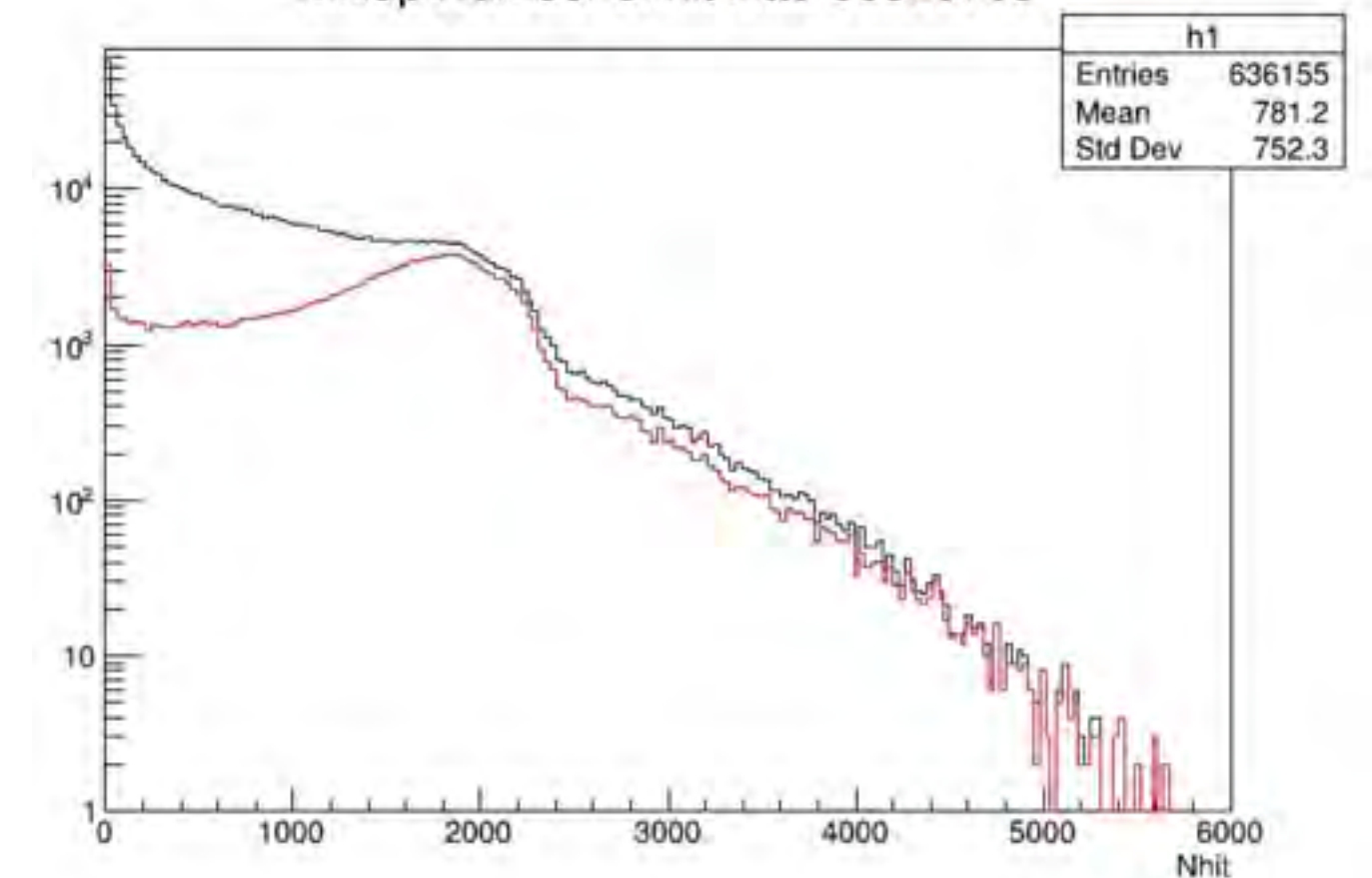
Previous event BCO_Full & 0x7F vs BCO



Correlation of lower 7 bits of BCO full of the previous event and BCO of an event.
A correlation was found unexpectedly.

Black: All events Red: Mixup events

Mixup Number of hit intt5-00020708



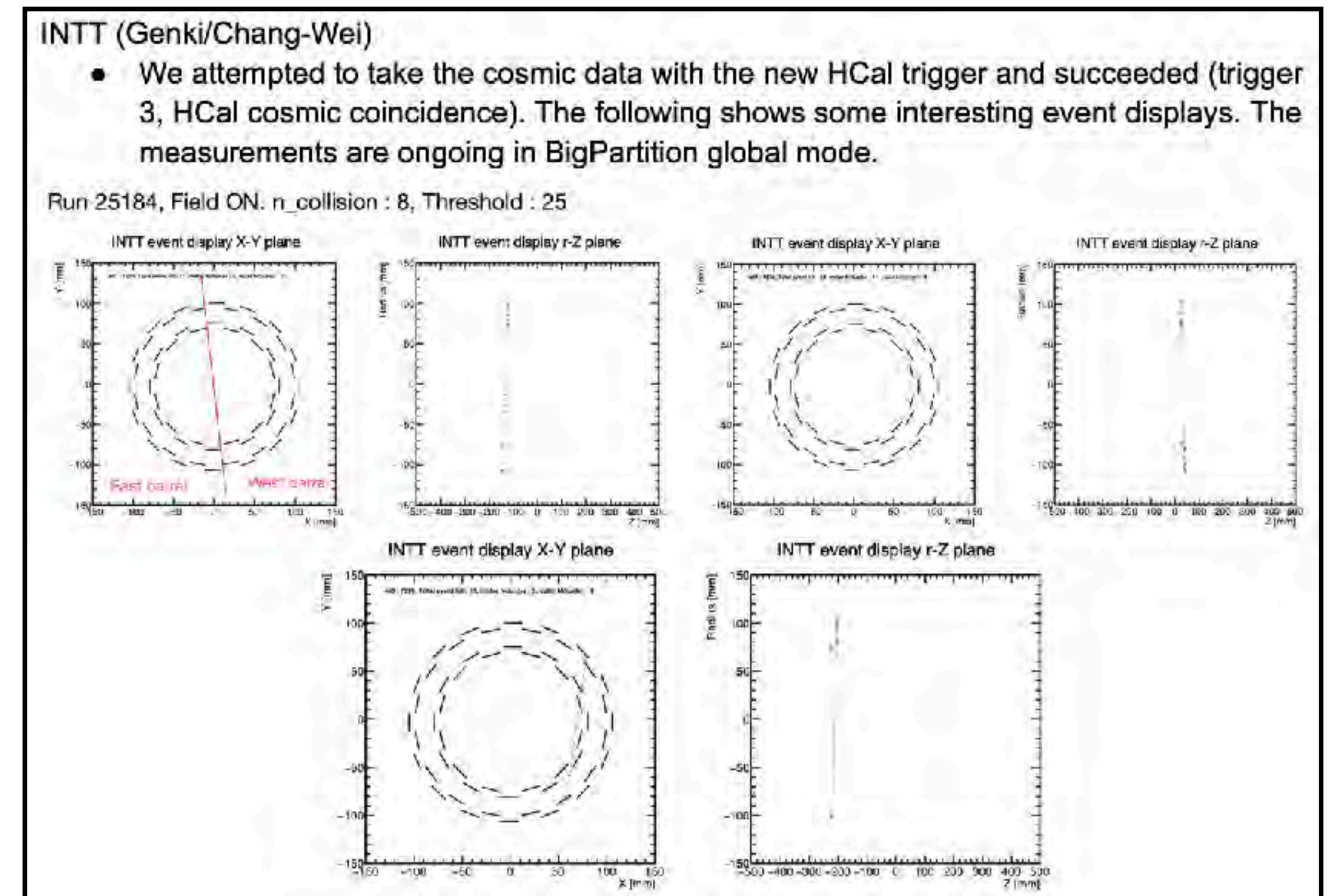
Correlation of lower 7 bits of BCO full of the previous event and BCO of an event.
A correlation was found unexpectedly.

Measurements With Cosmic Triggers

The first requirement from sPHENIX for us was tracking findings. Cheng-Wei quickly achieved it and led the tracking detector collaboration to find tracks detected by tracking subsystems.

- Common tracks were found together with TPOT under the magnetic field.
- Common tracks were found together with MVTX/TPC/TPOT without the magnetic field.
- Common tracks were found in the streaming readout mode together with MVTX without the magnetic field.

Since INTT is the most reliable tracking detector in sPHENIX, we had to serve sPHENIX. So, our activity was limited. The unstable chillers also lost the chance for detector study. Finally, we got lots of statistics in the same condition (at least for the vertical trigger).

