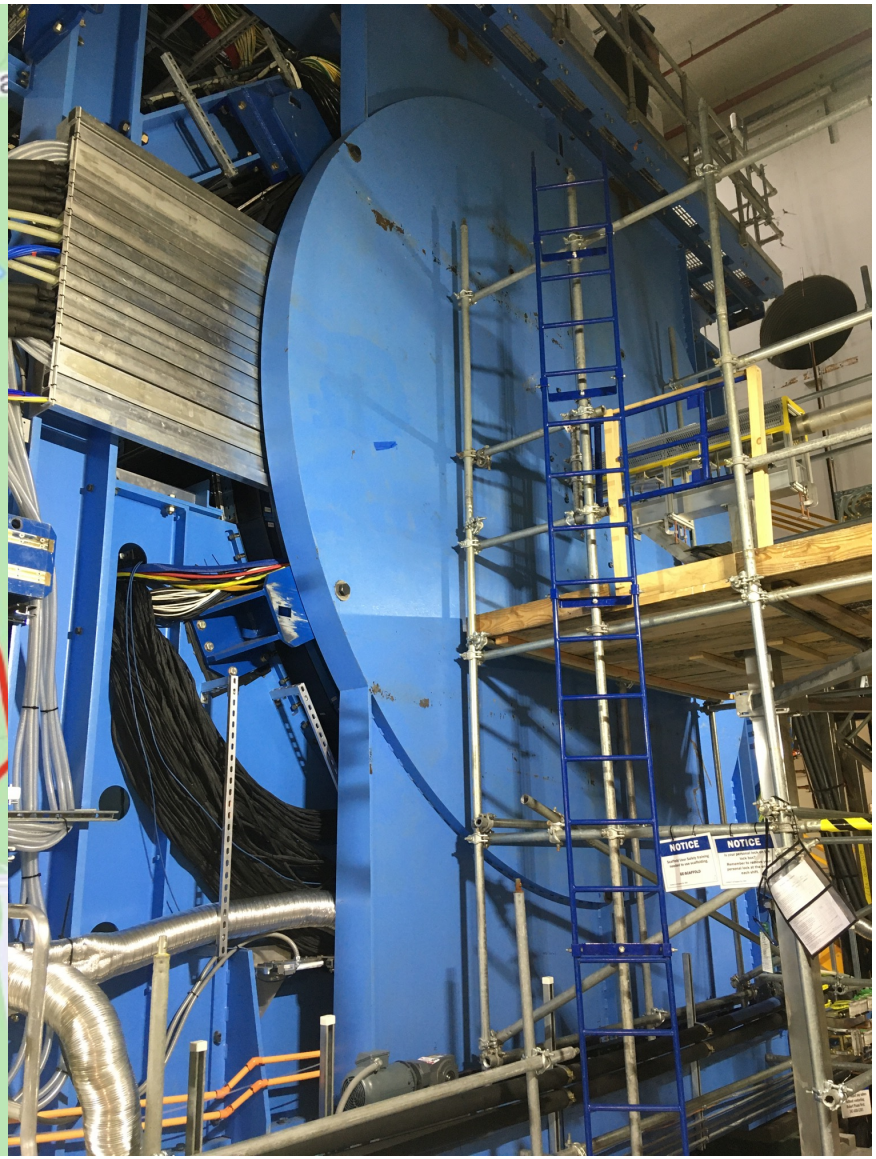
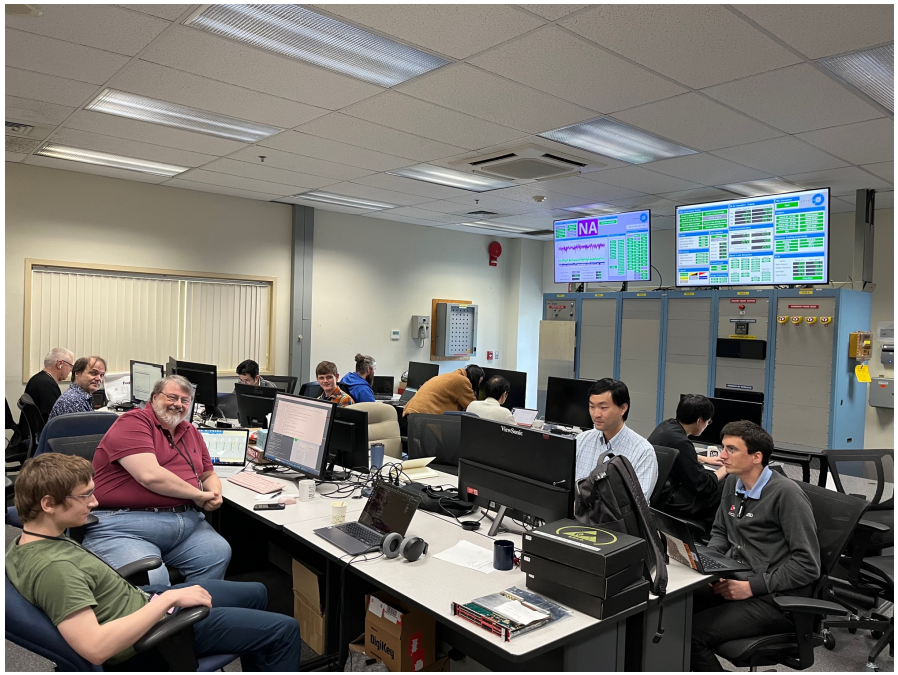
sPHENIX Status
RHIC Coordination Meeting
May 07, 2024

Jamie Nagle
University of Colorado Boulder
sPHENIX Run Coordinator



sPHENIXians having fun!



