# sPHENIX INTT -
## TH2INTT & hit effi.

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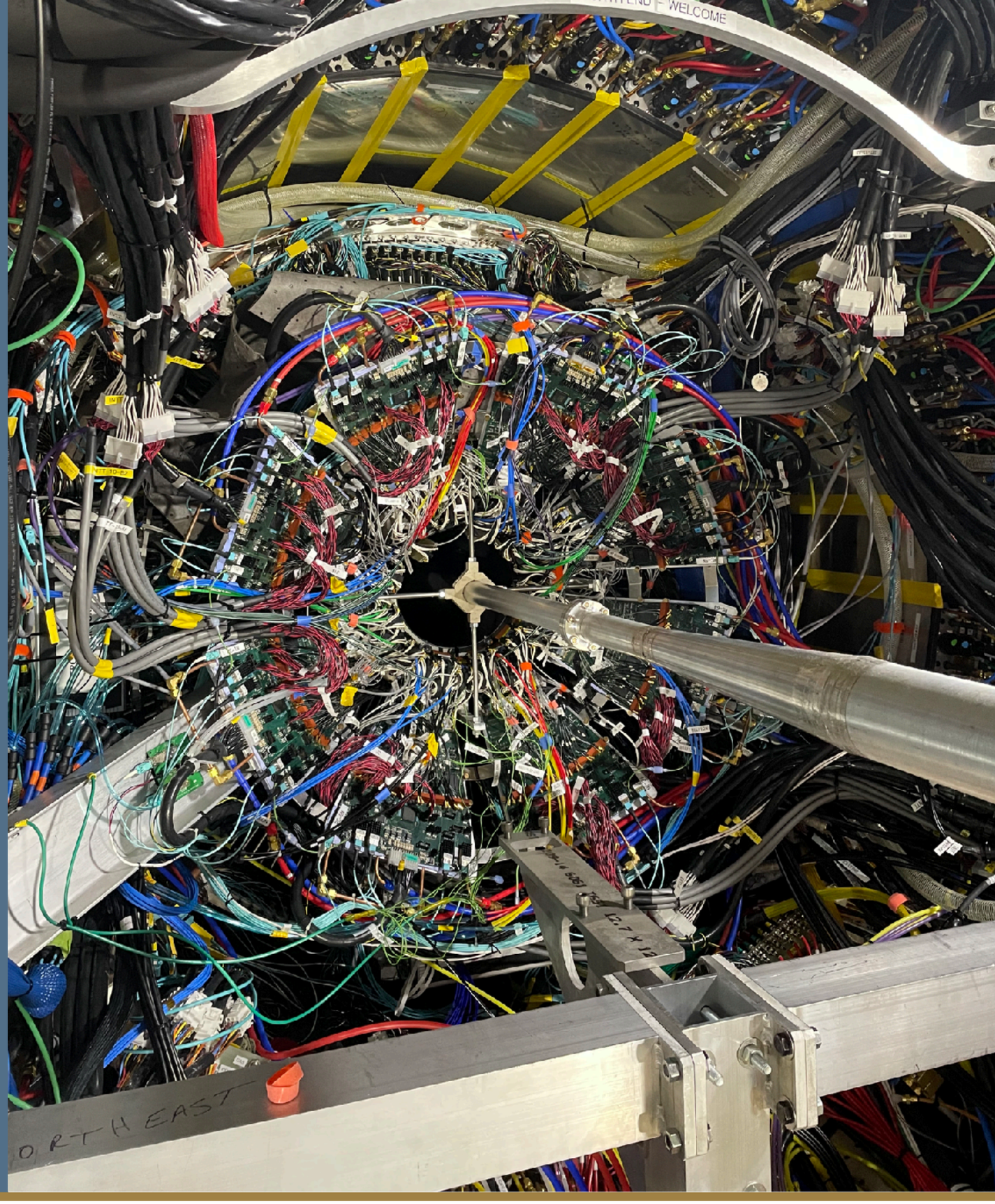
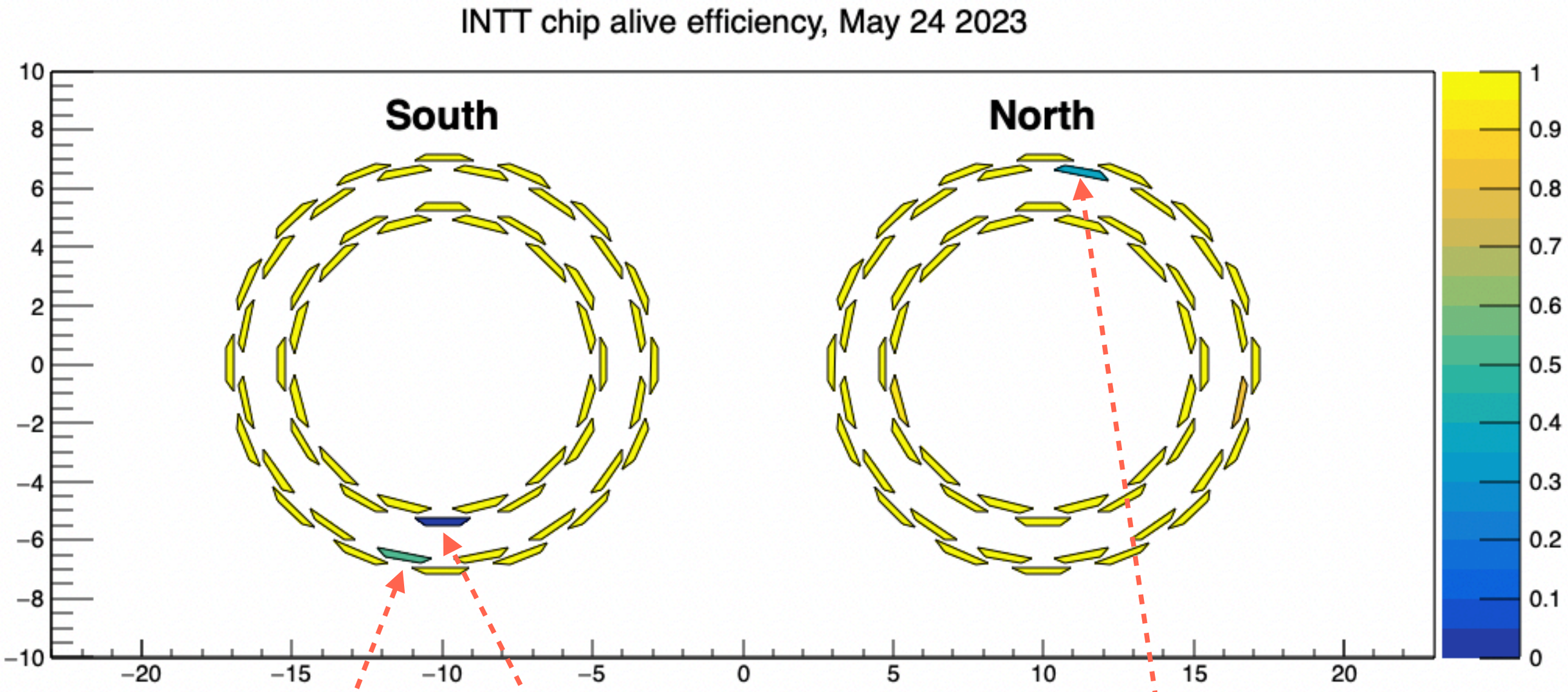