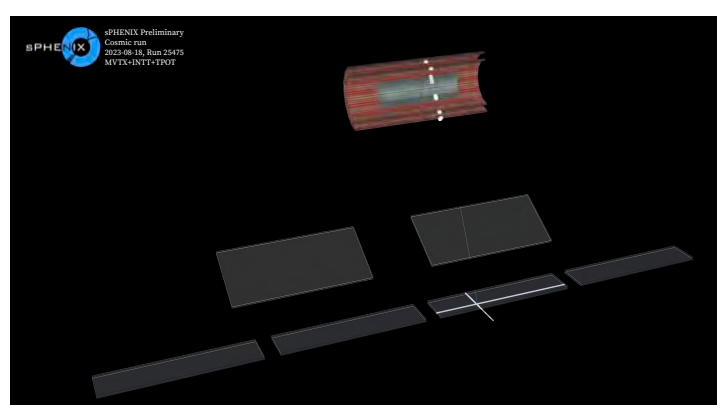
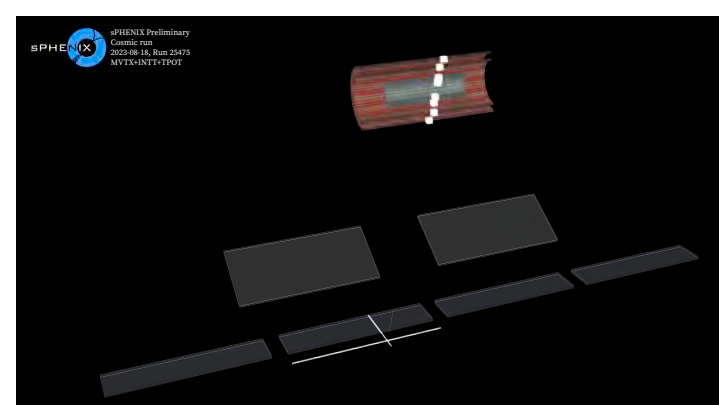
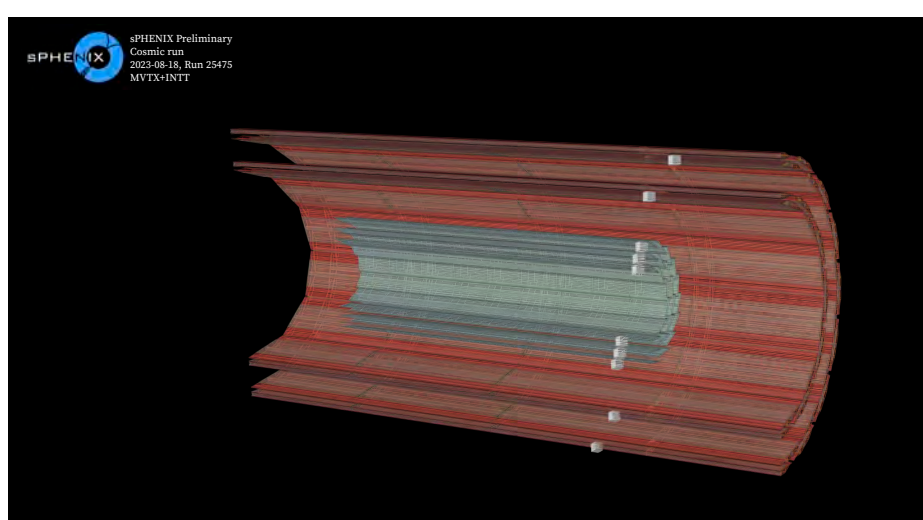
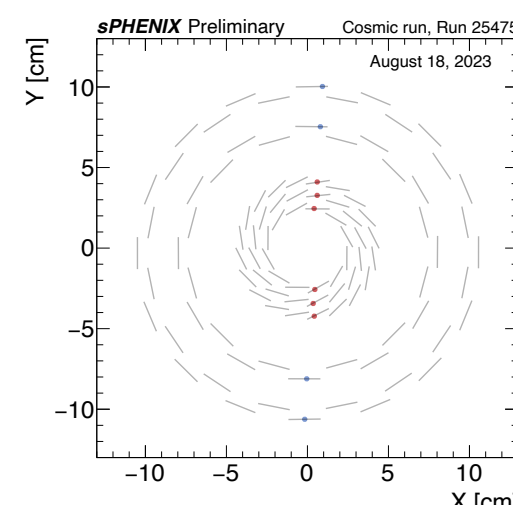
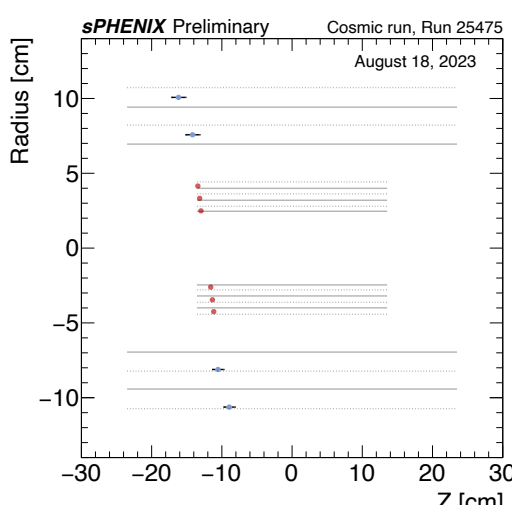
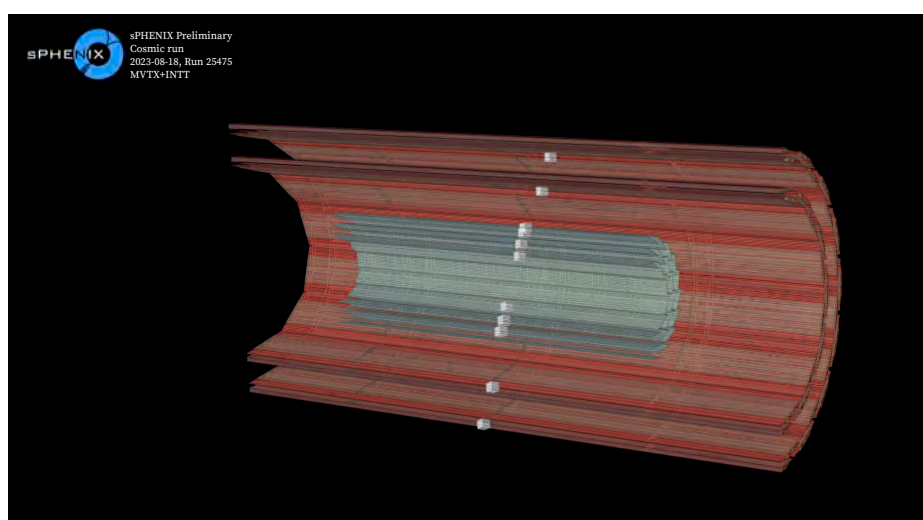
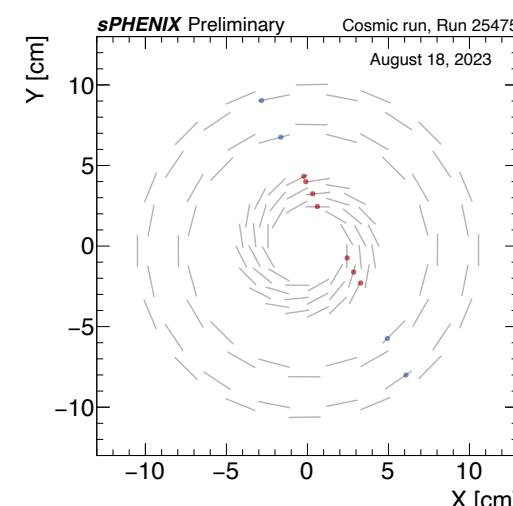
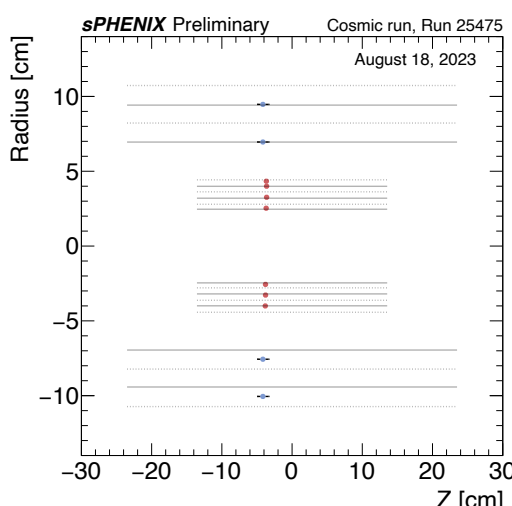
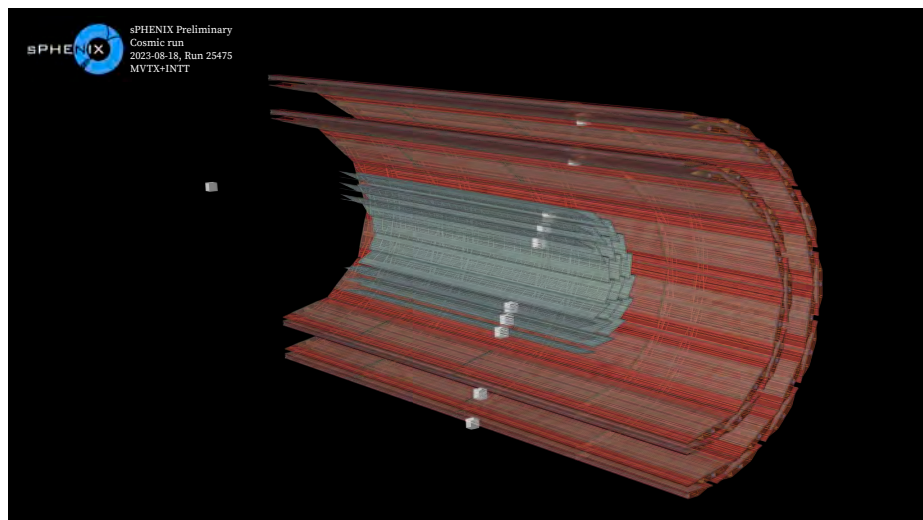
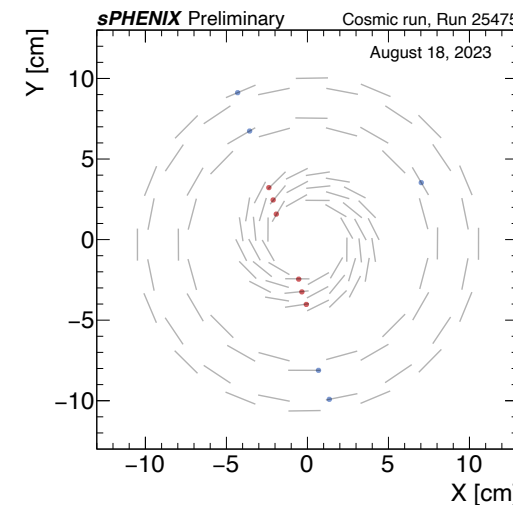
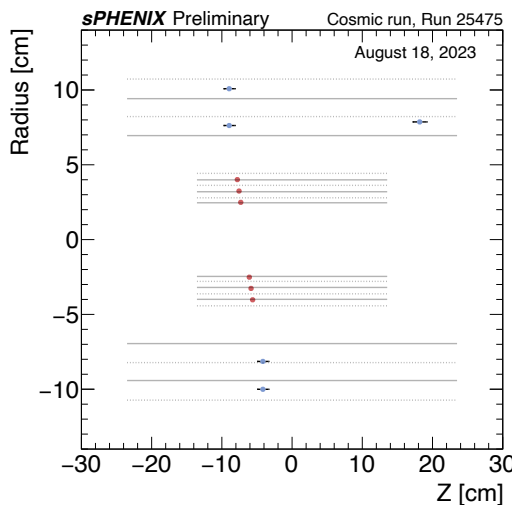


The first report about cosmic track finding at the shift change meeting by Cheng-Wei.