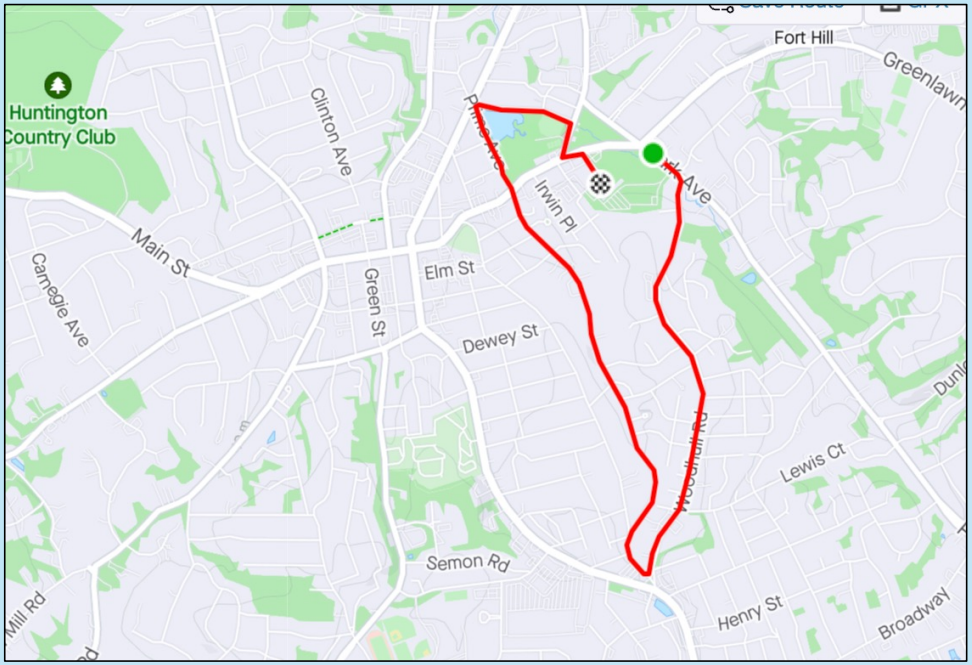
Noon – Midnight
TPC/TPOT commissioning

Midnight - Noon
DAQ/Trigger testing
Min. Bias data w/ all other systems

We are moving quickly towards physics…

Huntington, NY 5k
Sunday, May 5, 2024

Itaru – Spin Coordinator 2024 – 1st Place
Stefan – Run Coordinator 2023 – 2nd Place
Jamie – Run Coordinator 2024 – 3rd Place
* For 50+ young people



Shift Crew taking min. bias pp data at 11 kHz with
GL1, EMCal, Hcal, MBDD, ZDC/SMD, sEPD, INTT, MXTX
(all except TPC/TPOT)

Zero suppression turned on. MVTX in full streaming mode.
INTT in triggered mode and sampling 15% of all collisions.

Control Status

19:26:03

Running for 0:26:59

Run: 41713

Multi Event Buffering: 0, DEAD4N: 15

INTT busymask: 0x0 endat: 500	MVTX busymask: 0x0 endat: 500	EMCAL busymask: 0xFFFF endat: 500	SEPD/ZDC busymask: 0x40000 endat: 500
HCAL busymask: 0x30000 endat: 500	MBD busymask: 0x80000 endat: 500	LL1 busymask: 0x100000 endat: 500	

Host	Status	Busy Rate	Count	Data Volume (MB	Run
gl1daq			15380516	30040	41713
seb00 - EmCal (ZS)	not busy	0.00%	15380545	149845	41713
seb01 - EmCal (ZS)	not busy	0.00%	15380568	145633	41713
seb02 - EmCal (ZS)	not busy	0.00%	15380600	147219	41713
seb03 - EmCal (ZS)	not busy	0.00%	15380622	145573	41713
seb04 - EmCal (ZS)	not busy	0.00%	15380645	149531	41713
seb05 - EmCal (ZS)	not busy	0.00%	15380665	159921	41713
seb06 - EmCal (ZS)	not busy	0.00%	15380692	143614	41713
seb07 - EmCal (ZS)	not busy	0.00%	15380725	146966	41713
seb08 - EmCal (ZS)	not busy	0.00%	15380751	136828	41713
seb09 - EmCal (ZS)	not busy	0.00%	15380780	139854	41713
seb10 - EmCal (ZS)	not busy	0.00%	15380805	139522	41713
seb11 - EmCal (ZS)	not busy	0.00%	15380824	139457	41713
seb12 - EmCal (ZS)	not busy	0.00%	15380854	140396	41713
seb13 - EmCal (ZS)	not busy	0.00%	15380875	141450	41713
seb14 - EmCal (ZS)	not busy	0.00%	15380947	165783	41713
seb15 - EmCal (ZS)	not busy	0.00%	15380984	141900	41713
seb16 - HCal West (ZS	not busy	0.00%	15381010	168474	41713
seb17 - HCal East (ZS	not busy	0.00%	15381034	170654	41713
seb18 - MBD (NZS)	not busy	0.00%	15381061	243497	41713
seb20 - ZDC/sEPD (ZS	not busy	0.00%	15381237	125054	41713

