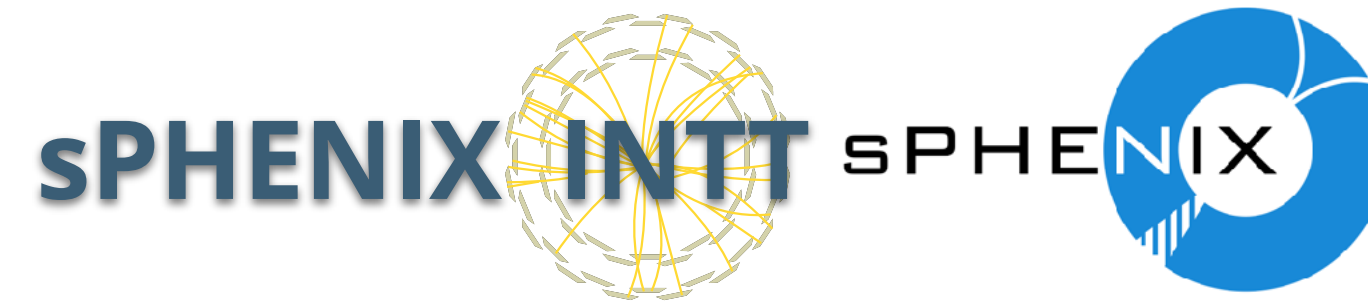


INTT - update