Measurements With Cosmic Triggers

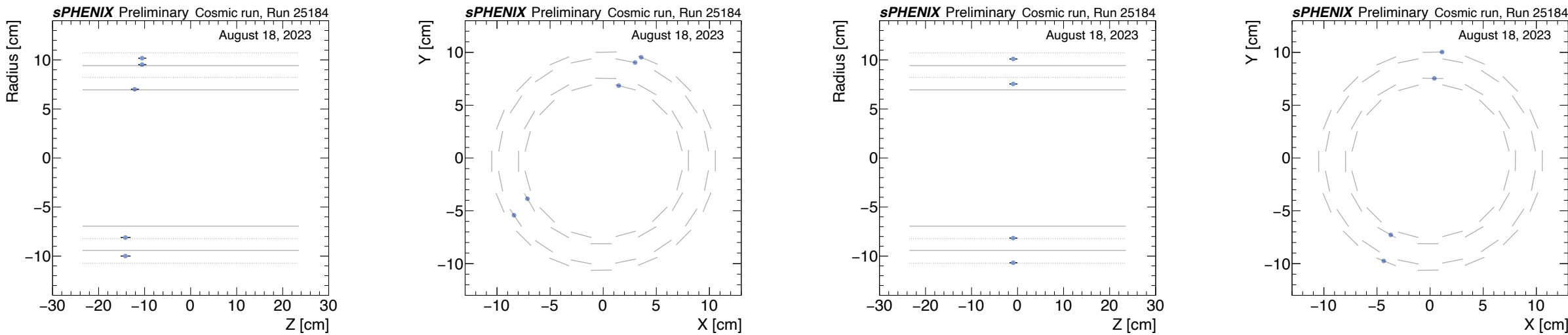
Released plots collection with cosmic ray

Aug. 18, 2023

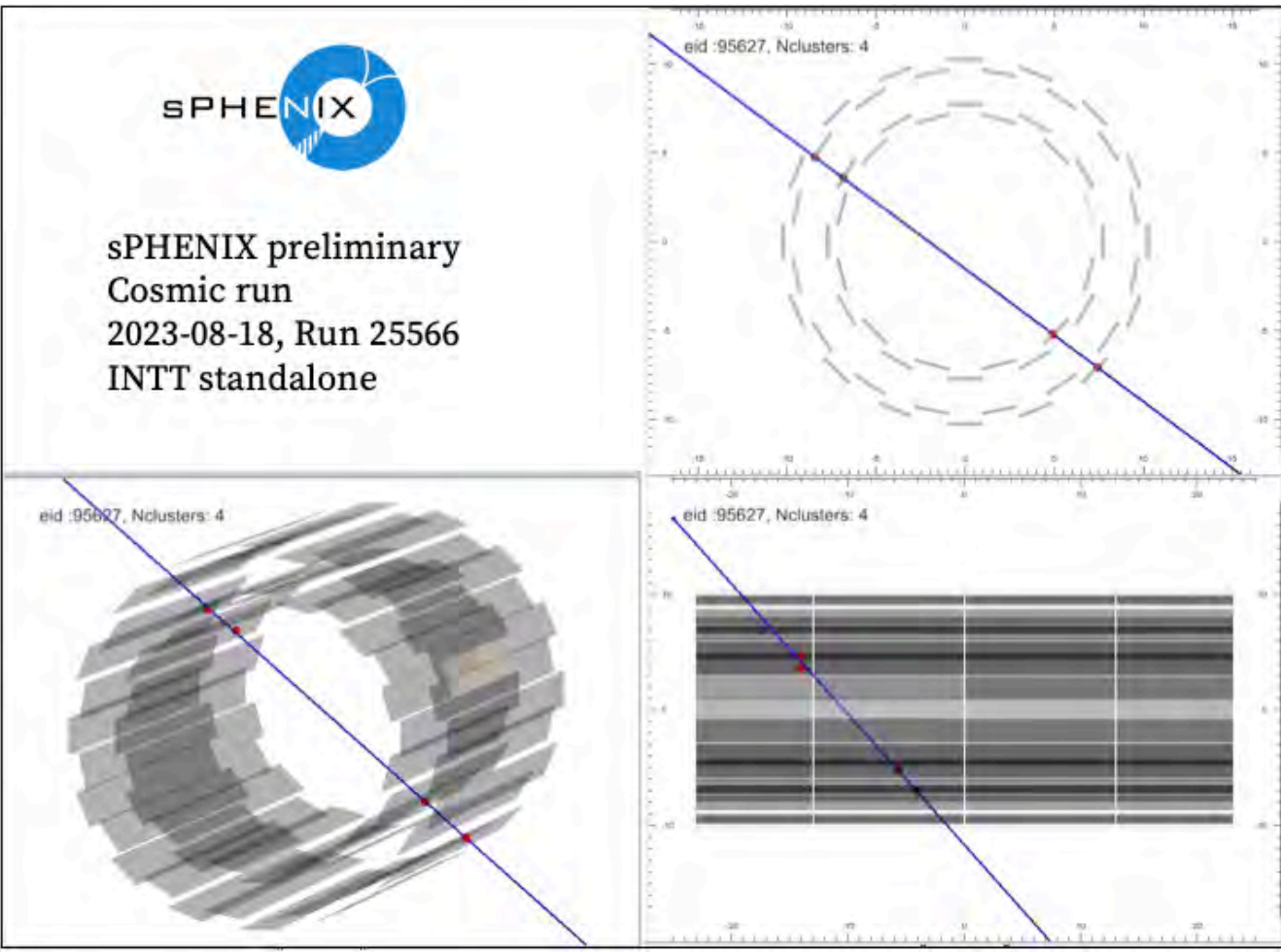
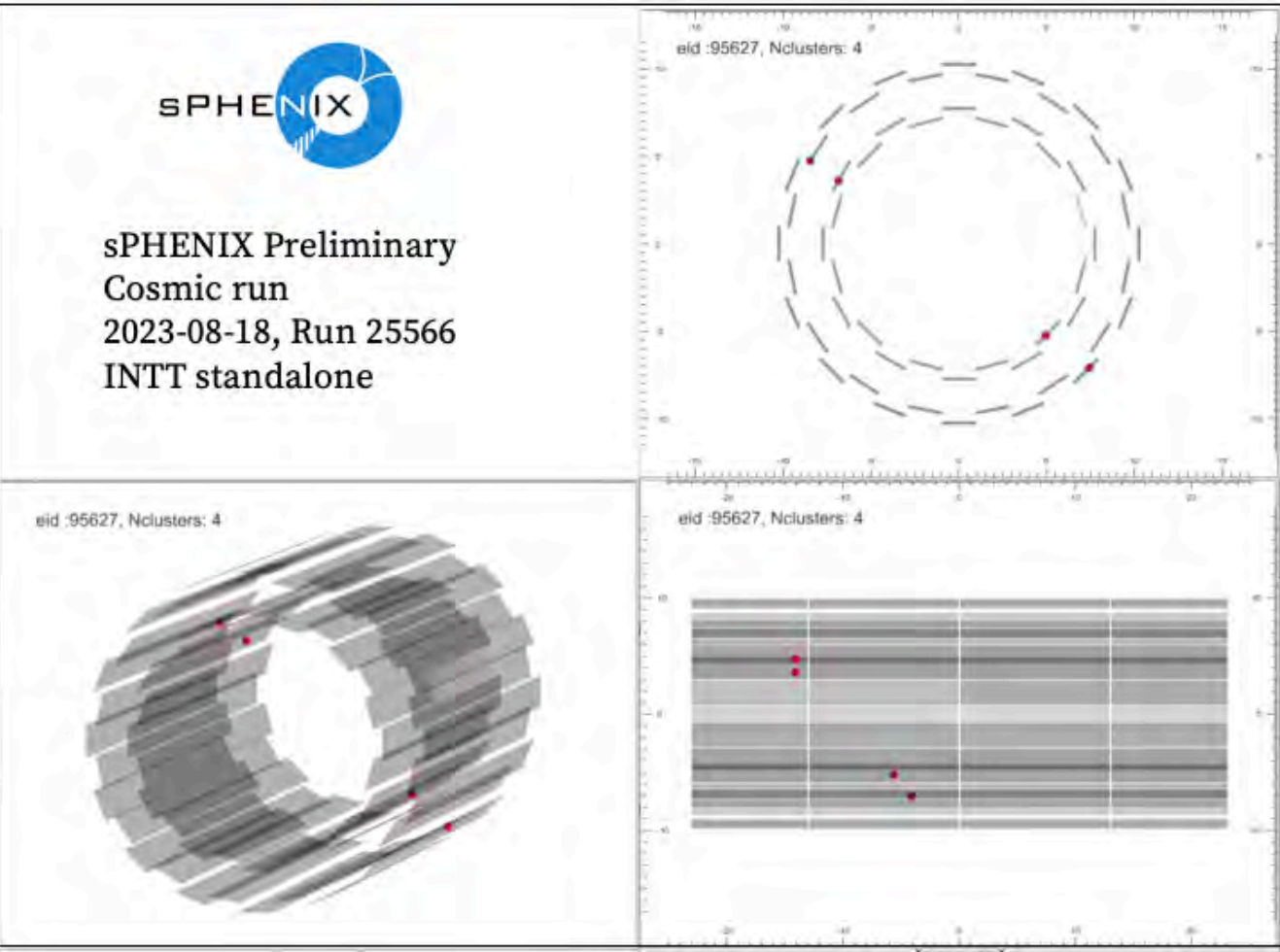
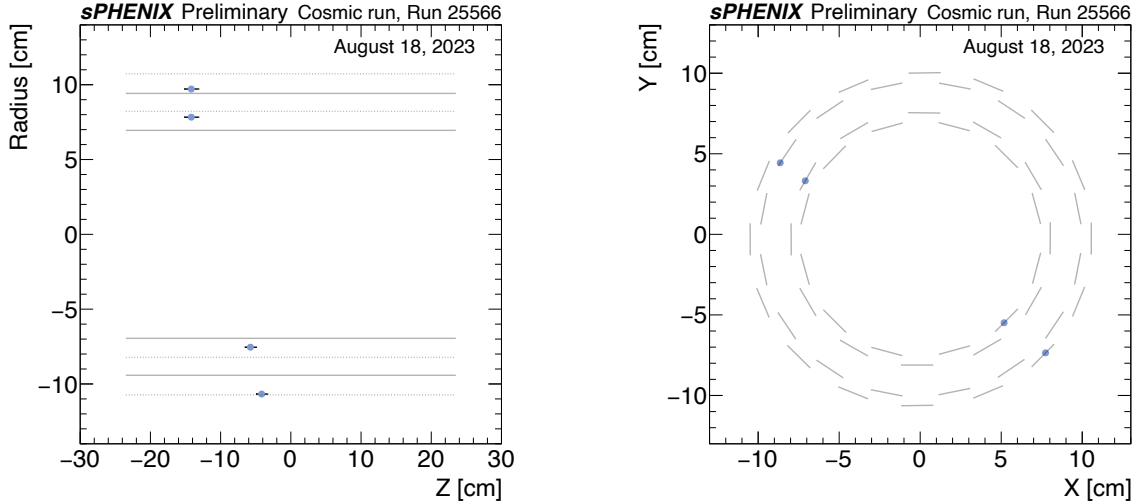