2023/06/02 INTT meeting

# TH2INTT - current INTT chip alive efficiency

Chip alive : the chip that can read the **collision** data

According to : Latest INTT status on wiki




intt0, FC6, unstable TLK issue

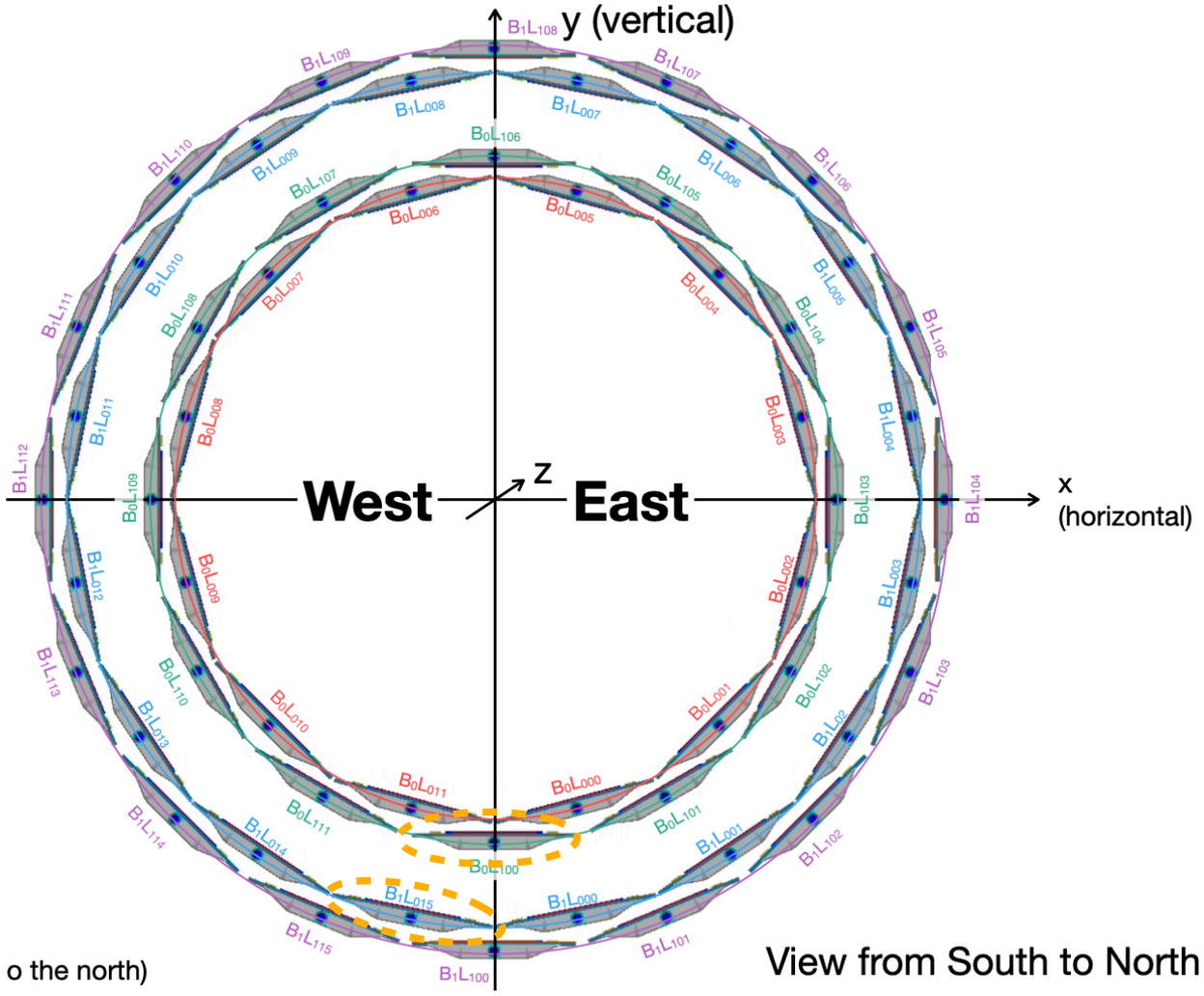
intt3, FC13, type B no bias, U21, U23, U25 half-entry