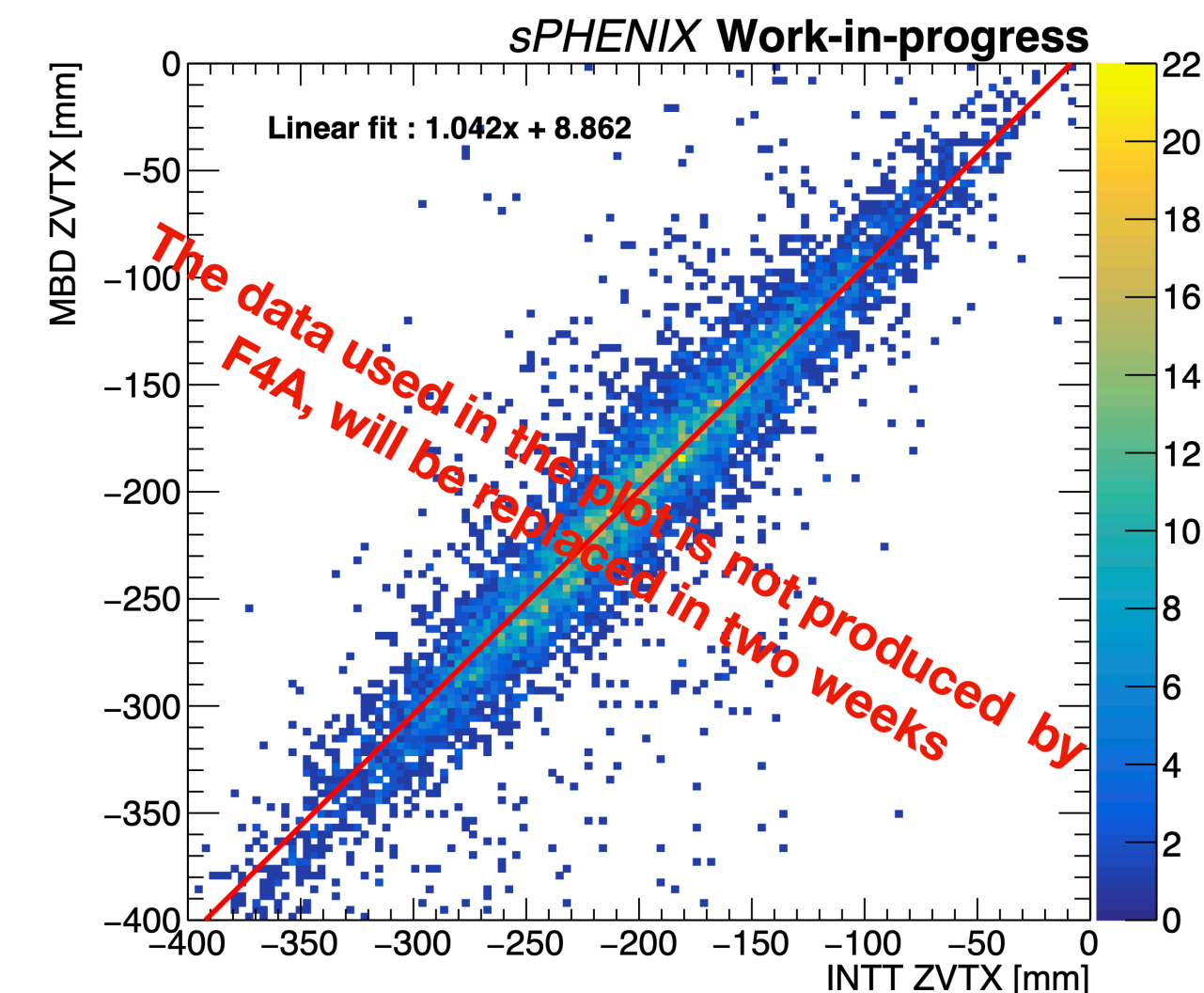
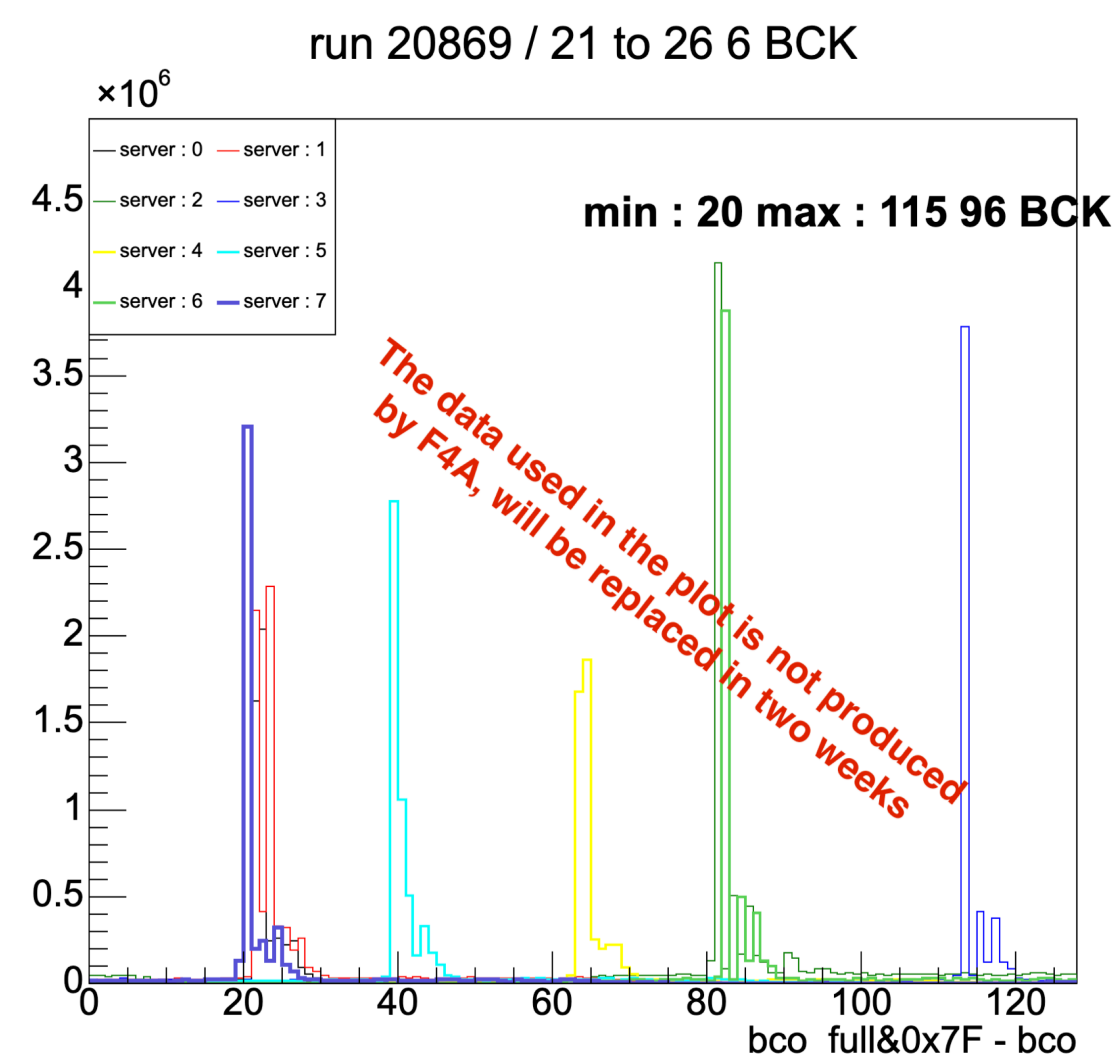
