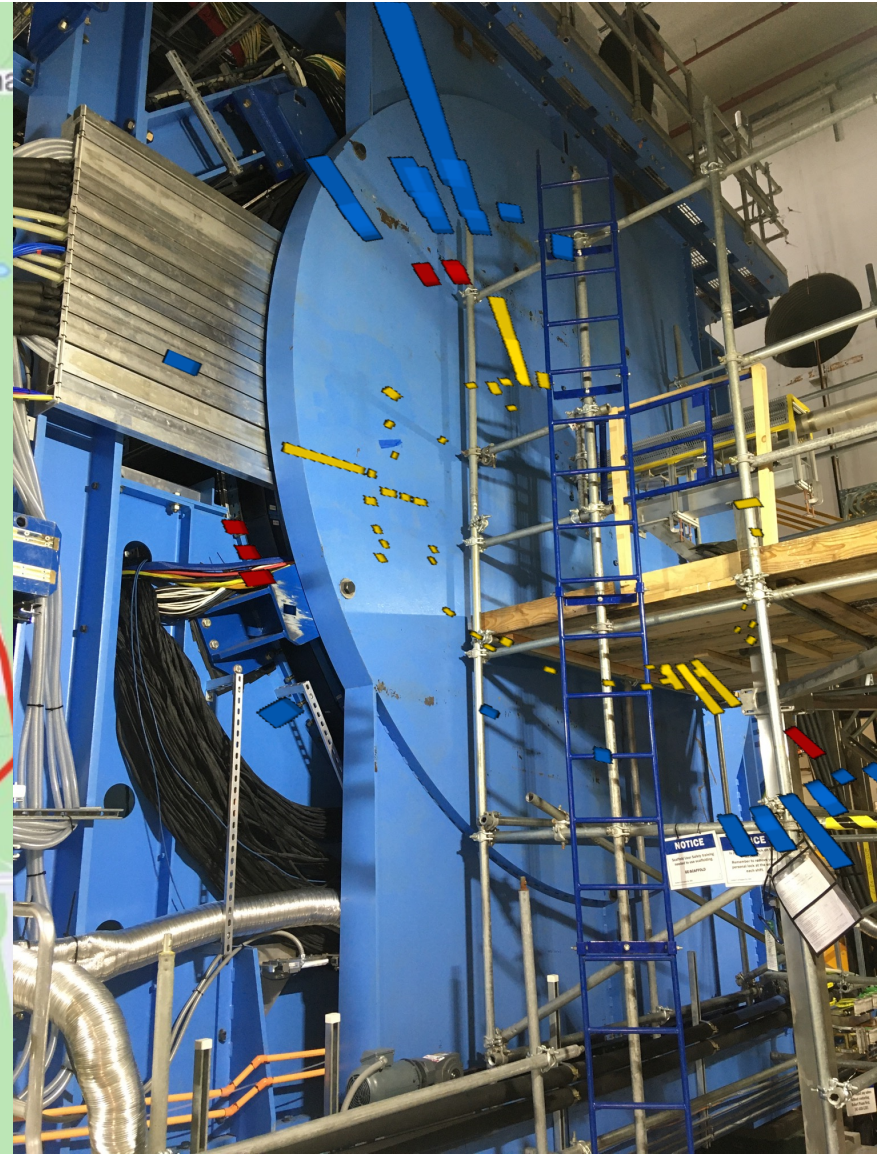# sPHENIX Status
RHIC Coordination Meeting
June 18, 2024