Measurements With Cosmic Triggers

Released plots collection with cosmic ray

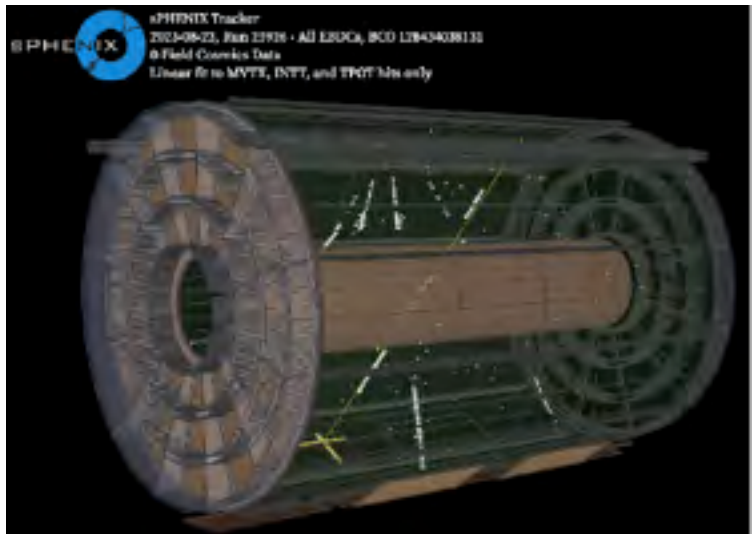
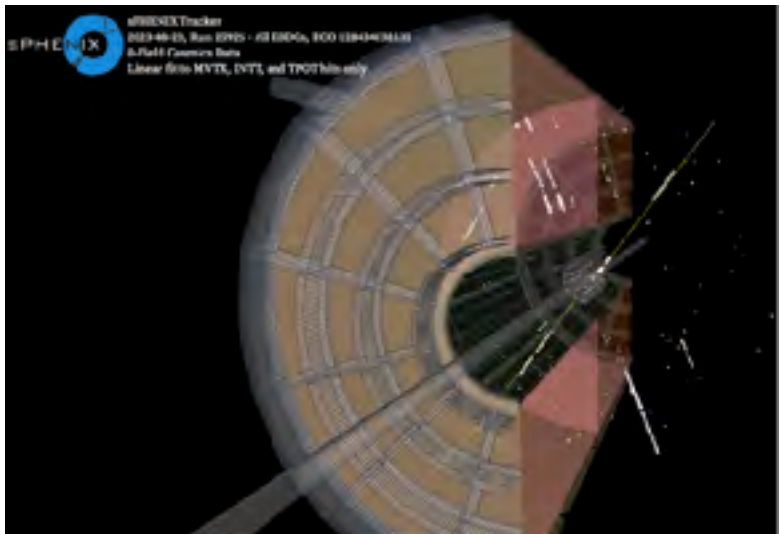
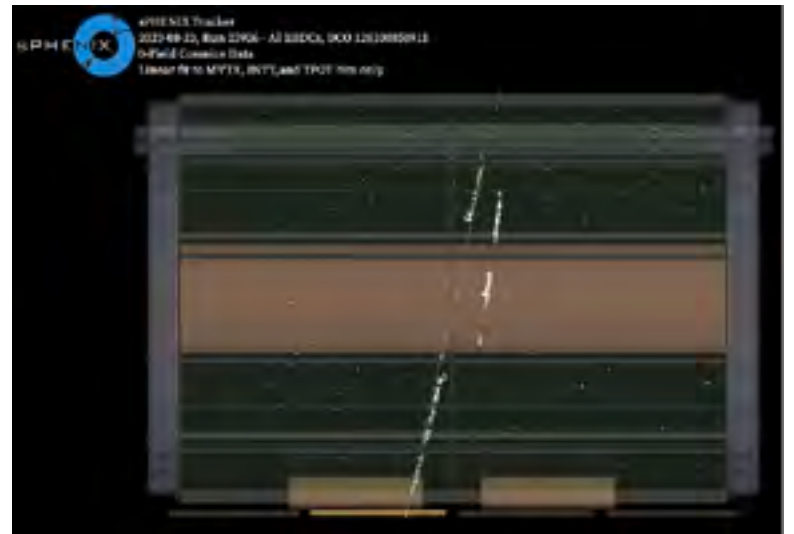
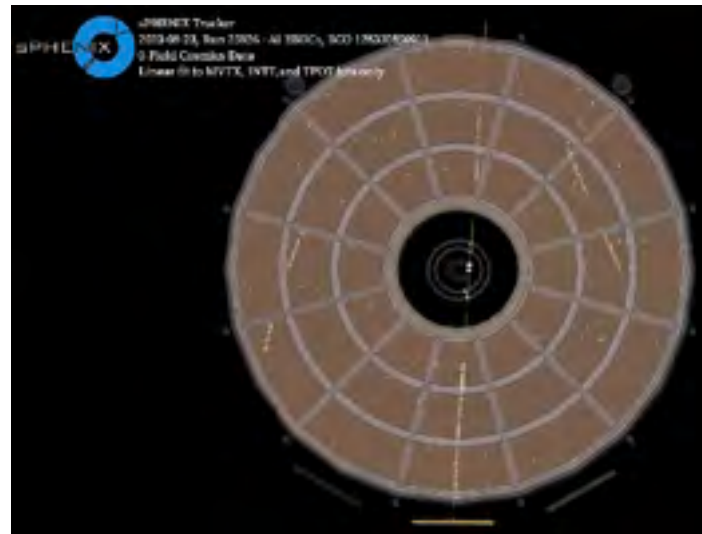
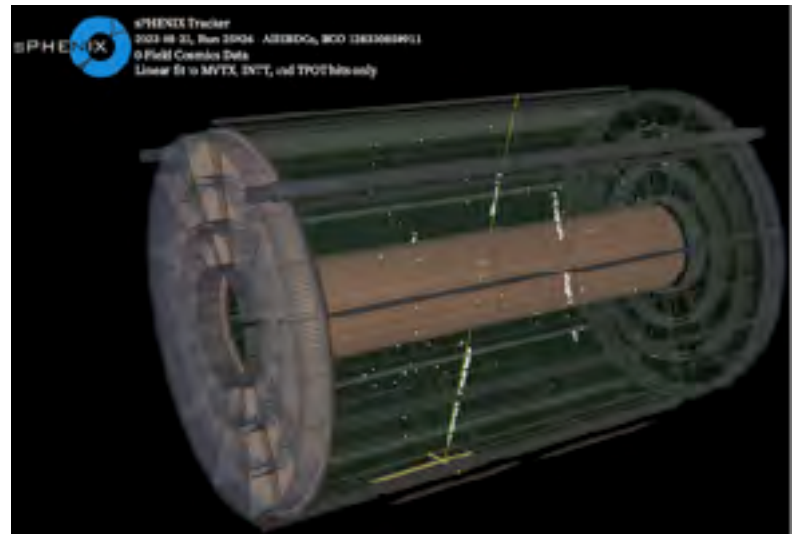
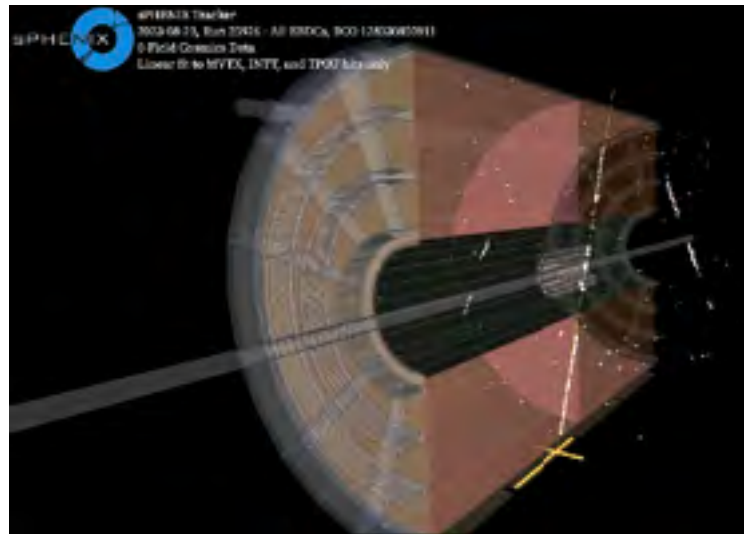
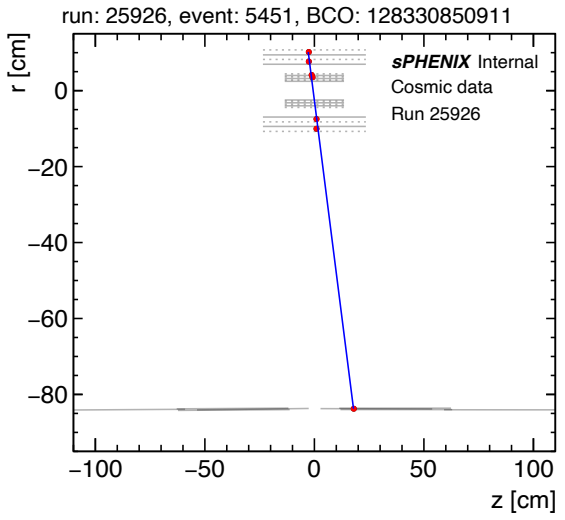
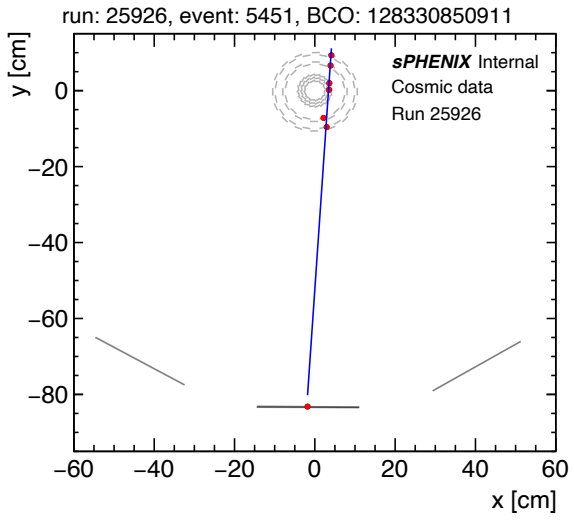
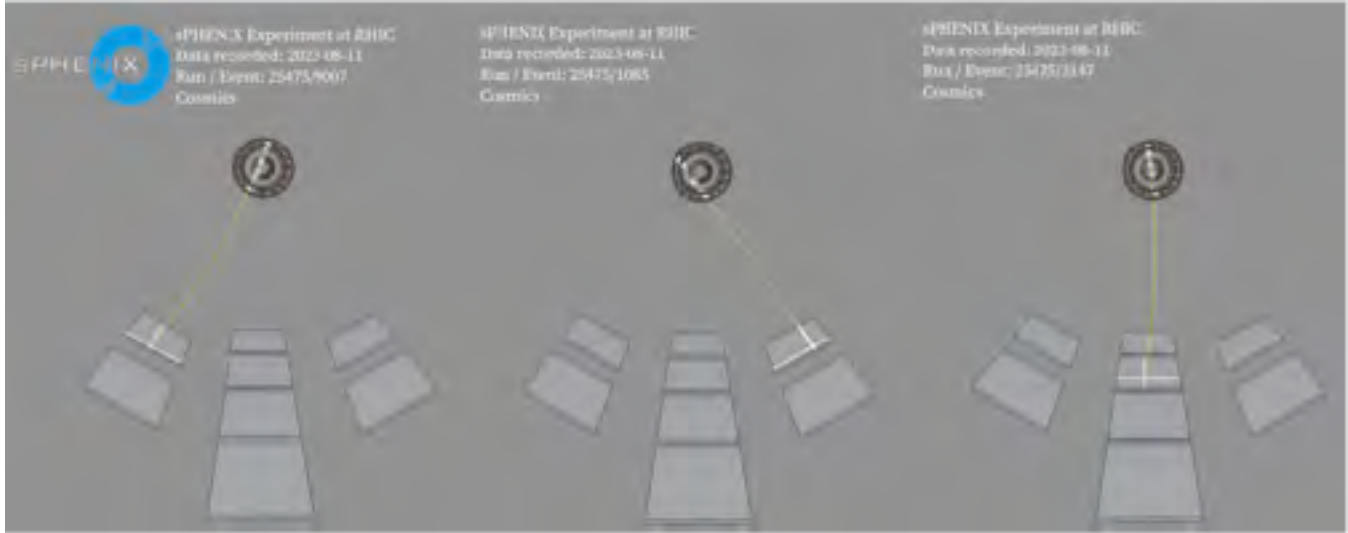