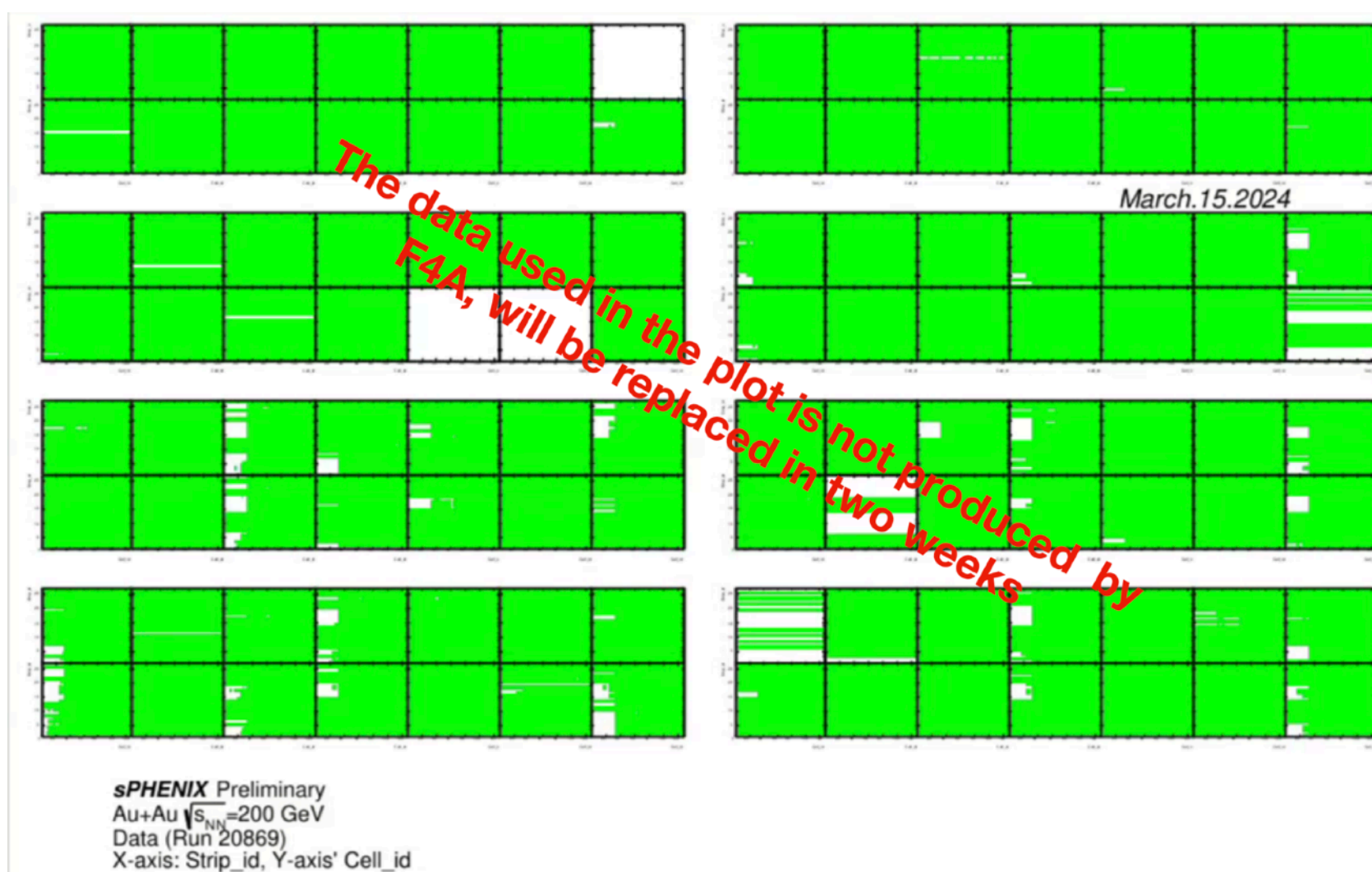
Cheng-Wei Shih
National Central University, Taiwan