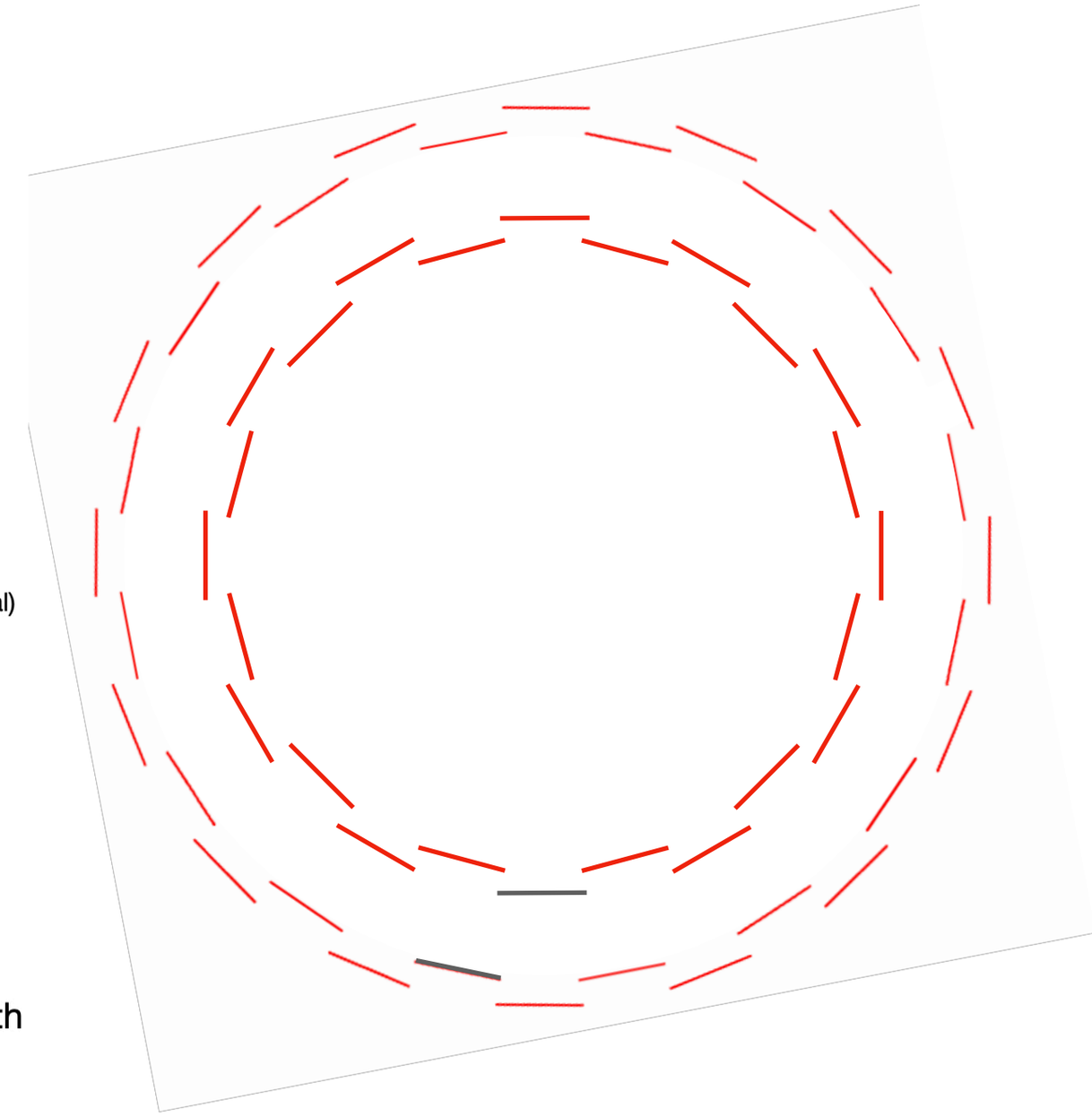
intt5, FC8 type A no bias

General speaking (only up to chip level) : 2849 / 2912 chips are good

# TH2INTT - current INTT chip alive efficiency

## South side open region



# TH2INTT

You can simply use it as the way you use the TH2 (SetName, SetTitle, Draw(“colz”), etc.)