Host	Status	Busy Rate	Count	Data Volume (MB	Run
intt0			94599390	6239	41713
intt1			139910781	6961	41713
intt2			115751665	6678	41713
intt3			99346207	6364	41713
intt4			101415044	6400	41713
intt5			108442740	6544	41713
intt6			111948866	6615	41713
intt7			95561599	6278	41713
mvtx0			118436	124102	41713
mvtx1			107184	117316	41713
mvtx2			114812	122270	41713
mvtx3			112745	116684	41713
mvtx4			114241	121214	41713
mvtx5			112518	116126	41713

~ 0.99 billion min. bias events (B=0) recorded so far

Trigger Control

LL1 Server OK

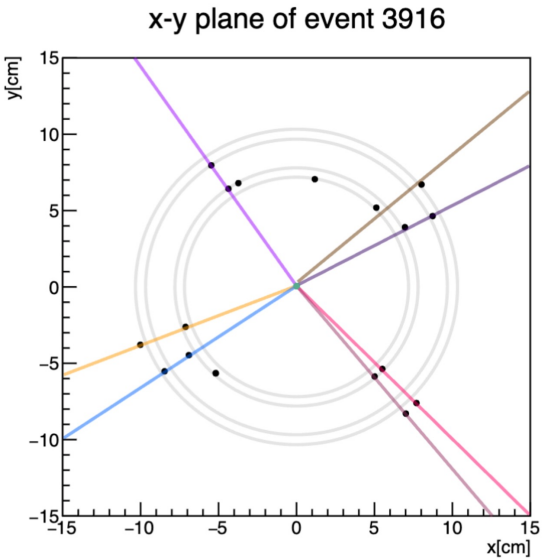
(ZDCN+ZDCS)/ZDC Coinc: 35.81
MBD N+S > 1/ZDC Coinc: 70.53

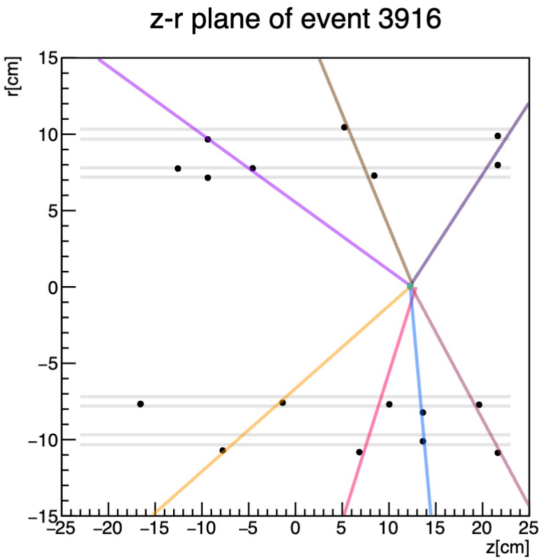
				Raw	Live
0: Clock	off		Modify	9383000.00 Hz	1305643.54
1: ZDC South	off		Modify	8721.97 Hz	1213.34 Hz
2: ZDC North	off		Modify	7913.73 Hz	1091.55 Hz
3: ZDC Coincidence	off		Modify	457.50 Hz	65.07 Hz
4: Random	off		Modify	51554.95 Hz	7174.56 Hz
5: HCAL Singles	off		Modify	0.00 Hz	0.00 Hz
8: MBD S >= 1	off		Modify	80442.22 Hz	11151.88 Hz
9: MBD N >= 1	off		Modify	74213.80 Hz	10303.93 Hz
10: MBD N&S >= 1	0		Modify	32890.39 Hz	4574.43 Hz
11: MBD N&S >= 2	off		Modify	366.33 Hz	21.06 Hz
12: MBD N&S >= 1, vtx < 10 cm	off		Modify	5780.87 Hz	2.50 Hz
13: MBD N&S >= 1, vtx < 30 cm	off		Modify	14029.89 Hz	6.42 Hz
14: MBD N&S >= 1, vtx < 60 cm	off		Modify	21629.00 Hz	10.59 Hz
15: HCAL Singles + MBD NS >= 1	off		Modify	10.51 Hz	0.00 Hz
16: Jet 1 + MBD NS >= 1	off		Modify	0.17 Hz	0.04 Hz
17: Jet 2 + MBD NS >= 1	off		Modify	0.00 Hz	0.00 Hz
18: Jet 3 + MBD NS >= 1	off		Modify	0.00 Hz	0.00 Hz
19: Jet 4 + MBD NS >= 1	off		Modify	0.00 Hz	0.00 Hz
20: Jet 1	off		Modify	45.99 Hz	5.12 Hz
21: Jet 2	off		Modify	1.98 Hz	0.26 Hz
22: Jet 3	off		Modify	0.95 Hz	0.17 Hz
23: Jet 4	off		Modify	0.34 Hz	0.09 Hz
24: Photon 1 + MBD NS >= 1	off		Modify	6.59 Hz	0.43 Hz
25: Photon 2 + MBD NS >= 1	off		Modify	6.76 Hz	0.39 Hz
26: Photon 3 + MBD NS >= 1	off		Modify	6.59 Hz	0.34 Hz
27: Photon 4 + MBD NS >= 1	off		Modify	6.29 Hz	0.34 Hz
28: Photon 1	off		Modify	2003.41 Hz	187.88 Hz
29: Photon 2	off		Modify	1799.12 Hz	167.90 Hz
30: Photon 3	off		Modify	1739.13 Hz	162.52 Hz