March 27th, 2024
INTT meeting



國立中央大學
National Central University

- [Link](#) of Overleaf AN
- According to Cameron, **ALL** the plots should use the data produced by F4A framework
 - Performance plots made with private gen. data are **NOT** acceptable as well
 - Is it true...? (It's so chaos to me...)
- Current alternative: label all the plots made by private gen. data, have to be replaced in two weeks
- What is the status of the data preparation?



INTT streaming readout

- The overview slide of sPHENIX streaming readout by Jin

| | | sPHENIX in Current day-1 setup | sPHENIX w/ Streaming tracker |
|------|---------------------|---|--|
| TPC | DAQ hardware | FEE → DAM → EBDC | Not Changed |
| | Firmware & Software | Record 13 μs data following a trigger (one TPC drift window), which provide one beam crossing (0.1 μs) of complete collision data | Record 20 μs data following a trigger, providing 7 μs of complete collision data |
| | Peak data rate | 192 Gbps | 288 Gbps |
| INTT | DAQ hardware | ROC → FEM → DCM2 → JSEB2 → Server | ROC → DAM → EBDC New construction of DAM and EBDC following TPC production |
| | Firmware & Software | Triggered readout of 1 beam crossing (0.1 μs) per trigger | Streaming readout of 7 μs of data following a trigger |
| | Peak data rate | 0.01 Gbps | 0.8 Gbps |
| MVTX | DAQ hardware | FEE → DAM → EBDC | Not Changed |
| | Firmware & Software | Record one strobe time window of data following a trigger (5-10 μs) | Continue recording strobe time windows until accumulating at least 7 μs of complete collision data |
| | Peak data rate | 3 Gbps | 6 Gbps |

0.1 GB/s, the current estimation by the tracking group

Talked to Jin Huang, it seems to be fine if INTT generates ~10Gbps (1.25 GB/s) of data, according to the sPHENIX computing plan

It might be a problem for the case of 10 GB/s

- Two possible ways in **software** to address/eliminate uncontrollable hot channels
 1. Mask the particular “data line” on the ROC side
 - It’s one functionality of ROC (but not yet been tested in FVTX) according to Jin
 - Not so necessarily to modify the code of slow control FPGA of ROC
 - INTT group doesn’t have much experience playing with ROC FPGA, will need Jin’s help for this, for sure
 2. Try to play with the “Digital Control” of the chip registers
 - If we received the data from the chip, it implies that the communication b/w chip exists (according to Raul, I remember...)
 - Try to reject the two serial out channels of chip. We have NOT tried it before
 - We have the abundant experience on playing with the chip slow control. This test must be doable

| | | | | |
|---|-----------------|-----|---|---|
| 2 | Digital Control | 7:0 | 1 | Bit 0 = Active Serial Lines (1=Two, 0=One) Bit 1 = Accept (1=Accept Hits, 0=Reject) Bit 2 = Global Inject Enable Bit 3 = Serial Output Order |
|---|-----------------|-----|---|---|

