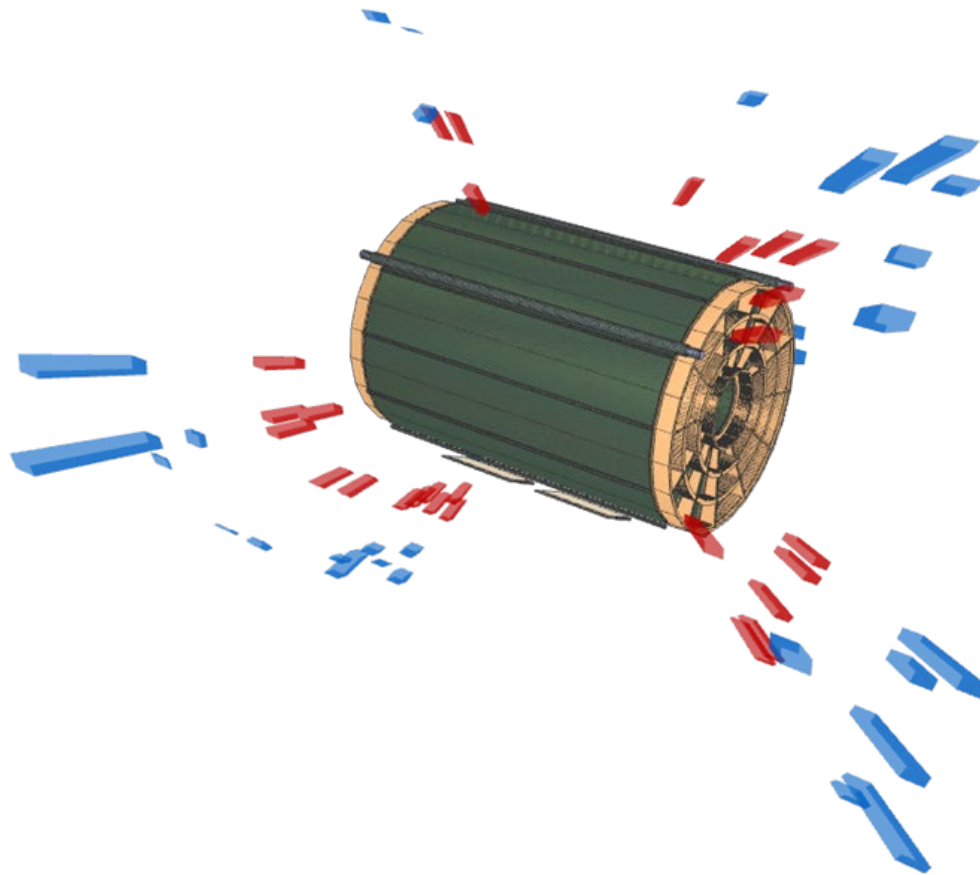


sPHENIX Commissioning Status

Kin Yip

5/23/2023

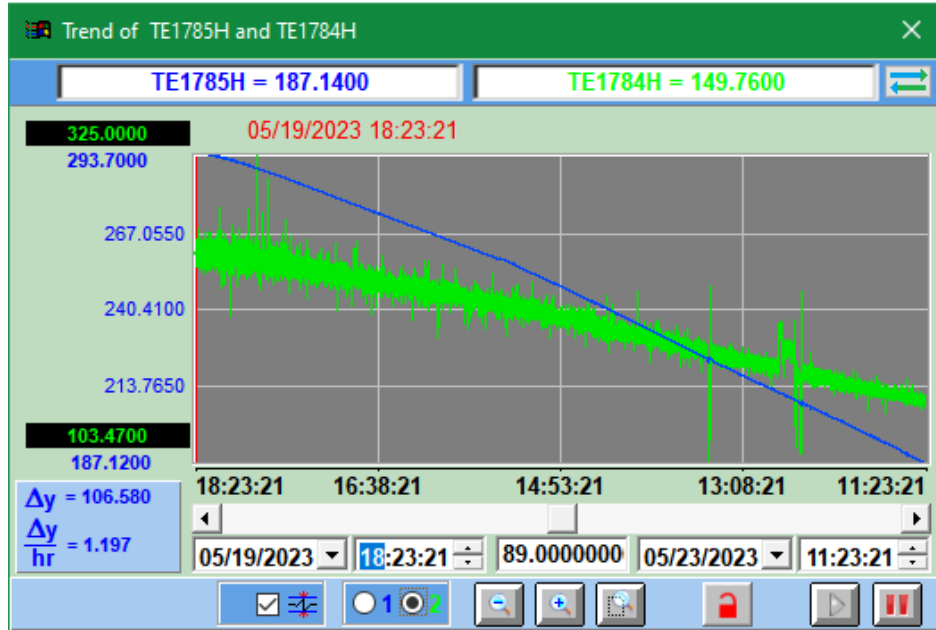
HCal Event Display (Data)
(by Oliver)