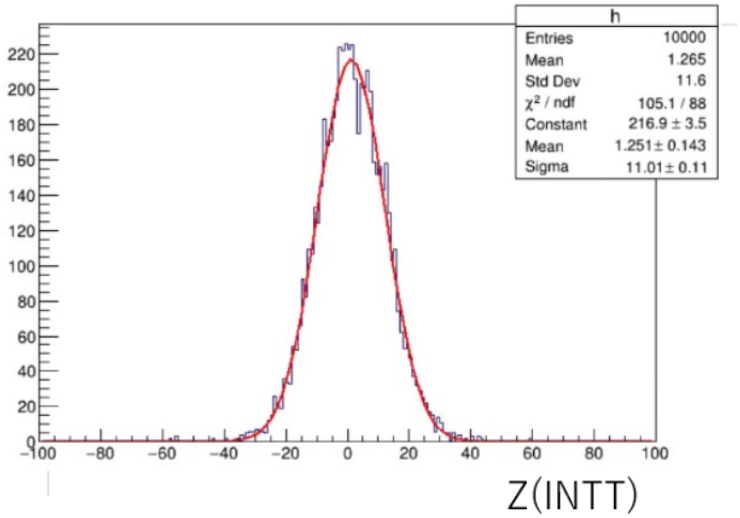
INTT fast offline analysis

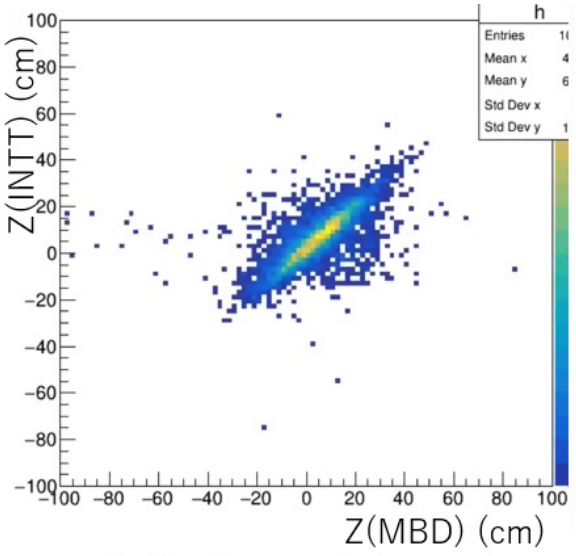
Low noise, initial tracking

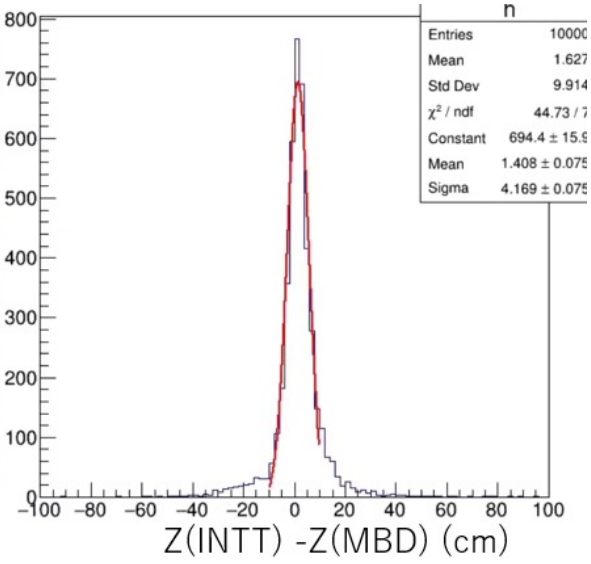
Determination of z-vertex and MBD offset