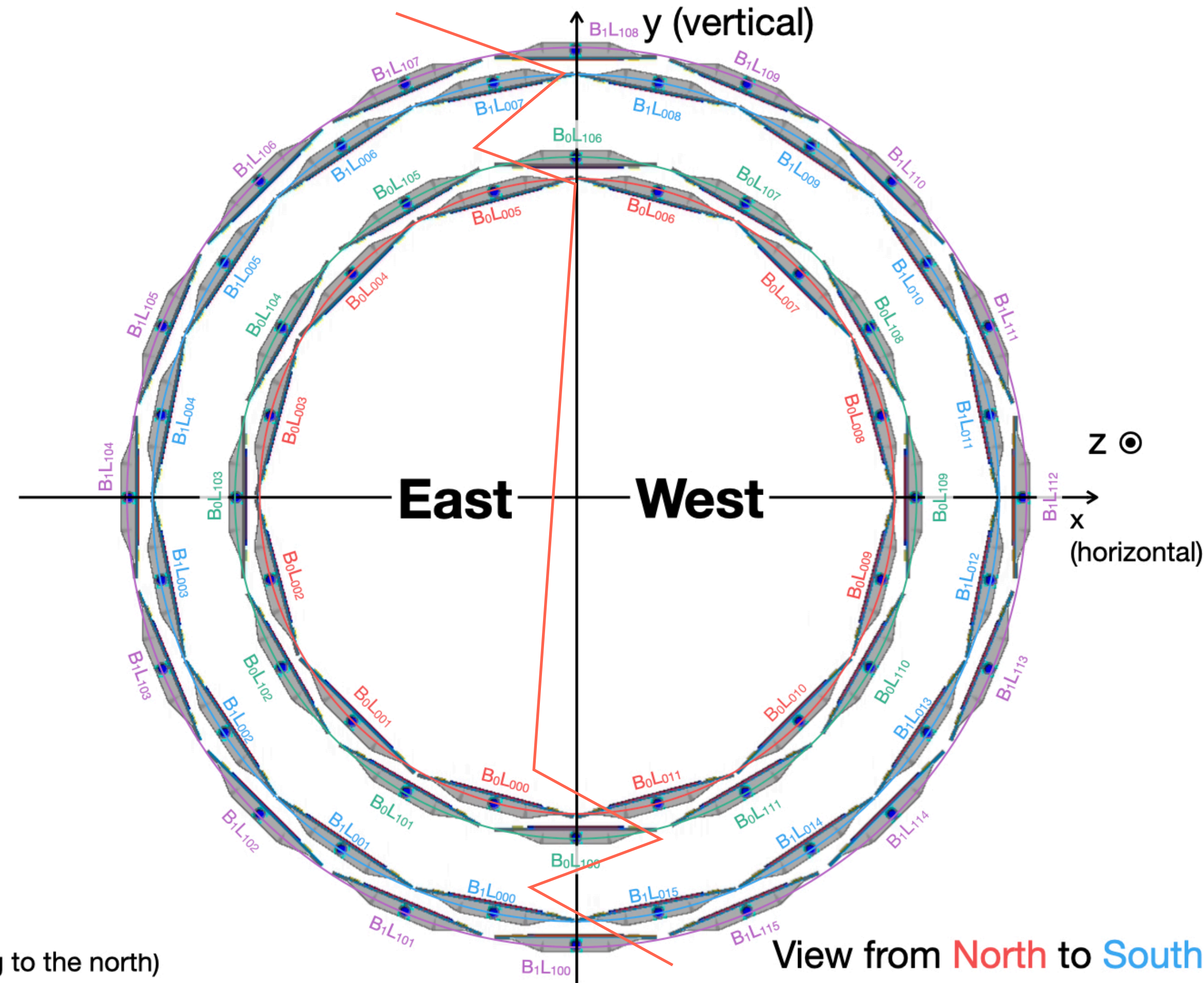
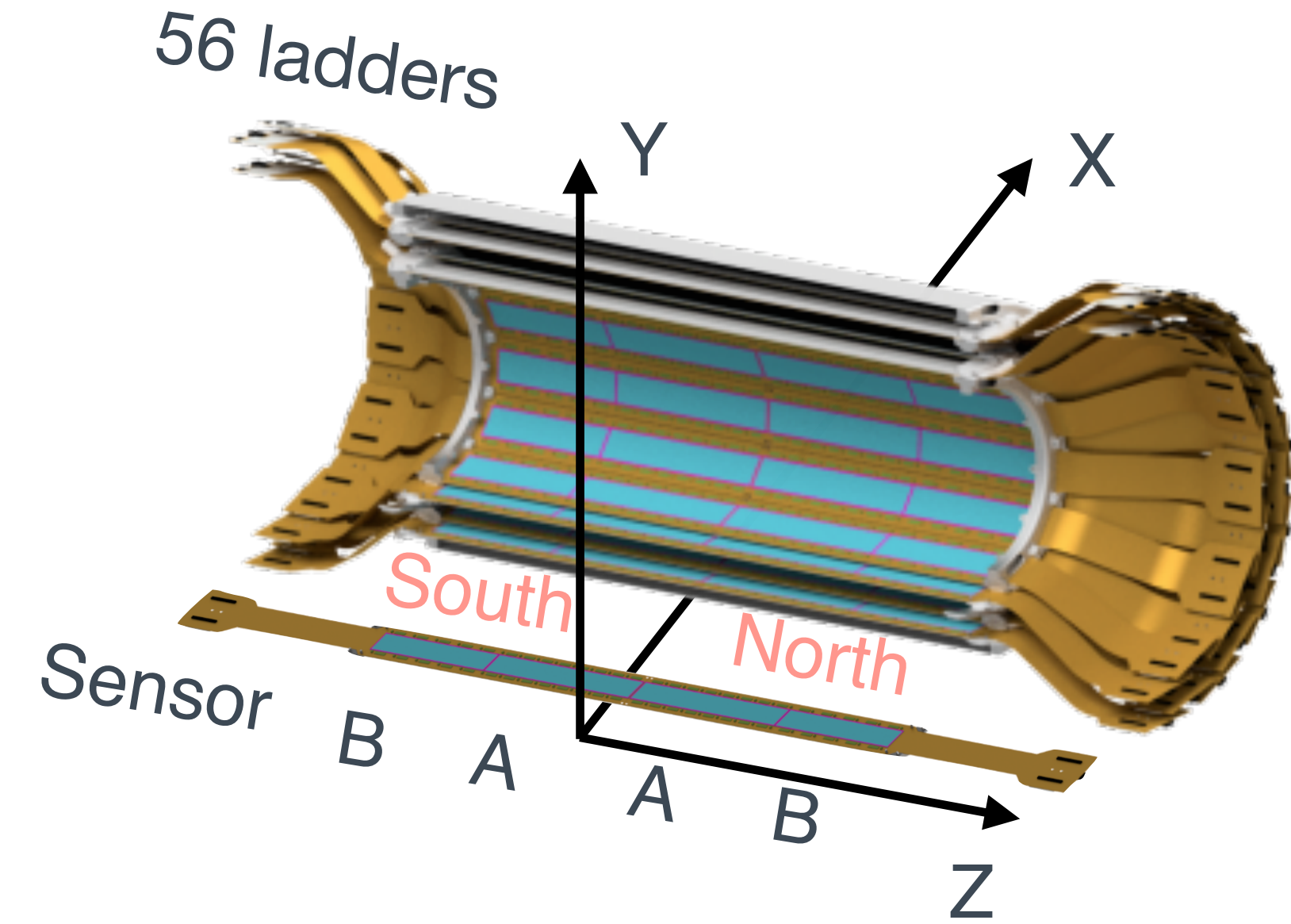
How should we proceed? 🤔🤔