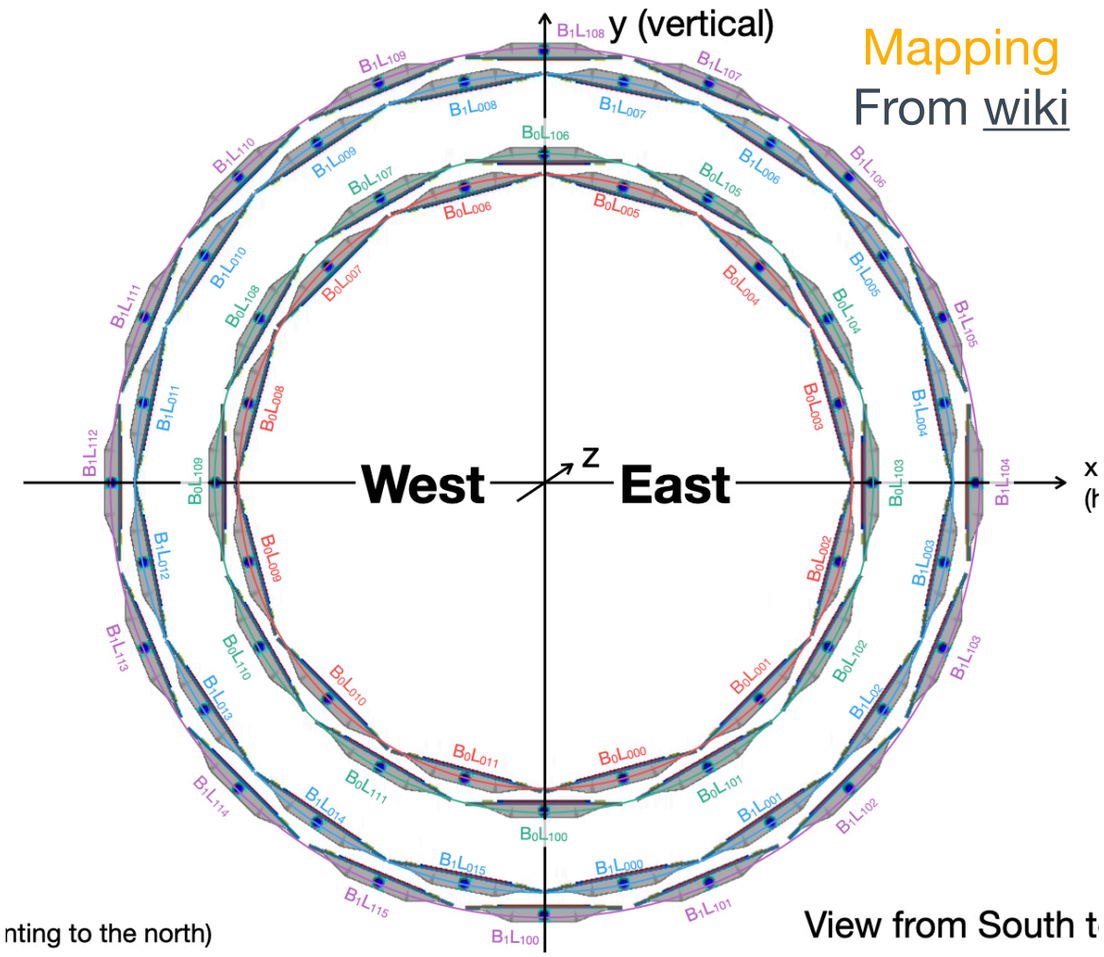
```
#include "TH2INTT.h"

void INTT_chip_effi()
{
    TH2INTT * chip_alive_effi = new TH2INTT();

    for(int server = 0; server < 8; server++)
    {
        for (int FC = 0; FC < 14; FC++)
        {
            chip_alive_effi -> SetSerFCIContent(server,FC,1.0);
        }
    }
```