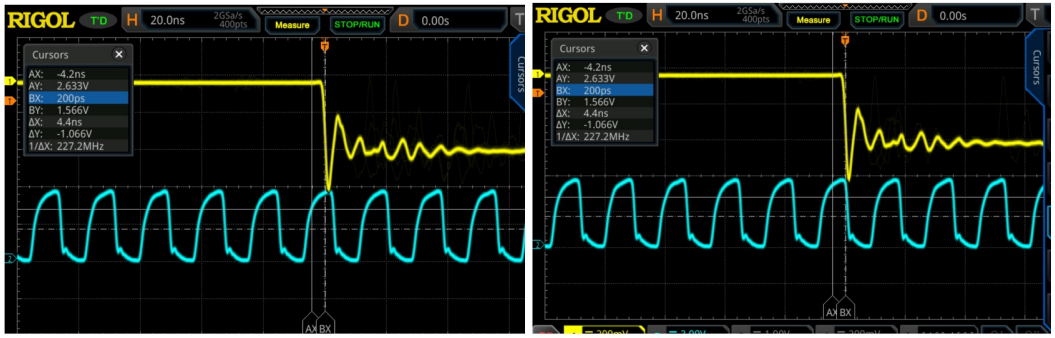


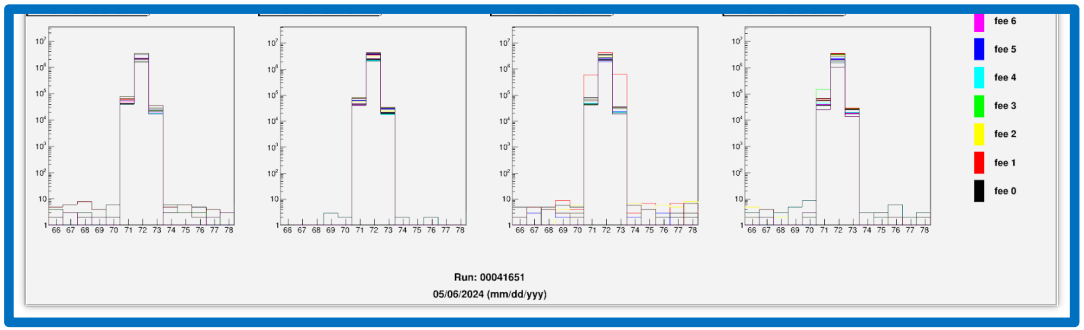


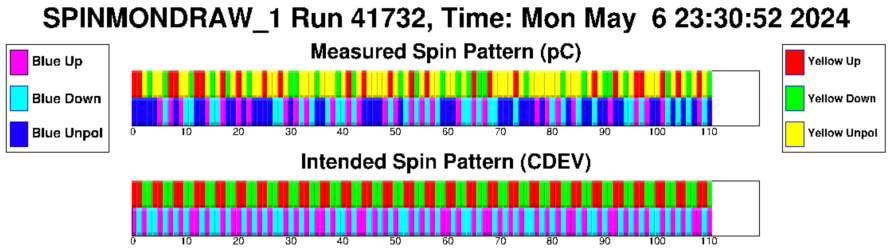




Clocks and Timing







Thanks to good communication between sPHENIX (Martin, Joe Mead) & C-AD, issue with clock / fiducial appears resolved. We also now have time/phase offset “wizard”.