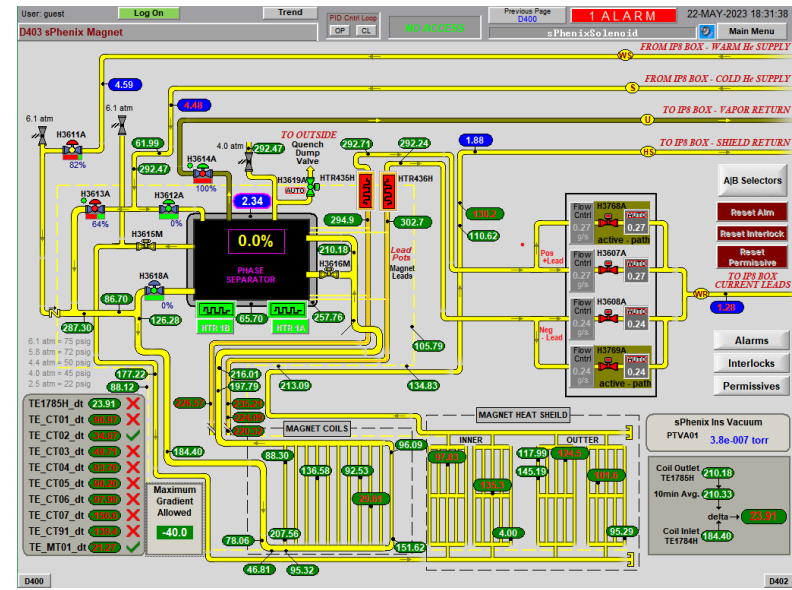
Commissioning Progress

- Approval from BHSO obtained on Thursday (May 18)
- Magnet cool-down started Friday (May 19)
- Flow of operating gas to TPC and TPOT started Friday (May 19)
 - TPOT commissioning started Saturday (May 20)
- Minimum Bias Trigger commissioning
 - Definitely triggering on collisions
 - Definitely can provide "clean" trigger on central collisions
 - Instabilities observed of phase with respect to 56 MHz clock
 - Presently, the shifters need to adjust the phase from store to store.
 - We have a firmware fix which is being tested.
- Calorimeter commissioning
 - Definite HCal-MBD correlation observed
 - Timed-in EMCAL last night

Magnet is being cooled down (by ~ 60 K gas at the moment)



- TE1785H (Return) & TE1784H (Supply)



Current plan:

- May 28/29, hipot (Carl and Kin)
- May 30/31 testing/ramping (Pablo & CAS)