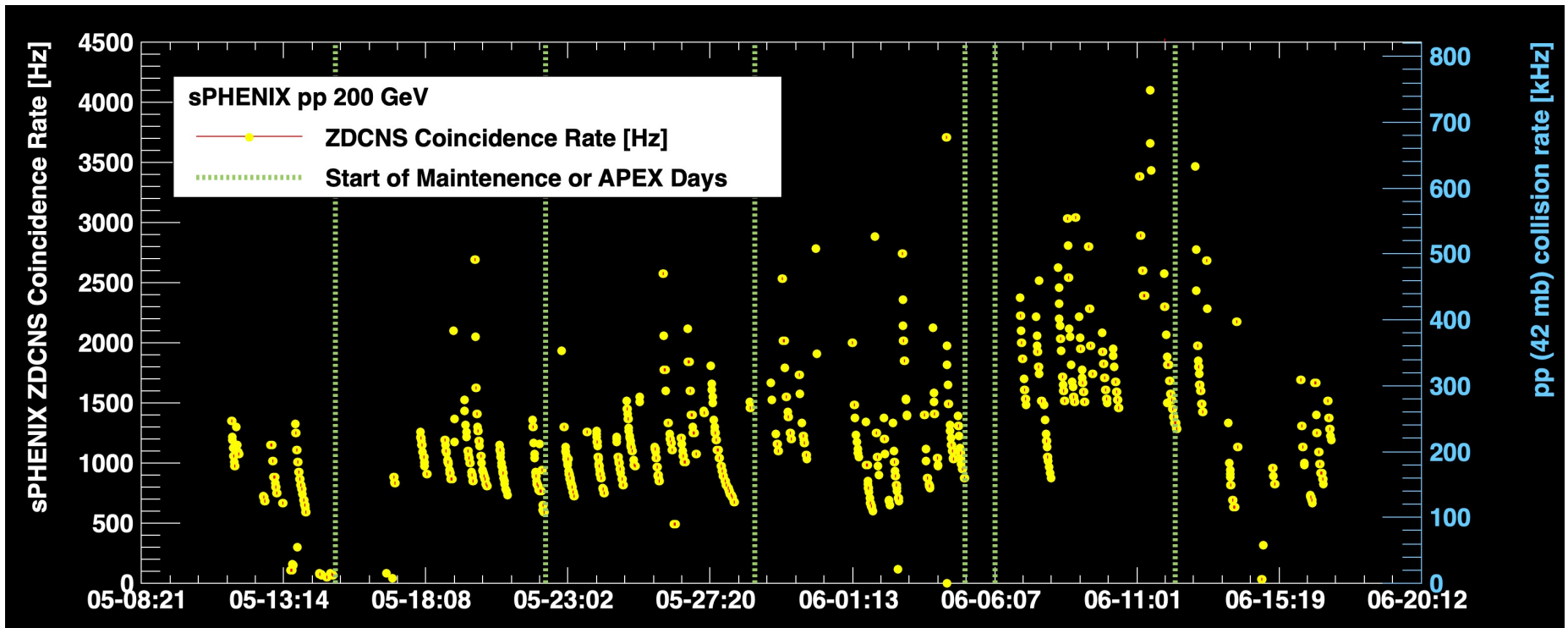
Jamie Nagle
University of Colorado Boulder
sPHENIX Run Coordinator