Aug. 23, 2023



Measurements With Cosmic Triggers

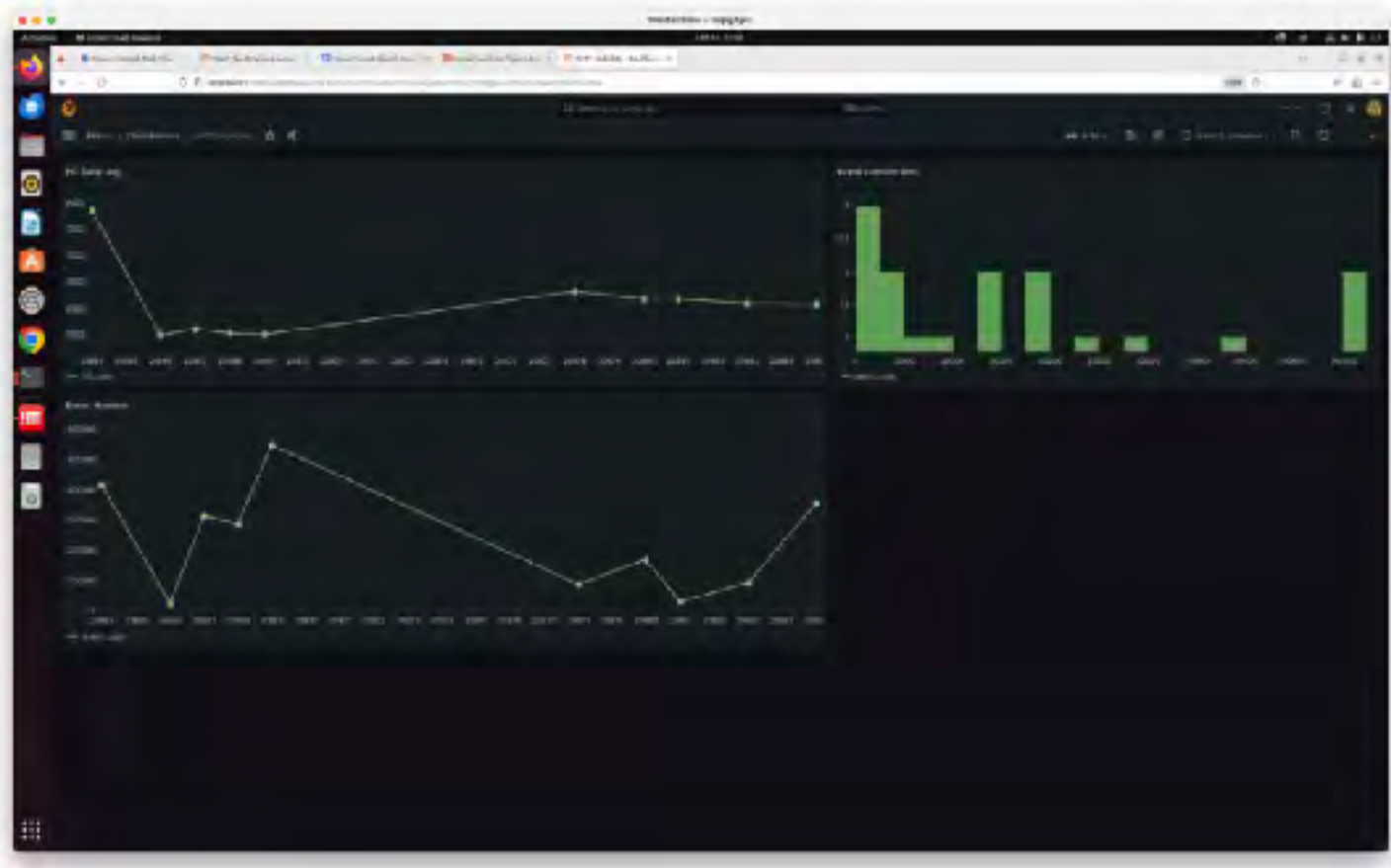
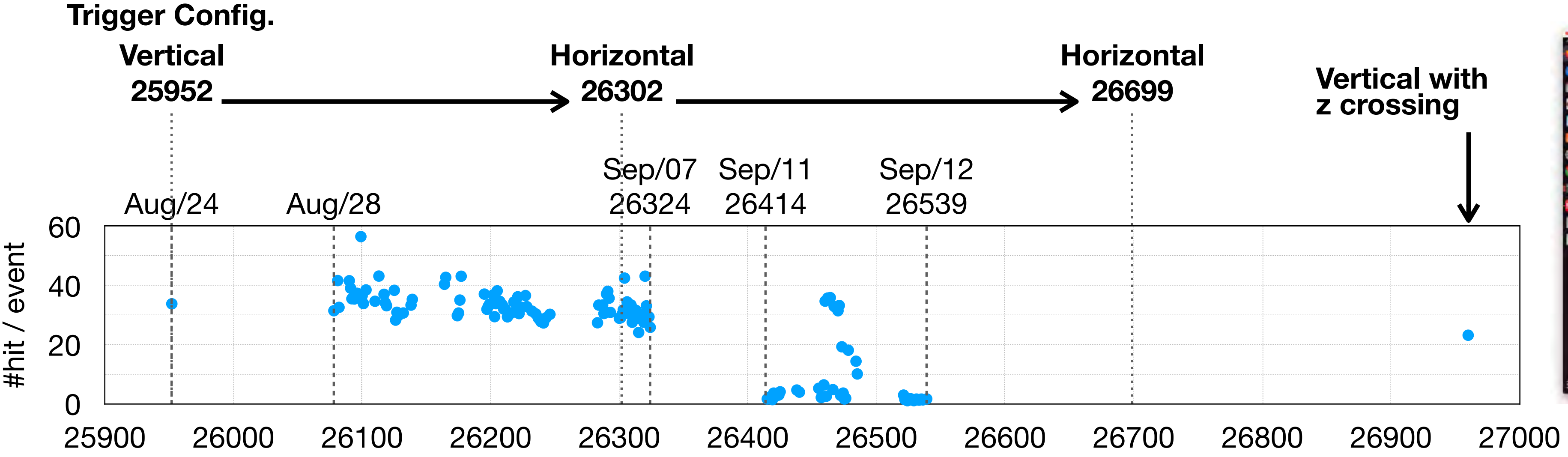
Released plots collection with cosmic ray



Aug. 31, 2023

Measurements With Cosmic Triggers

It was a good opportunity for stability study. INTT was basically stable. We found a necessary to update the LV GUI (done, to be tested). Also, operation history viewers for LV/HV are needed. Wei-Che is working on the stability monitor.