TPOT Commissioning

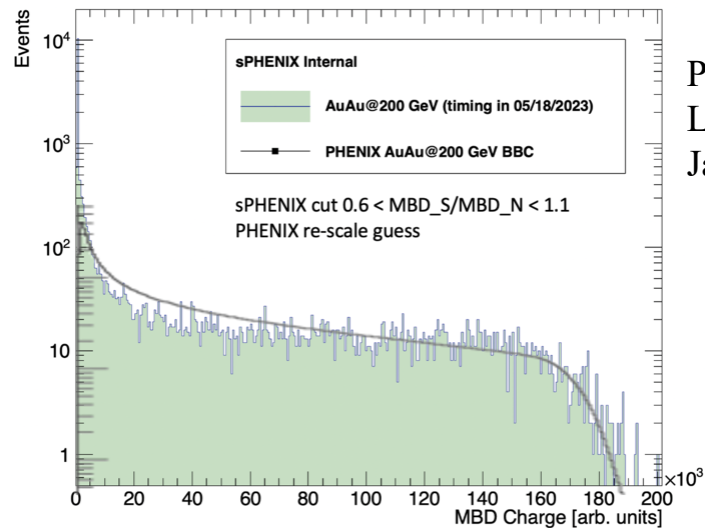
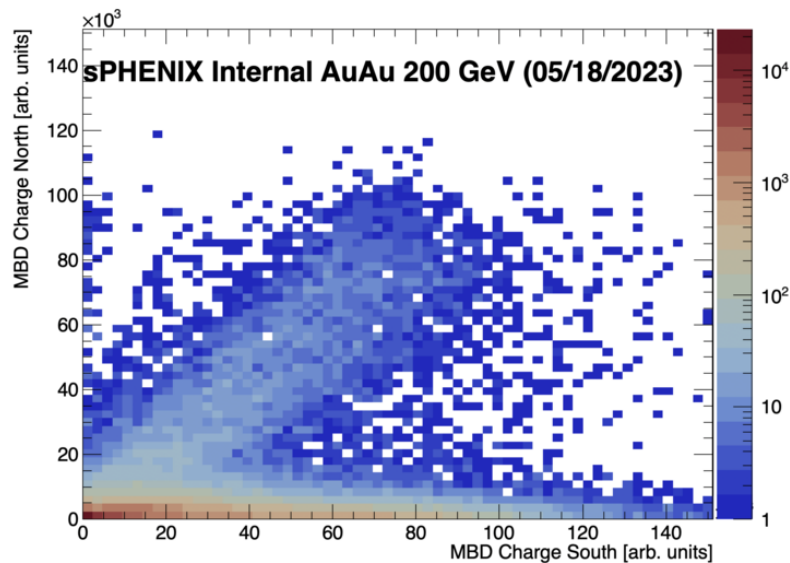
Ramping the chambers to operating voltage when there was no beam



No problems during the 56x56-bunch stores.

Plots by Hugo, Tristan

Evidence of collision trigger (First night)

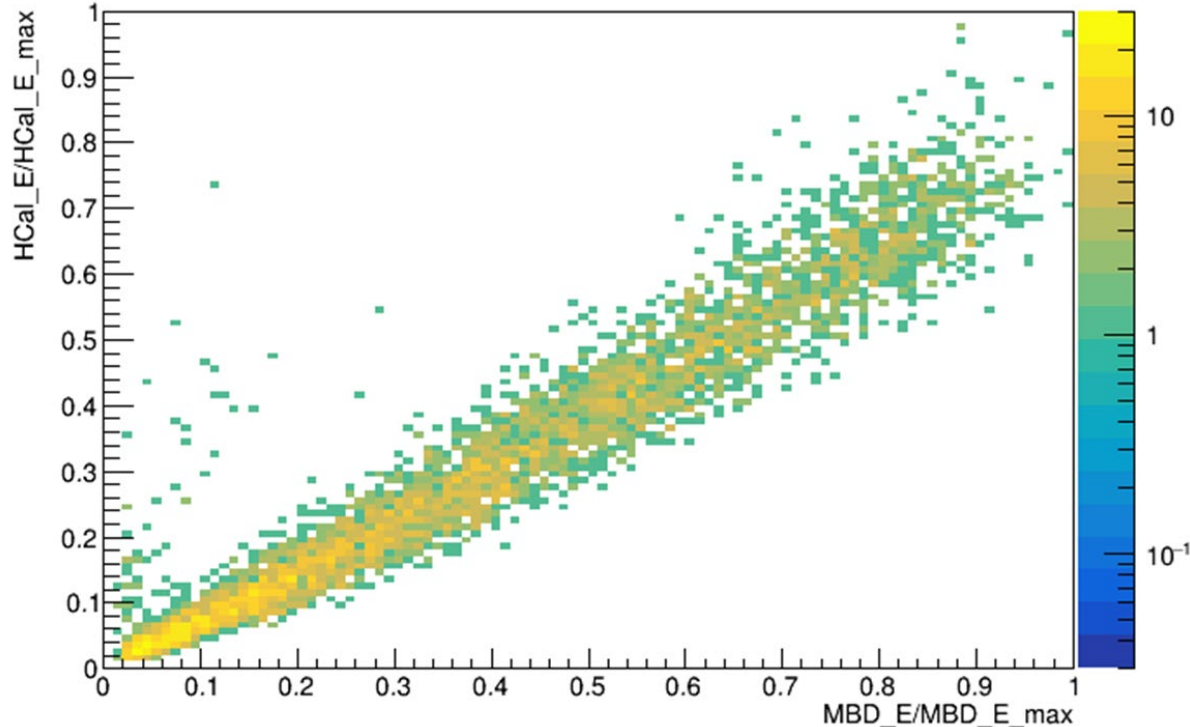


Plot by Jamie, Dan
Lis, Mickey, Abdul,
Jaebeom, Joey

- First night's data \rightarrow triggering mostly on background
- But when selecting N-S correlation \rightarrow charge distribution as expected from collisions