# include ”TH2INTT.h”

TH2INTT * INTT = new TH2INTT();




Mapping
From wiki

void SetLadderIContent(int barrel_id, int layer_id, int ladder_id, int side, double content)
INTT -> SetLadderIContent(1,1,10,1, 300); // B1L110N, content : 300

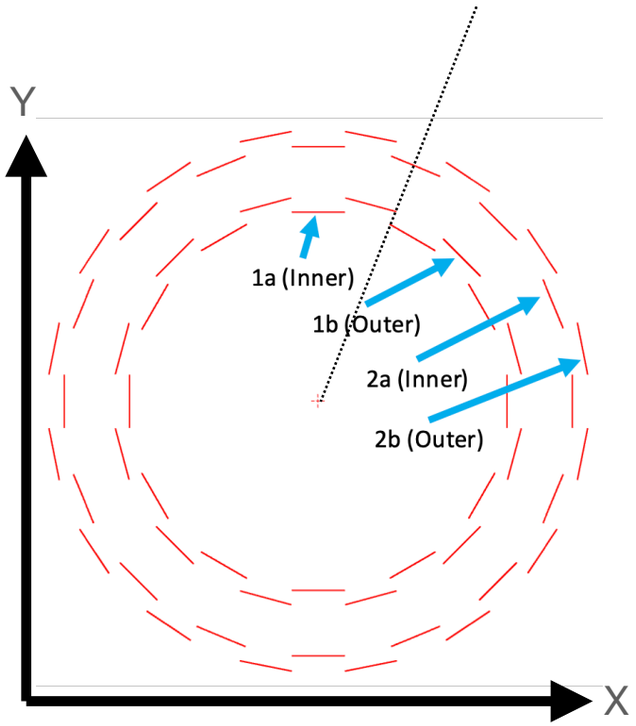
void SetLadderSContent(TString ladder_name, double content)
INTT -> SetLadderSContent(“B1L110N”, 9.8); // B1L110N, content : 9.8

void SetSerFCIContent(int server_id, int FC_id, double content)
INTT -> SetSerFCIContent(4,3,100); // intt4_FC3, content : 100

void SetSerFCSContent(TString server_FC, double content)
INTT -> SetSerFCSContent(“intt4_3”,20) // intt4_FC3, content : 20

# Possible ways to measure the INTT hit efficiency in IR - 1

- 4 layers of INTT, 1a, 1b, 2a, 2b
  - Step 1, make sure the track leaves two clusters in 1a and 1b
  - Step 2, measure the DCA in X-Y plane
  - If it's within a certain range -> track is validated as the true track
  - Check the cluster in 2a "or"2b




- Track confirmation info.
  - 2 cluster in 1a & 1b, DCA

- Bottleneck :
  - Statistic hunger
  - Require no magnetic field (straight track)
  - Not low level study, misalignment correction needed