Measurements With Cosmic Triggers

Activities using cosmic data are less than those with beam data. We have to work on more!

People interested in

- Genki (detection efficiency)
- Wei-Che (detection efficiency)
- Mai K. (alignment)
- Ryota (for noise study)
- undergrad from NWU?

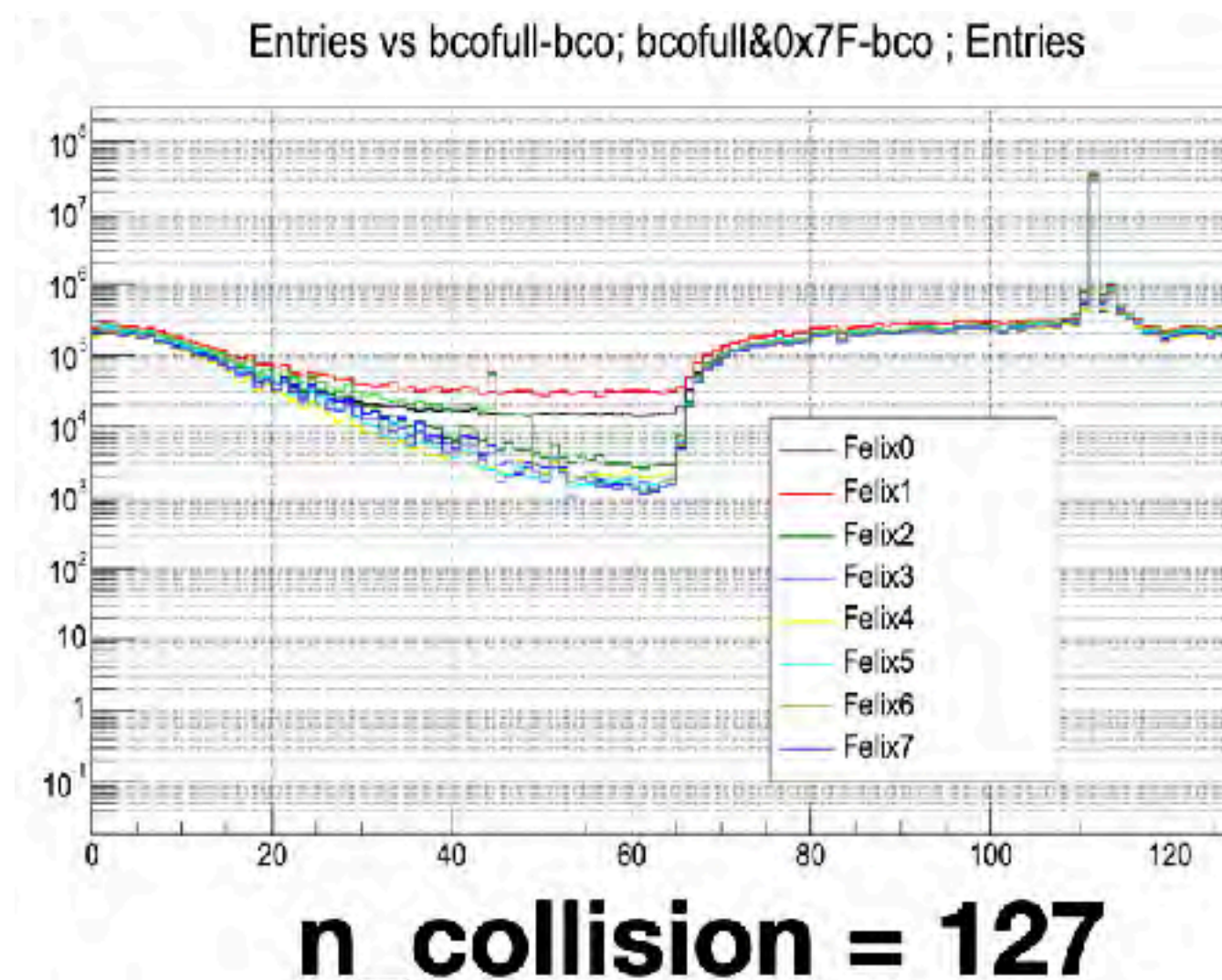
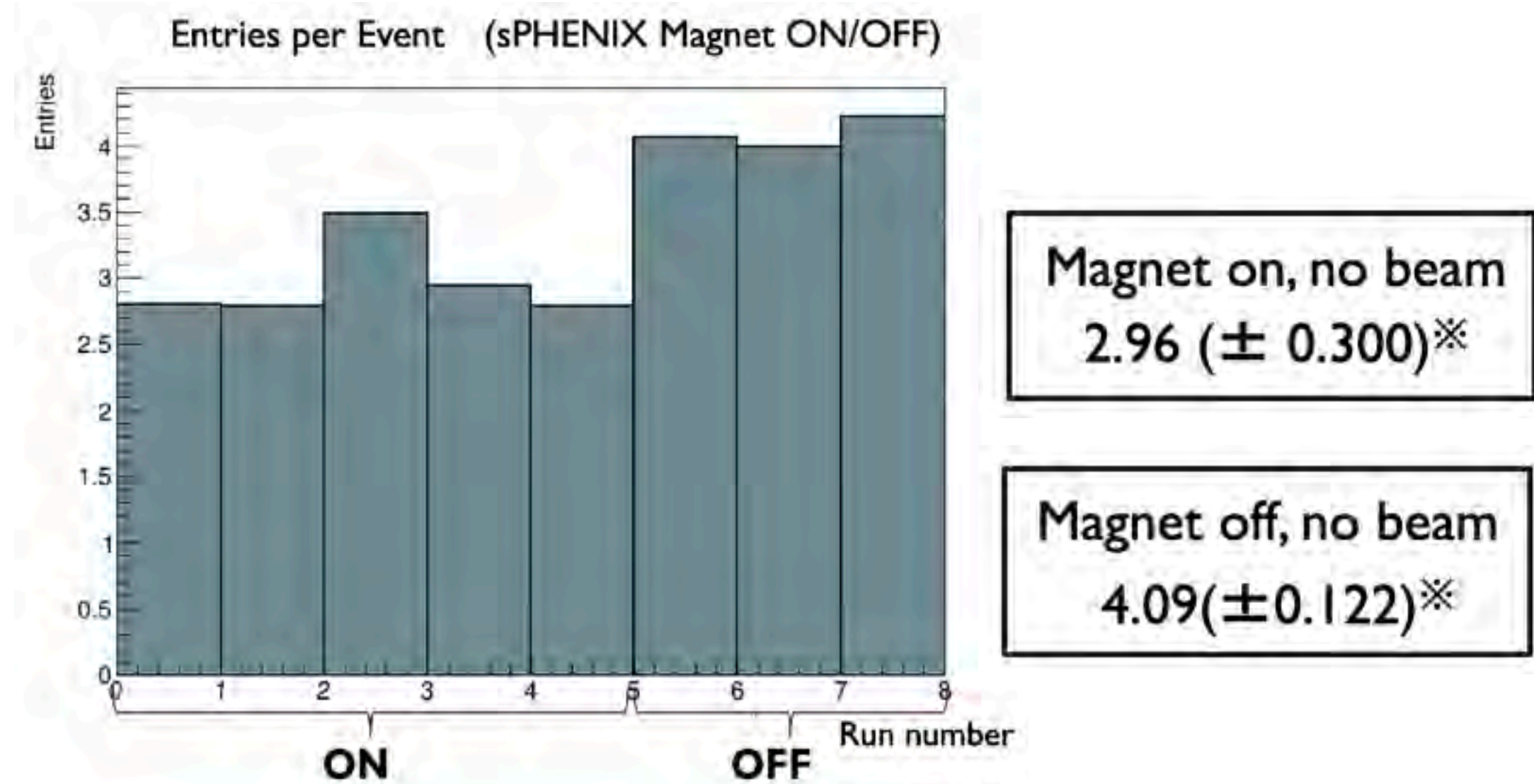
Commissioning: Pedestal Measurements

The pedestal measurements this year were

- Few trials when RHIC was working
 - Jain did some study for DAC0 optimization. It's not (could not be?) finalized yet, in my understanding.
- **Weekly measurements after the RHIC trouble**
 - Ryota organized the data taking and analyzed data.
- n.b. Beam data but not timed-in data/data selection can be used for the pedestal study.

We have good knowledge of noise thanks to Ryota's work. It has to be released, I think.