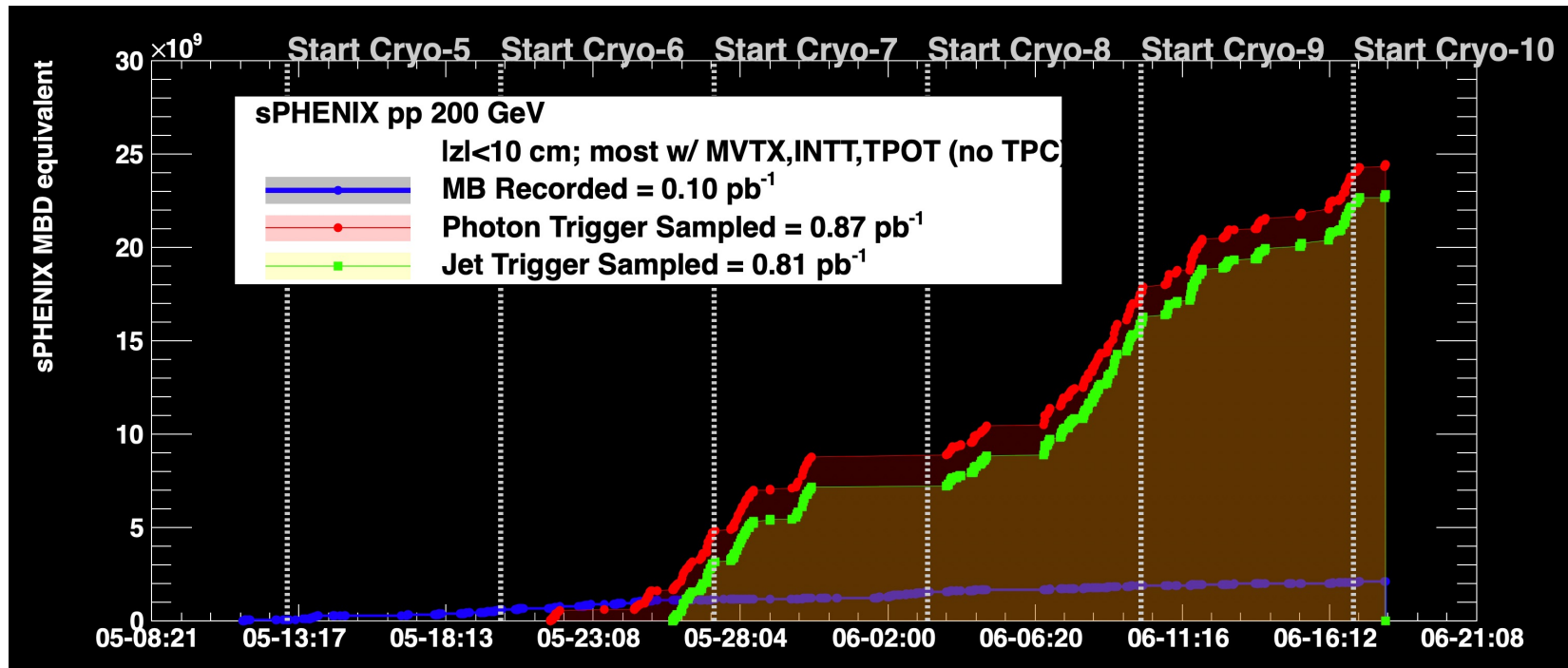6/18/24

sPHENIX 2024

Data taking update
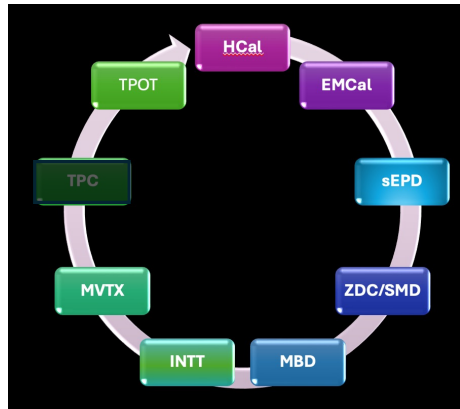
Data taking update

RHIC time in store is an issue.

sPHENIX has significantly improved uptime and running (modulo fire alarm on Friday)

Even with best slopes for data taking, would estimate 40-50 weeks to achieve 45 pb^{-1} (minimum goal)

Running all systems
except TPC

Sampling full luminosity with photon and jet triggers, and running > 10 kHz with high livetime.

MVTX, INTT data integrity checks look good.

MVTX very steady logging rate in full streaming mode with firmware updates and changes to Buffer Box / Lustre configuration.