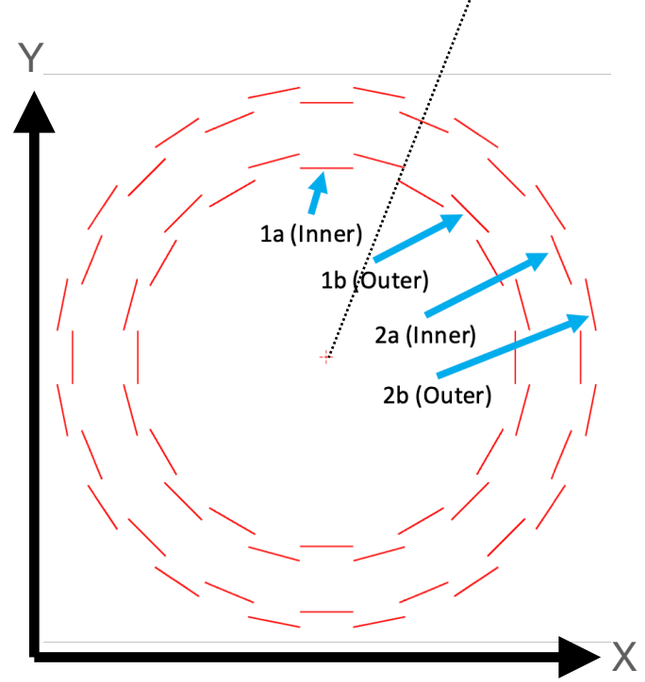
# Possible ways to measure the INTT hit efficiency in IR - 2

- 4 layers of INTT, 1a, 1b, 2a, 2b
  - Step 1, make sure the track leaves two clusters in 1a and 1b
  - Step 2, measure the DCA in X-Y plane & check the EMCal cluster (EMCal same timing resolution, no bias. Or EMcal trigger ?)
  - If DCA is within a certain range & EMCal cluster ΔR is within in a certain range as well -> track is validated as the true track
  - Check the cluster in 2a “or”2b

EMCal cluster

- Track confirmation info.
  - 2 cluster in 1a & 1b, DCA, EMCal cluster

- bottleneck :
  - Statistic hunger
  - Require no magnetic field (straight track)
  - Not low level study, misalignment correction needed
  - ΔR resolution



# Possible ways to measure the INTT hit efficiency in IR - 3

- Find one cluster in 2-a or 2-b (or 2 clusters in 2-a & 2-b). Require the size of the cluster to be larger than 1. Define the time_window_M for MVTX

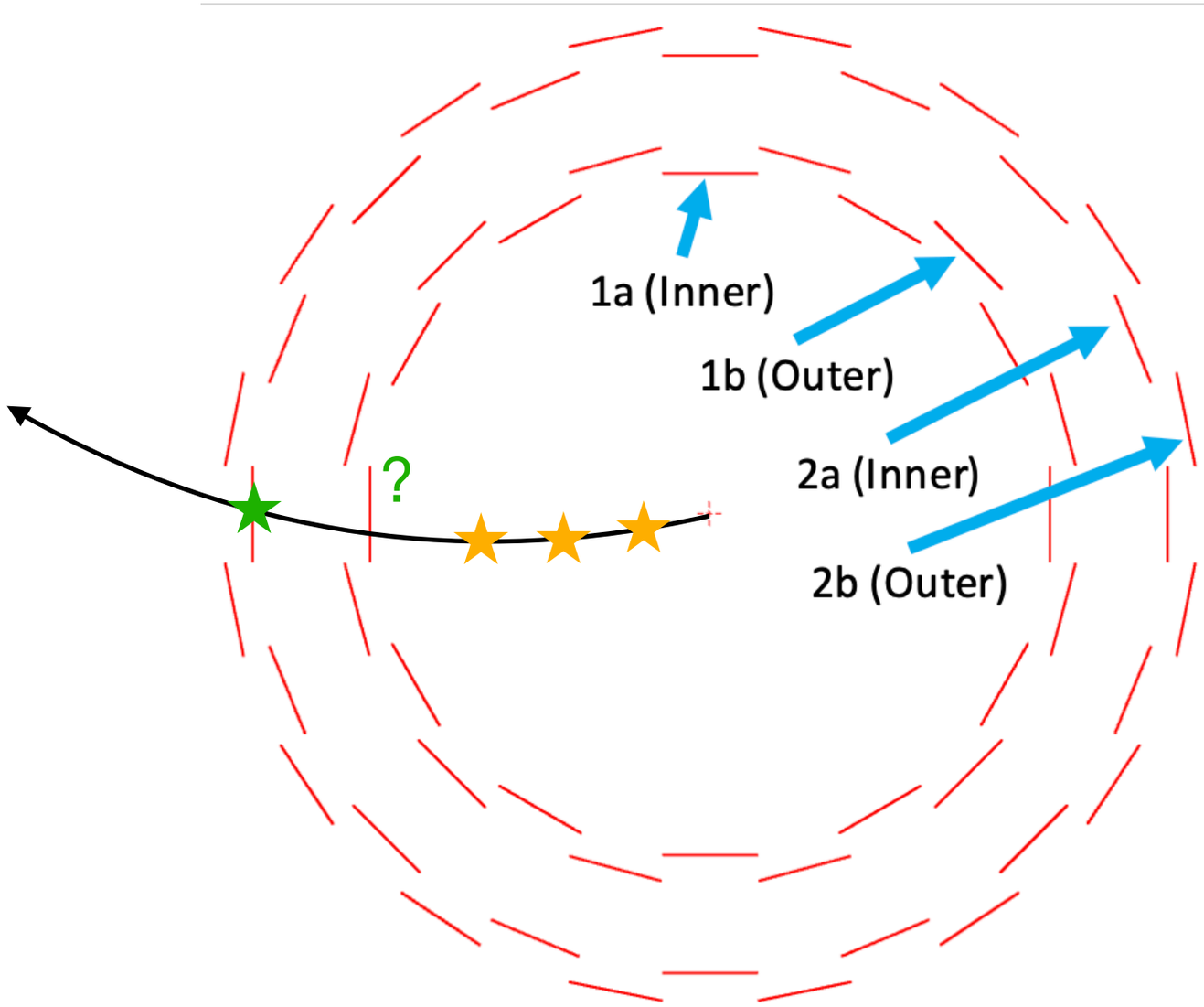
- Make the fit with 2-a or 2-b cluster + MVTX track (without 1-a and 1-b). The used MVTX tracks should be within the given time_window