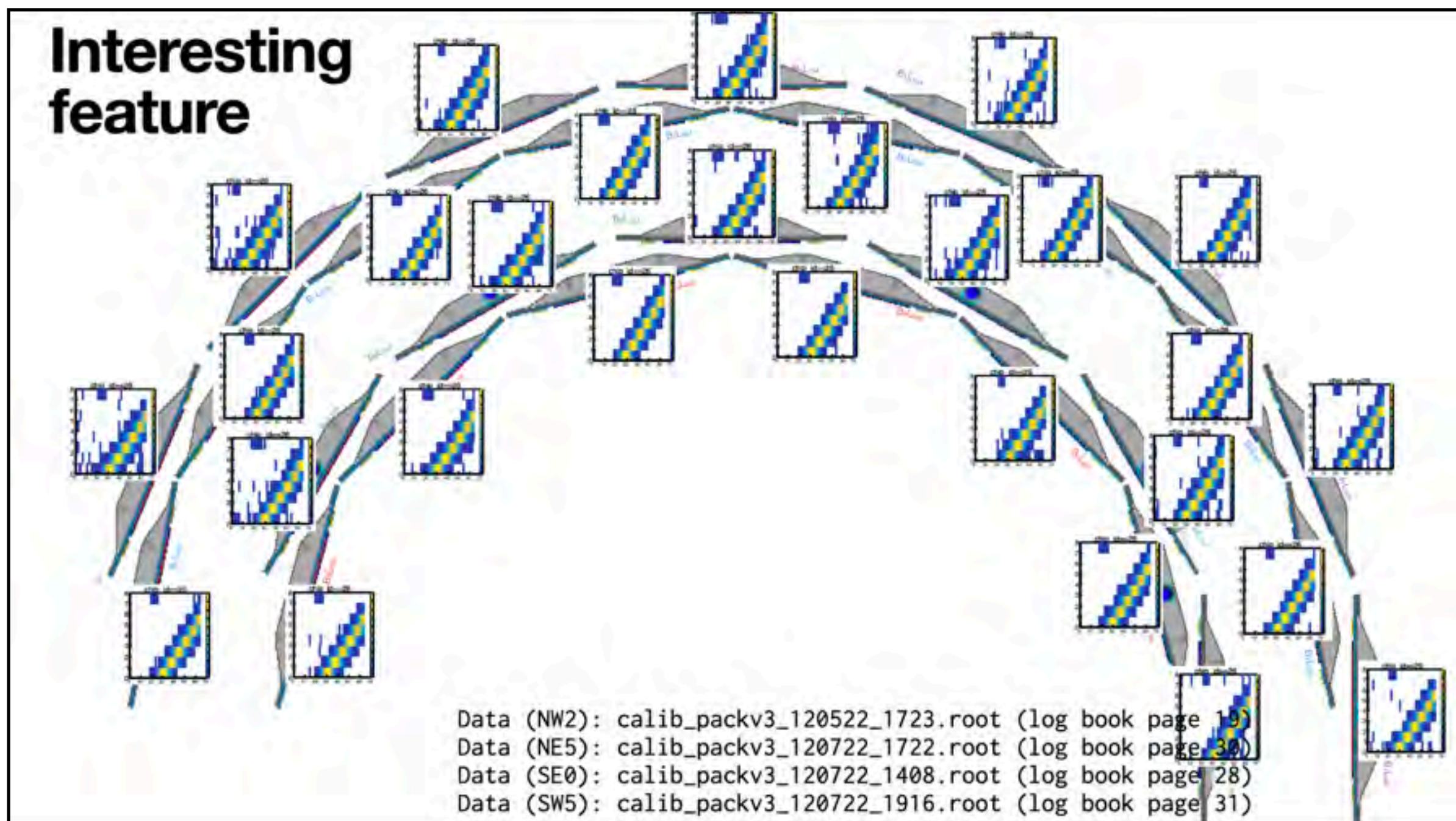
His analysis came to the next stage. The shape of the #hits distribution is quite interesting. He is investigating noise features. What about the layer dependence?



Commissioning: Pedestal Measurements

One idea for finding noise features: layer dependence

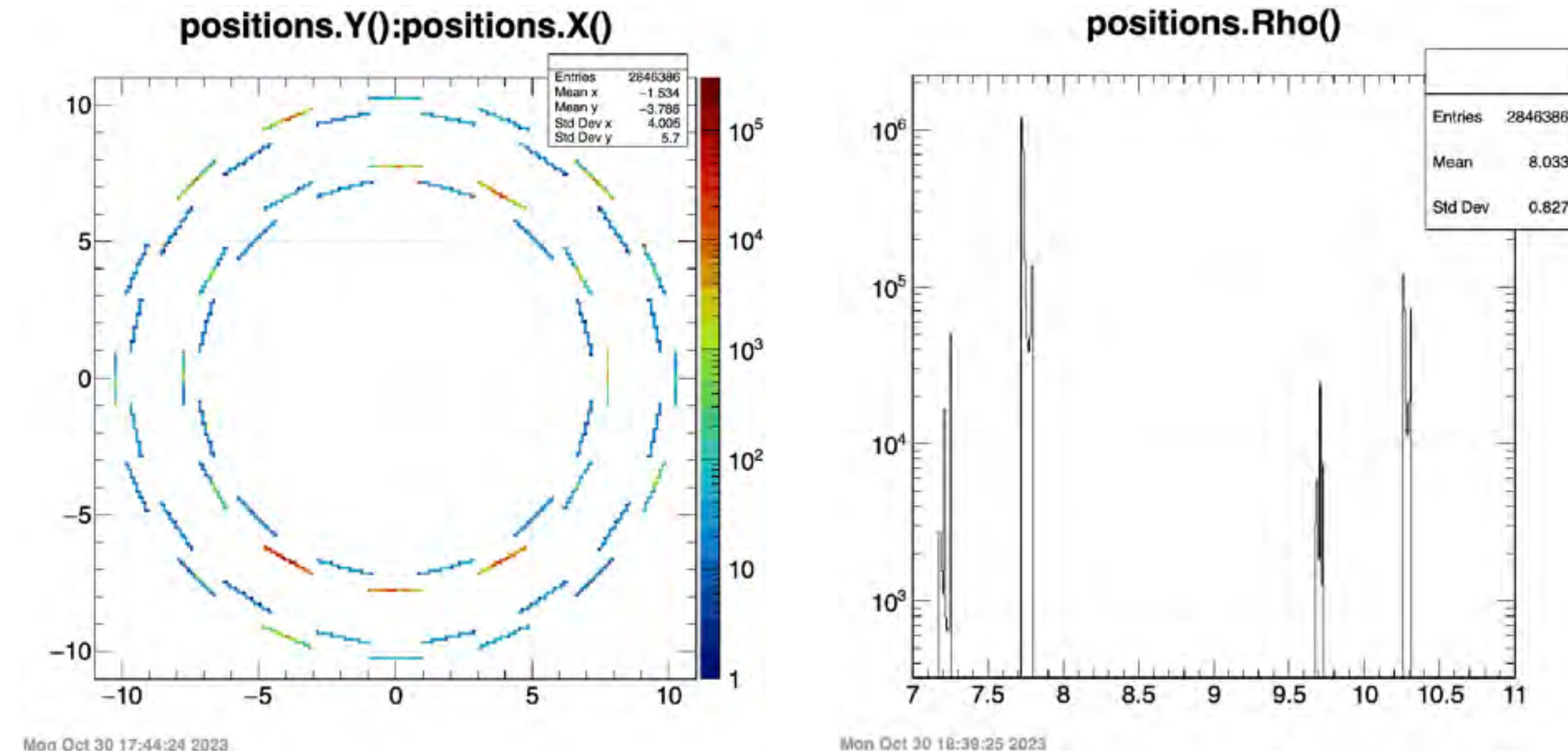
INTT half-barrel in the silicon lab



INTT meeting, Feb. 23 2023?

INTT barrel in the IR

Run25926 (2023/08/23 20:00-), Cosmic ray measurement



#hits as a function of x and y coordinates.

#hits as a function of $\rho = \sqrt{(x^2 + y^2)}$

Commissioning: Streaming Readout

We tested the streaming readout mode in cosmic ray measurements.

Test 1: Cosmic tracks finding. → Success!

Test 2: Cosmic track findings with MVTX. → No news yet?