Remaining issue might be VTRx heat issue (seen in all CERN experiments). Working on additional cooling.
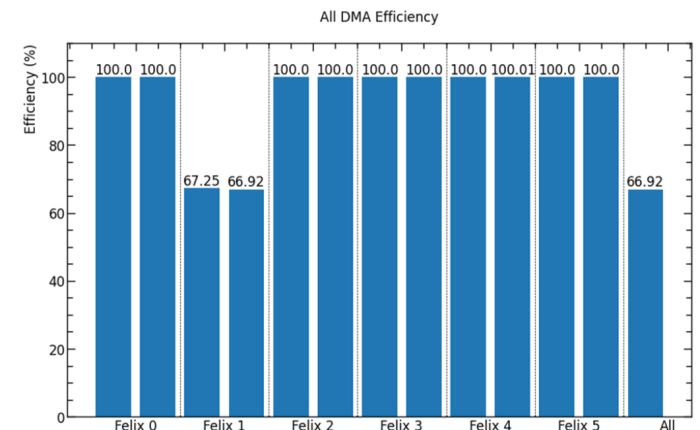
Backgrounds and start of store procedure
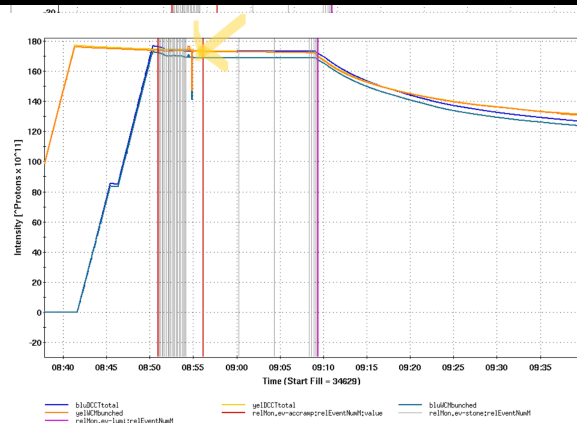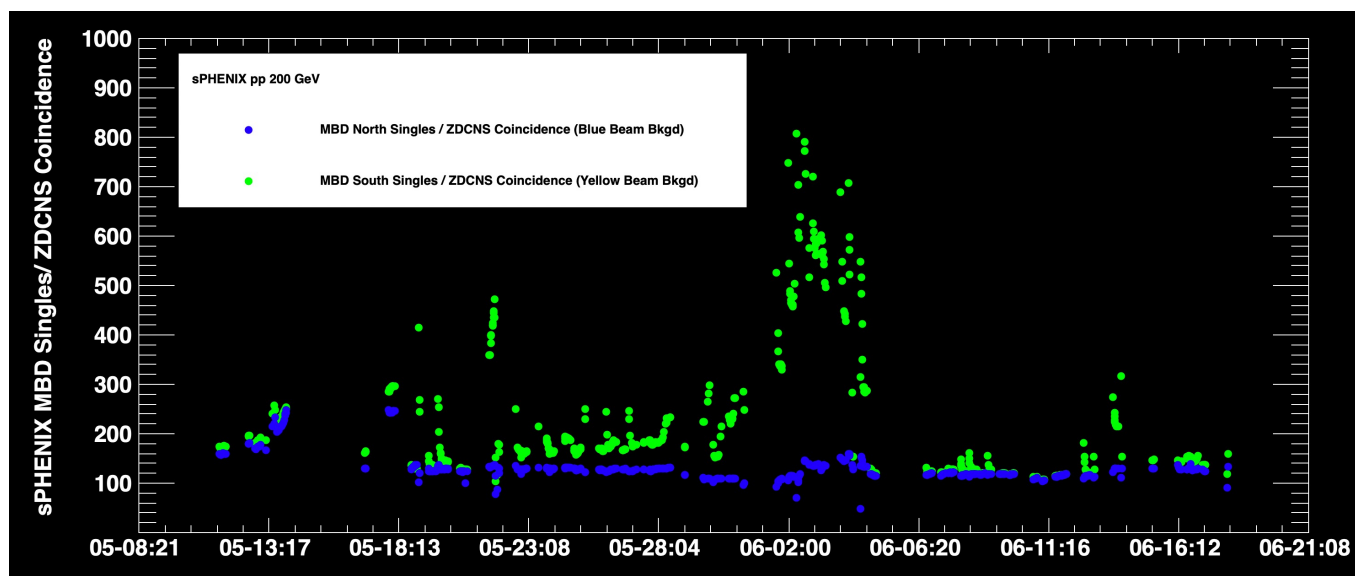
Thanks for C-AD / Kin coordination.
We are configuring our whole system as soon as clocks are stable, then turning on voltages when physics declared.