- As long as the nice track is found, check the cluster in 1-a and 1-b

- Pros :
  - The valid tracks are still reliable
  - Full coverage (if only require one cluster)
  - Feasible with the magnetic field condition
  - No bias from the TPC distortion
  - MVTX group is developing the standalone misalignment correction method
  - Possibly we can also include the EMCal cluster
- Cons :
  - time_window bias ?
  - Not low level study, misalignment correction needed
  - another other bias ?

Promising ! maybe

# Possible ways to measure the INTT hit efficiency in IR - 3




Wei-Che can work on it

# Backup

# Plots I have in the case of the BCO window

- stack of 7 servers or 8 servers, one set
- overlap of 8 servers, one set

- one server, overlap, all sets

- Entry occupancy ratio, 7 servers,
  - Data point each set,
  - Y : the average
  - Y_e : the standard deviation

# Set list

8020_Time_5min_L1Delay00_Ncollision127_Opentime120
8021_Time_5min_L1Delay20_Ncollision127_Opentime80
8023_Time_5min_L1Delay20_Ncollision127_Opentime75
8024_Time_5min_L1Delay20_Ncollision127_Opentime70
8025_Time_5min_L1Delay20_Ncollision127_Opentime65
8026_Time_5min_L1Delay20_Ncollision127_Opentime60
8027_Time_5min_L1Delay20_Ncollision127_Opentime50
8028_Time_5min_L1Delay20_Ncollision127_Opentime40
8030_Time_5min_L1Delay20_Ncollision127_Opentime30
8031_Time_5min_L1Delay20_Ncollision127_Opentime20
8032_Time_5min_L1Delay20_Ncollision127_Opentime10
8033_Time_5min_L1Delay20_Ncollision127_Opentime15
8034_Time_5min_L1Delay20_Ncollision127_Opentime17
8035_Time_5min_L1Delay20_Ncollision127_Opentime19