- Where to keep the calibration plots?
 - It must be good if the calibration information can be kept in the website
 - Centrality calibration web
 - INTT run hit map web made by Genki
 - Proposal: expand the INTT current website ?
- News related to INTT from the software meeting in the past two weeks
 - New run list on the Github (?)
 - link (<https://github.com/sPHENIX-Collaboration/RunList/tree/main>)
 - Calibration status, link
 - Verbally reported the status of INTT geant4 implementation
 - They looked forward to having it as soon as possible → for the HF simulation

Back up

INTT: 2 sensors X 2 sides of half-ladders X 56 ladders = 224 sensors

Notation: $B_xL_yz_z$
 x: Barrel ID (0 for inner or 1 for outer)
 y: Layer ID (0 for inner or 1 for outer)
 zz: Ladder ID (from 0 to 15)



Axis (Right-handed coordinate)
 x-axis: $\vec{y} \times \vec{z}$
 y-axis: Vertically upward direction
 z-axis: The blue beam direction (pointing to the north)

View from North to South

- INTT geometry
- $dN/d\eta$ analysis note, data preparation
- Performance/Physics plots data requirement?
- INTT streaming readout
- Where to keep the calibration plots?
- INTT beam test cluster size in Z axis
- News from the Software meeting
 - New run list, [link](https://github.com/sPHENIX-Collaboration/RunList/tree/main) (<https://github.com/sPHENIX-Collaboration/RunList/tree/main>)
 - Calibration status, [link](#)