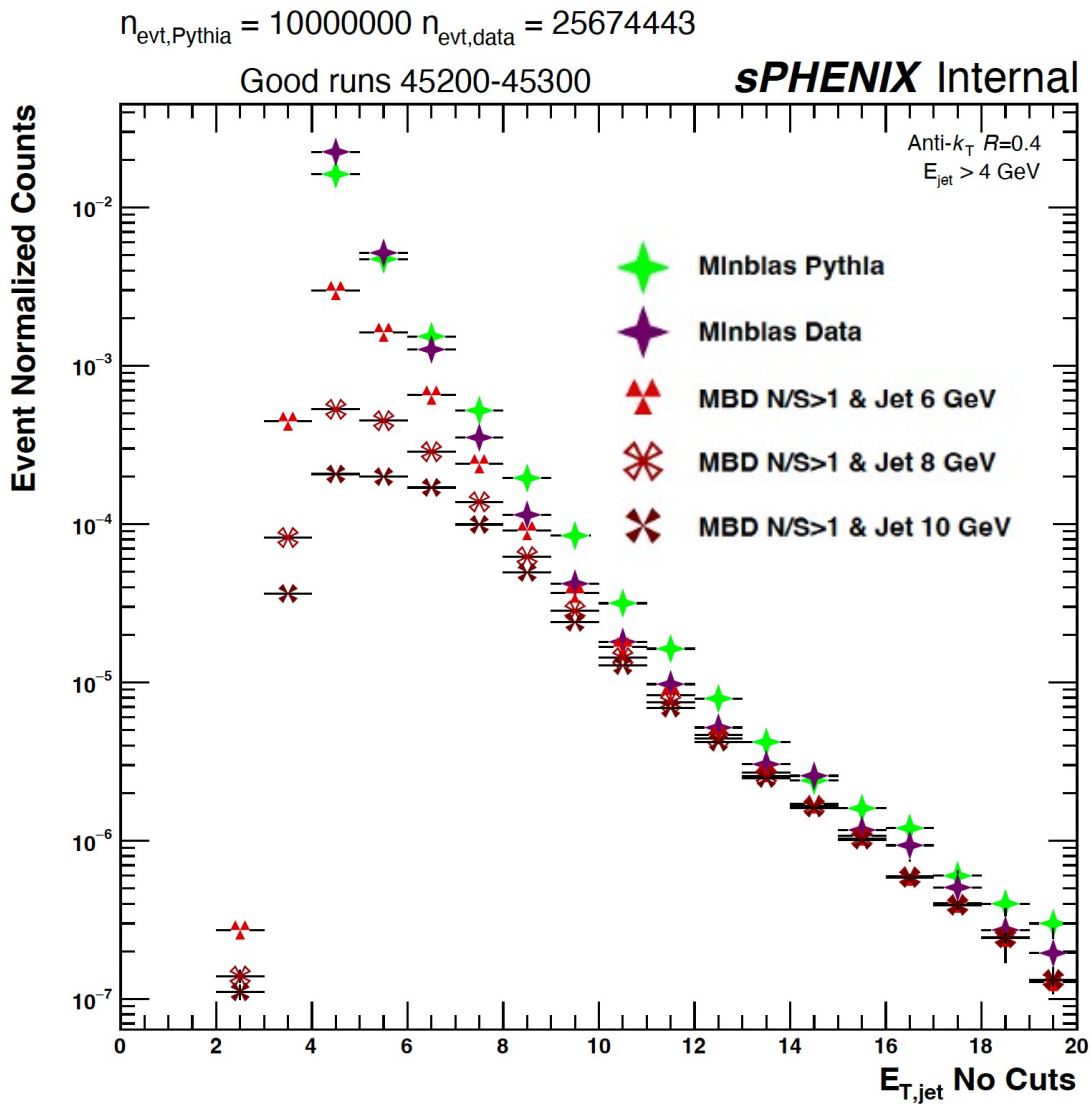
Young people on sPHENIX are excited to pushing on multiple data checks –
low level to higher level objects
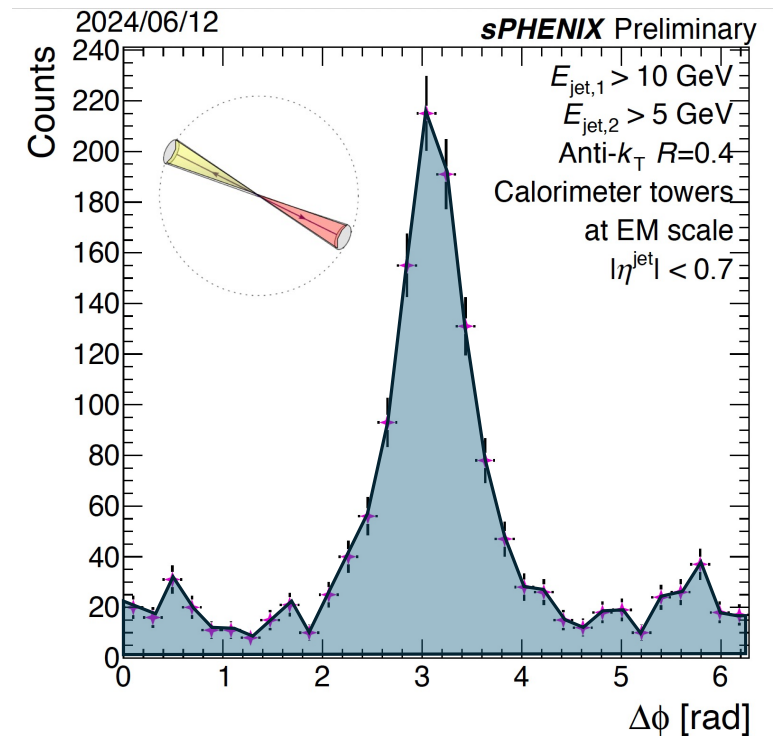
TPC Update