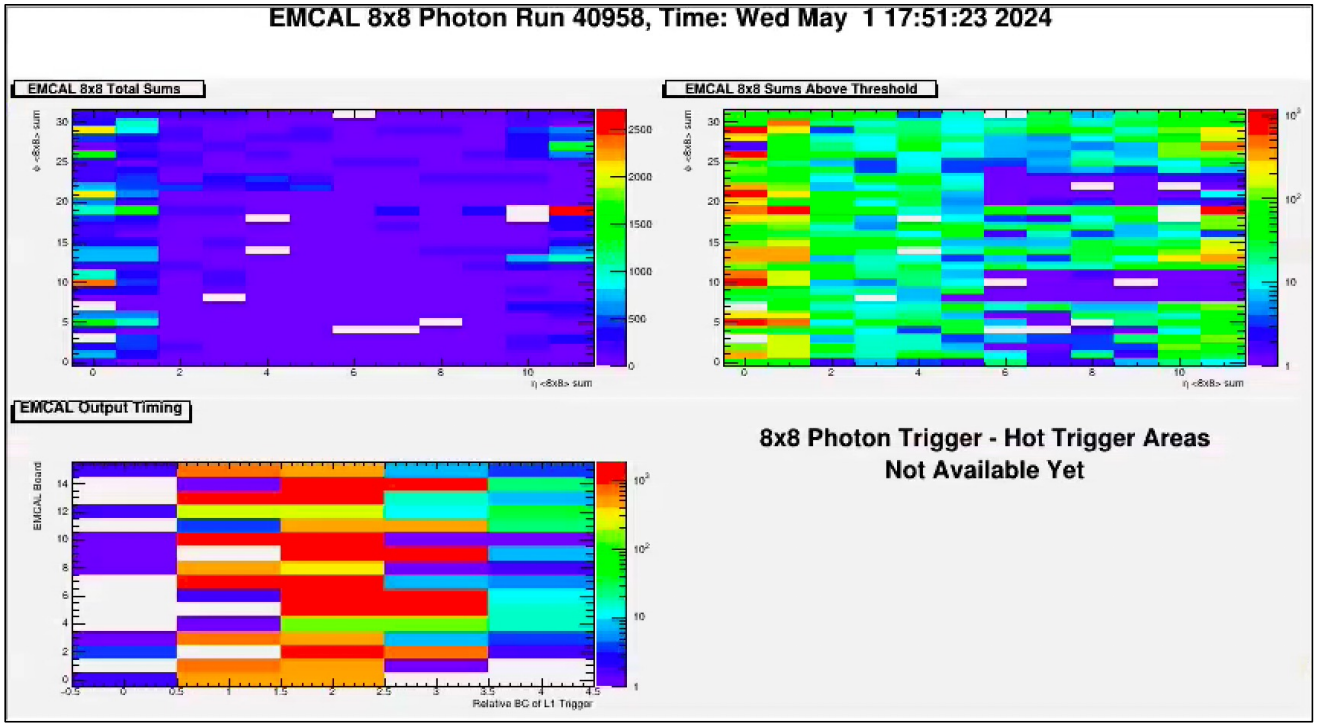
INTT timing not all in one bunch crossing.

Needs adjustment of fine delay and will want **56 x 56 bunches**.

Working on integrating spin pattern and local polarimeter into monitoring.

Commissioning Photon and Jet Triggers

- Initial timing set, checking hot towers last night
- 56 x 56 bunches will help for timing confirmation
- Goal is to have initial suite running by the end of the week



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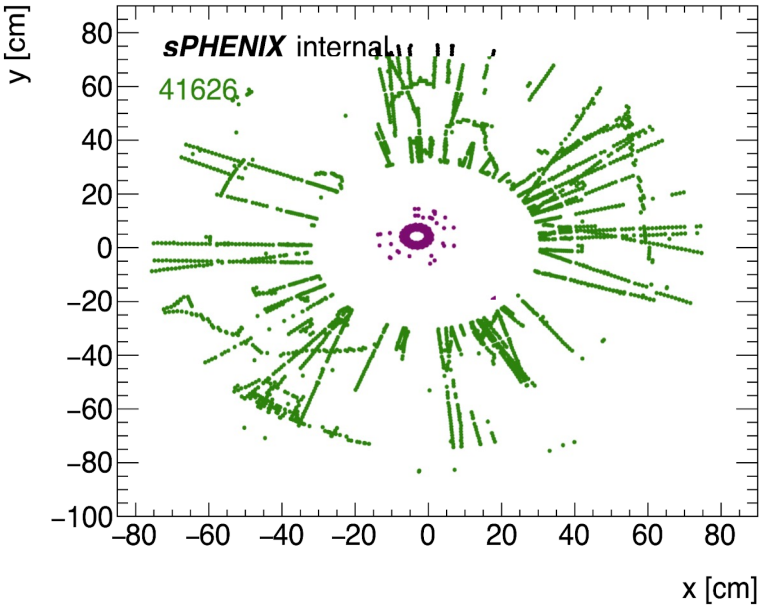
TPC Commissioning

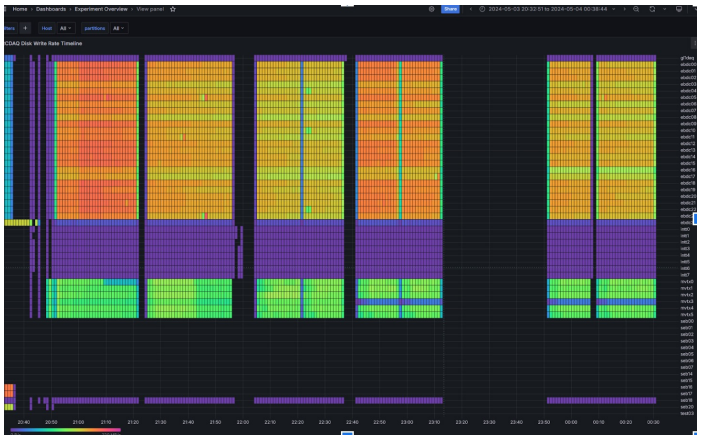
HV working point with cosmics is not optimal with collision data