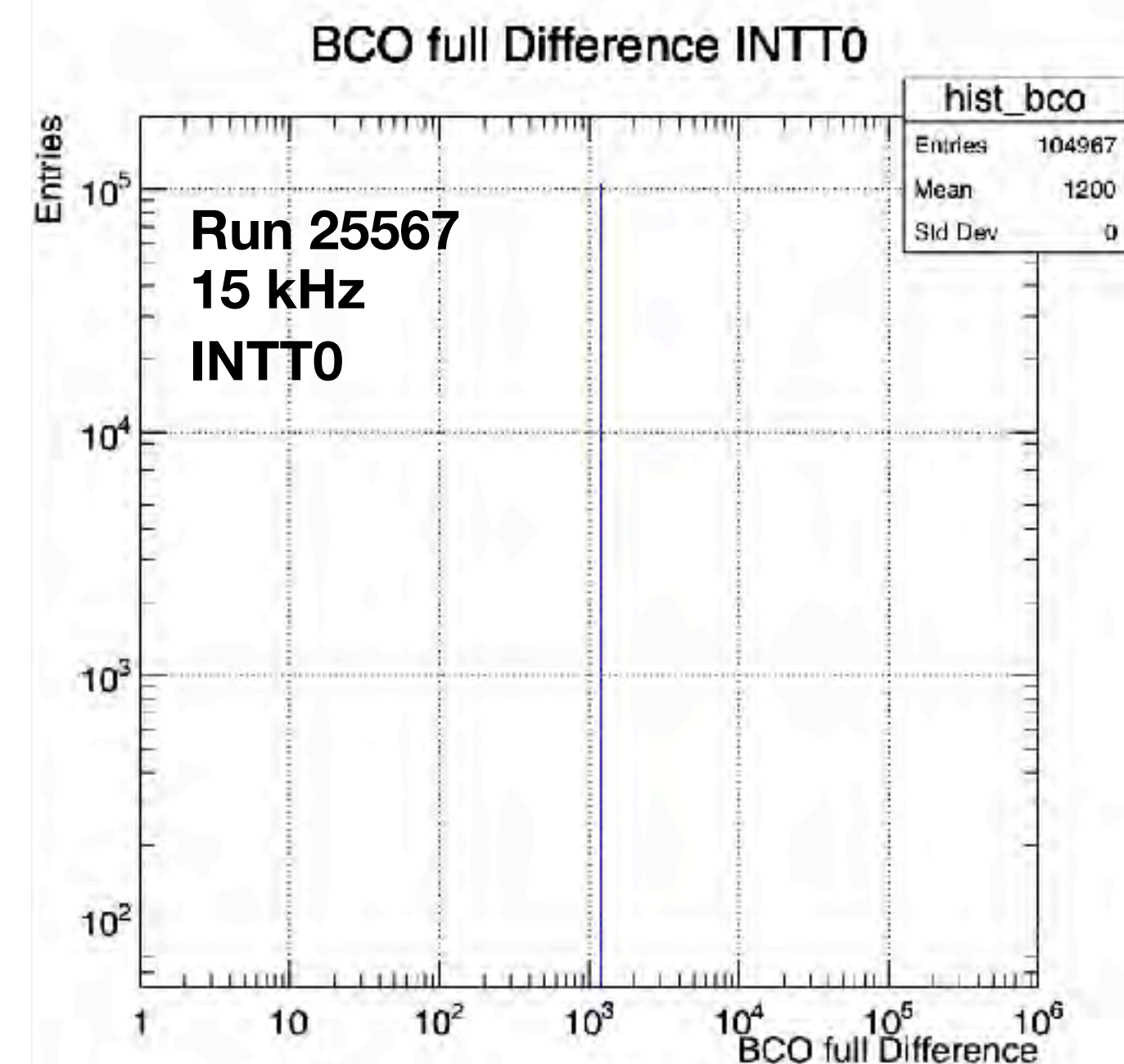
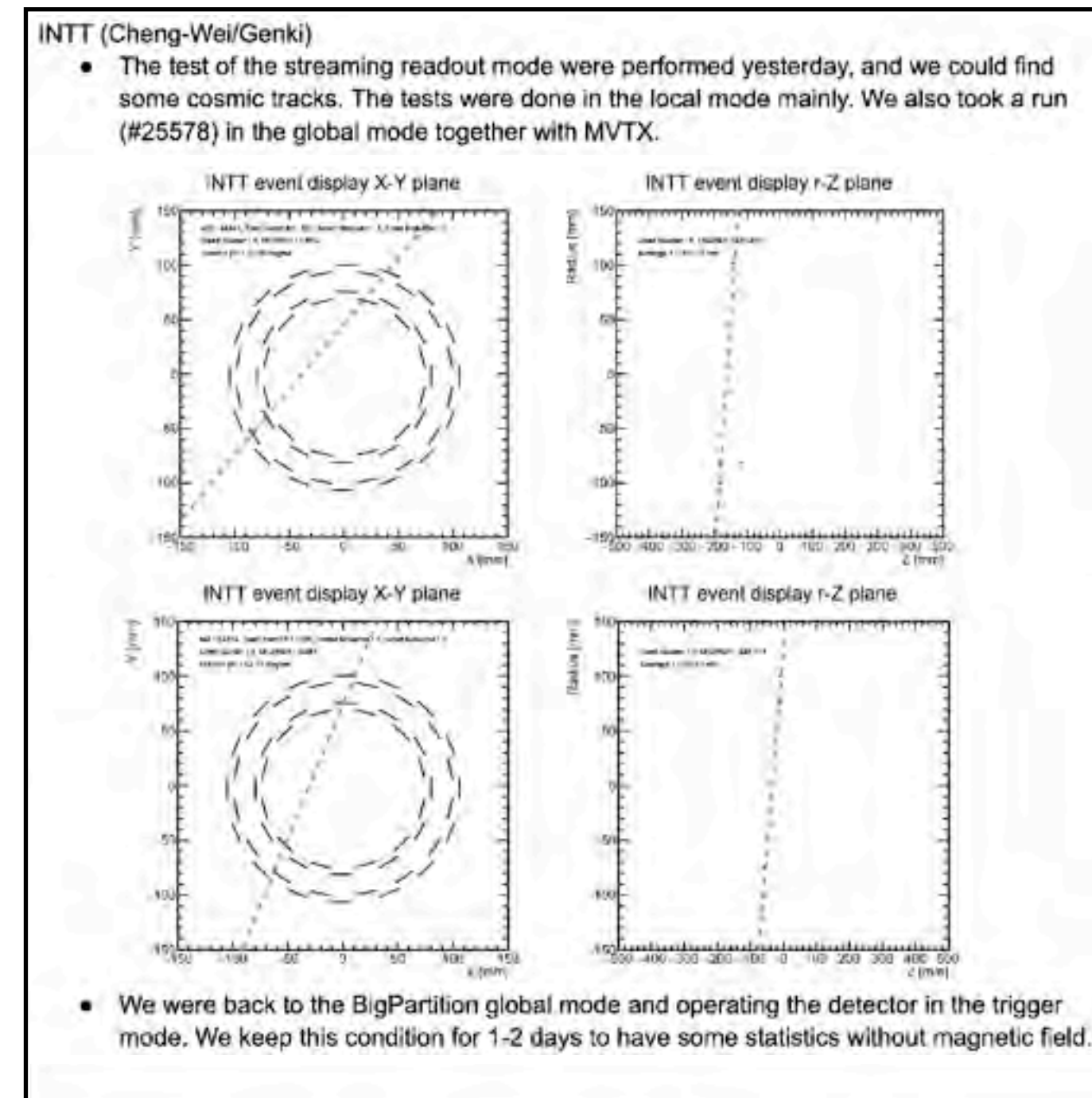
Test 3: Streaming readout at various operation frequencies.

- A new parameter, “endat” was introduced.
- Event counter incrementing by exactly 1 was confirmed.
- BCO full differences of neighboring events were exactly the same number.

The streaming readout mode was working well.

The configuration/operation procedures were not established yet (how to embed it into the sPHENIX configuration processes?). We can learn from MVTX.

The cosmic ray data is not biased by the HCAL trigger. For example, angular distribution can be tested. Are you interested in it?



Documentations

Intermediate Tracker (INTT)

Contents [hide]

- 1 INTT Barrel operation, commissioning, etc.
 - 1.1 General Information
 - 1.2 INTT Drawings
 - 1.3 Hardware Configuration
 - 1.4 Software
 - 1.5 Testbench
 - 1.5.1 Testbenches
 - 1.6 INTT Barrel
 - 1.7 Analysis
 - 1.7.1 Data
 - 1.7.2 Au + Au
 - 1.7.3 p + p
 - 1.7.4 Cosmic ray measurement
 - 1.7.5 Pedestal measurement
 - 1.7.6 Calibration
 - 1.8 Some Great Achievements
 - 1.9 Events
 - 1.10 Database
 - 1.11 Useful links for INTT crew
 - 1.12 Misc

INTT Barrel [edit | edit source]

- INTT Barrel
- INTT Barrel Operation
- INTT commissioning
- How to access data and analyze

Software [edit | edit source]

- INTT GEANT model
- GitHub INTT team
- Mattermost INTT channel
- Software tasks
- Software tasked ver2023
- Unpacker
- Numbering Convention
- INTT Expert GUI
- INTT Event Display

Analysis [edit | edit source]

Analysis of data taken in 1008 is here. See [here](#) for the analysis itself.

Data [edit | edit source]

- Overview
- 2023
- 2024
- 2025

Au + Au [edit | edit source]

- Overview
- 2023
- 2024
- 2025

p + p [edit | edit source]

- Overview
- 2024

Cosmic ray measurement [edit | edit source]

- Overview
- 2023
- 2024
- 2025

Pedestal measurement [edit | edit source]

- Overview
- 2023
- 2024
- 2025

Calibration [edit | edit source]

- Overview
- 2023
- 2024
- 2025

Released results

The released results are summarized here.

The link to sPHENIX note contains the indico agenda of "Approved Preliminary plots from sPHENIX

You can find a collection of them (PDF, PPTX, Keynote) (accessible inside BNL network. See F

Contents [hide]

- 1 Aug/31/2023
 - 1.1 BCO 128330850911
 - 1.2 BCO 128434038131
- 2 Aug/23/2023
- 3 Aug/18/2023
- 4 July/28/2023
- 5 July/21/2023
- 6 June/14/2023

Aug/31/2023 [edit | edit source]

Indico

- Cosmic ray event display under the magnetic field together with MVTX and TPOT

BCO 128330850911 [edit | edit source]

- 2D event displays without the magnetic field together with MVTX, TPC(not shown), and TPOT
- 3D event display 1
- 3D event display 2 (x-y)
- 3D event display 3

Run#	Time/Date	Duration(min.)	Setting
1		50 mins	
2		50 mins	setftrg_packv5_043023_14
3		50 mins	setftrg_packv5_043023_14
4		50 mins	setftrg_packv5_043023_14
5		50 mins	setftrg_packv5_043023_14
6		50 mins	setftrg_packv5_043023_16
7		50 mins	setftrg_packv5_043023_14
8		50 mins	setftrg_packv5_043023_14
9		50 mins	setftrg_packv5_043023_14
10		50 mins	setftrg_packv5_043023_14
11		20 mins	
12		20 mins	setftrg_packv5_043023_16
13		20 mins	setftrg_packv5_043023_16
14		20 mins	setftrg_packv5_043023_16
15		20 mins	setftrg_packv5_043023_16
16		20 mins	setftrg_packv5_043023_16
17		20 mins	setftrg_packv5_043023_16
18		20 mins	setftrg_packv5_043023_16
19		20 mins	setftrg_packv5_043023_16
20		20 mins	setftrg_packv5_043023_16
21		10 mins	
22		10 mins	setftrg_packv5_043023_17
23		10 mins	setftrg_packv5_043023_17
24		10 mins	setftrg_packv5_043023_17
25		10 mins	setftrg_packv5_043023_17
26		10 mins	setftrg_packv5_043023_17
27		10 mins	setftrg_packv5_043023_17
28		10 mins	setftrg_packv5_043023_17

The new run log
by Ryota

Contribute as much as possible!!!