On Thursday last week, took cosmic runs at 4.2 kV, 4.3 kV, 4.35 kV, 4.4 kV

Over the weekend, ran with beam at 4.1, 4.2, 4.3 kV.   Large sparking and damage at 4.3 kV (disappointing).   Extensive discussion on Monday with TPC group/experts.

TPC Diagnostics and Plan

TPC Gain with Ar:CF4:N2 65:25:10

- Run 45818, TPC: GEMs: 4.1 kV, CM: 44.3 kV

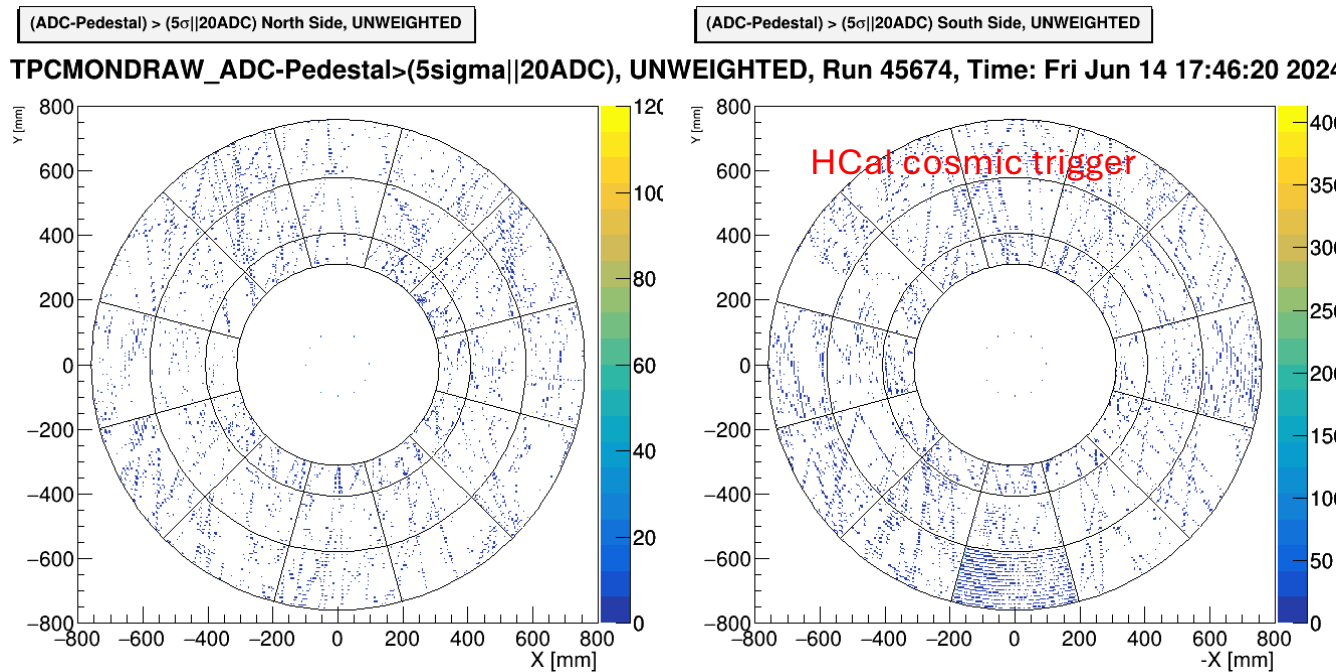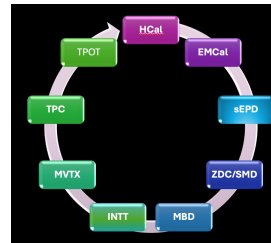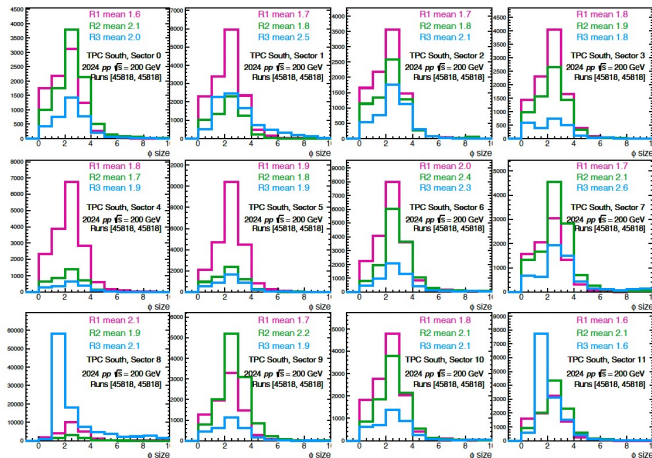|	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11
South R3	59.9	75.7	54.6	51.0	52.6	48.5	58.1	66.1	95.5	50.7	52.6	65.7
South R2	53.1	56.5	46.4	44.6	41.9	43.2	61.4	59.4	47.6	57.5	49.3	54.8
South R1	38.0	40.9	38.9	43.1	42.4	49.6	45.1	37.8	52.6	40.4	52.0	39.1
North R3	47.4	45.4	57.5	49.8	47.9	48.3	57.7	47.4	50.6	47.5	49.2	49.8
North R2	43.5	47.1	43.7	42.6	45.8	41.7	40.2	40.5	45.0	40.8	41.8	41.8
North R1	38.7	34.2	35.8	37.5	37.5	160.2	37.1	37.9	37.5	40.6	39.3	35.4

Run TPC with this gas mixture at 4.1 kV. Lower efficiency / resolution – being evaluated in detail.