Working on adjustments, including during today's access

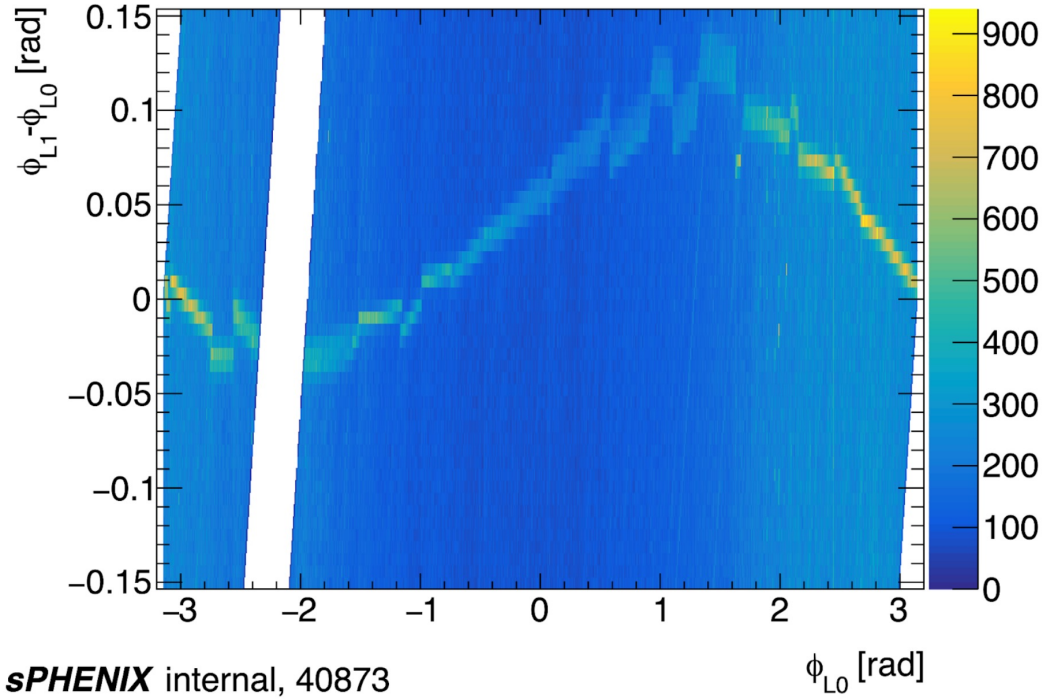
Data set for alignment / checks taken with all trackers on Sunday

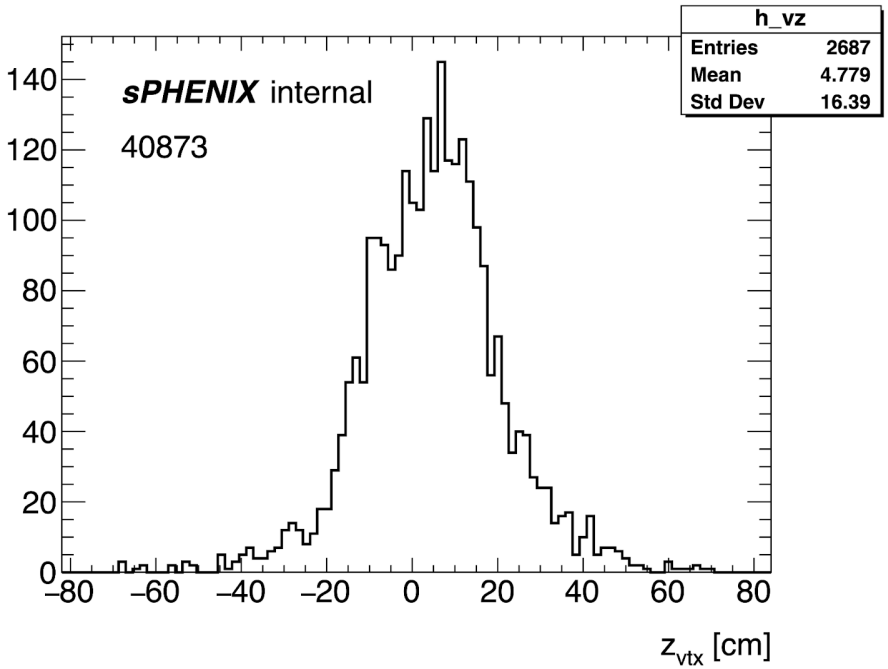
Good progress in parallel on firmware for zero suppression, alignment, etc.





MVTX Alignment Checks





Week #3 - starting Monday, April 29, 2024

→ Plan "Physics Quality" ADC system data taking at 15 kHz with minimum bias and "some HCal energy" trigger (using cosmic lemo).

→ EMCal, HCal, MBD, sEPD, ZDC/SMD should be physics ready including full monitoring.

→ TPC checks with B field in steps

→ Hopefully more regular beam/stores at moderate luminosity

→ Full MVTX background checks (dedicate significant time as needed) Potential single beam studies, steering, etc.

→ Potential first running at low rate with everyone in Big Partition

→ TPC new firmware needs to be running stably
[zero suppression, BCO alignment, busy signal, etc.]
Initial testing anticipated ~April 12…must monitor progress.

Week #4 - starting Monday, May 06, 2024

→ Bringing online photon (8x8 version) Level-1 trigger and maybe jet trigger [checking rejections and fast turnaround offline efficiency]

Where are we on the road to physics?

On schedule so far.

No background issues in MVTX are a major bonus.

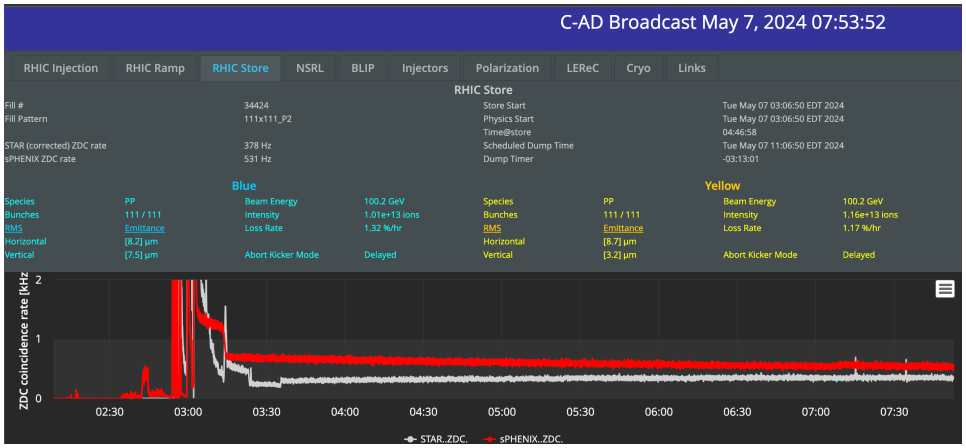
Bringing rare triggers online this week.

Challenges for TPC operations remain ahead.

Next “fun” steps

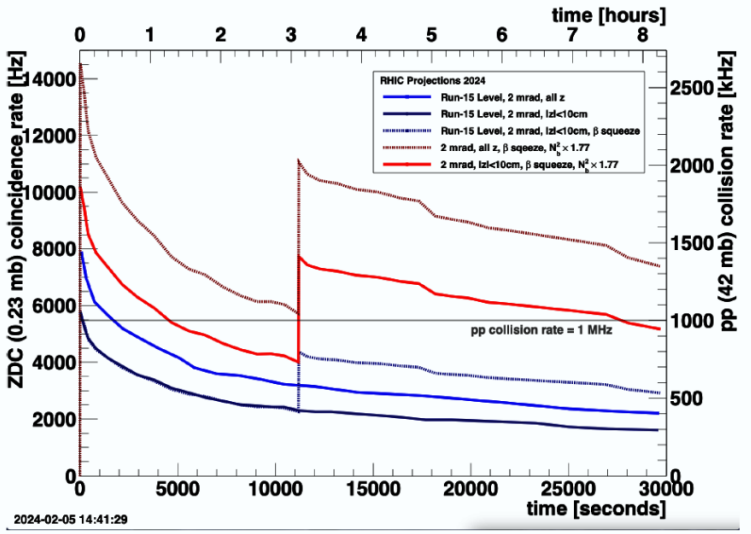
Access today:
TPC resistor swaps, SMD cable fix,
Laser work

Need to schedule:
56 x 56 bunch (potentially over weekend)
Turning on sPHENIX magnet (TBD)



Current luminosities yield collision rates at sPHENIX with 2 mrad of ZDCNS ~ 700-800 Hz (all z).

2015 levels would be ~ 5000 Hz (all z)
Goal for this run ~ 10,000 Hz (all z)



https://surveys.bnl.gov/TakeSurveyPage.aspx

DOE Mile Walk/Run Registration and Time Entry Form

The 2024 DOE Mile is the 9th annual one mile "friendly competition" walk/run between lab workers and family members across the DOE complex. Thirteen DOE labs and 1501 walkers and runners participated last year with expectations to exceed those numbers in 2024. DOE National Labs will hold races on their campuses in May.

Race results will be merged to determine overall standings.

- **BNL Onsite Walk/Run Race:** May 15
- **Report Your Virtual Race Time:** No later than May 17
- **Winners Announced:** End of May

How to Participate:

There are two options to participate: onsite and virtually.

- **Onsite:** The BNL onsite DOE mile race (walk and run) will take place on **May 15th** starting around noon (rain date May 16th). The 1-mile course will run through Brookhaven Avenue, starting at Bldg. 438 and finishing near the crossing with 5th Street. Family members *with on-site access* are also welcome to join the onsite walk/run.
- **Virtually:** Employees can also participate virtually in a **"do-it-yourself"** race. Simply measure a mile course, race it, and submit your time using the same registration form **by May 17th**. Use a fitness app like Strava to verify your mile (a screenshot of your time is necessary when reporting the time). Sign-up now, you can come back at a later time to upload your time and screenshot.

BERA will provide prizes for the winners in each category.

DOE mile 2024 t-shirts are available for purchase (starting at $19.99 + shipping).

May 15, 2024, at noon

sPHENIX
throws down
the Gauntlet