Dedicated time each day (~ 6 hours). Some running w/o ZS (30 Hz) and bringing online full ZS and needed firmware updates.

Checking stability at this working point. **Running all systems together in this state as of yesterday.**

In parallel, pushing forward to switch to isobutane mixture that has a much lower discharge point.
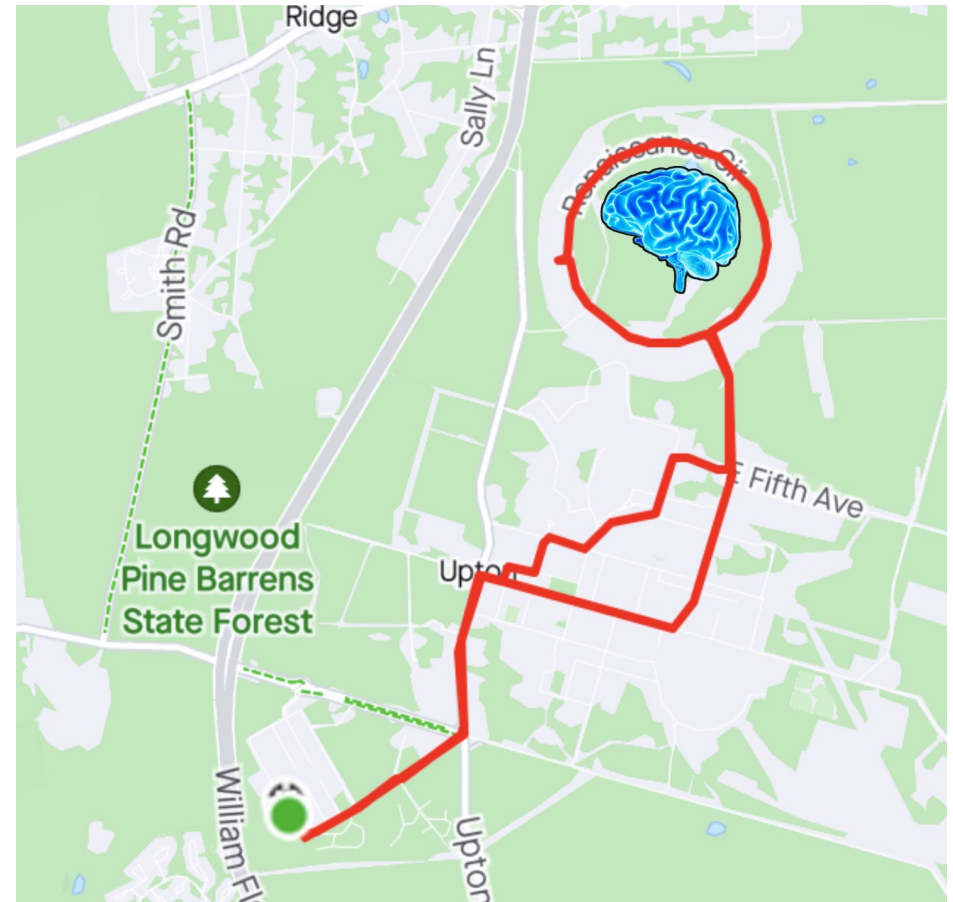
Brainstorming...

A few notes from sPHENIX

- Calorimeters can use collisions over all vertices (e.g., γ-jet).
- At low luminosity we can run with smaller crossing angle (but then beam-beam issues).
- Spin is much lower priority for sPHENIX.
- Beginning of store luminosity mostly lost (long time to physics declared).
- Length of store hard to optimize, machine reliability issues.
- At this point, we just want to enable C-AD to check/test things to inform a decision discussion (not today).

Everything on the table for us...