HCal-MBD Correlation

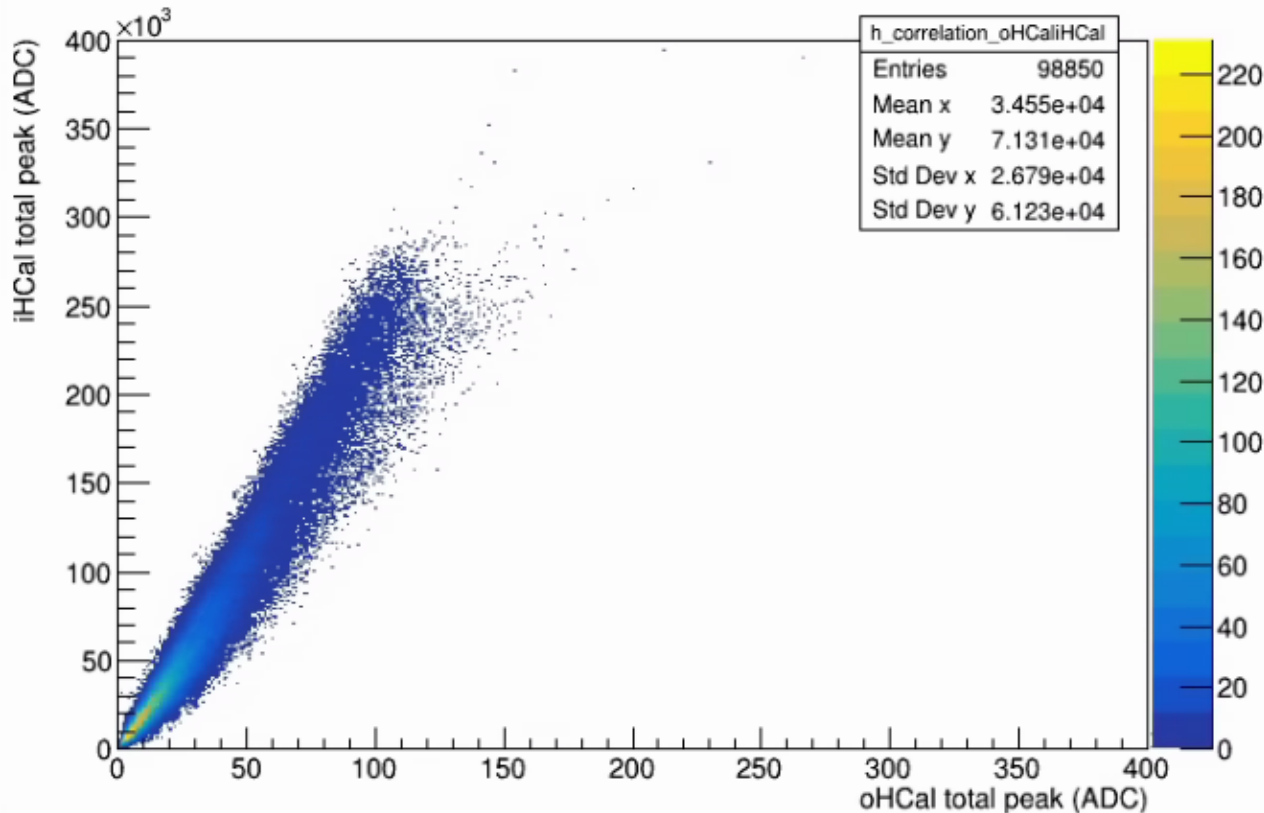
MBD-HCal correlation



- Sunday night's data
- MBD coincidence trigger with > 20 tubes on each side
→ trigger on central events, i.e. “clean”

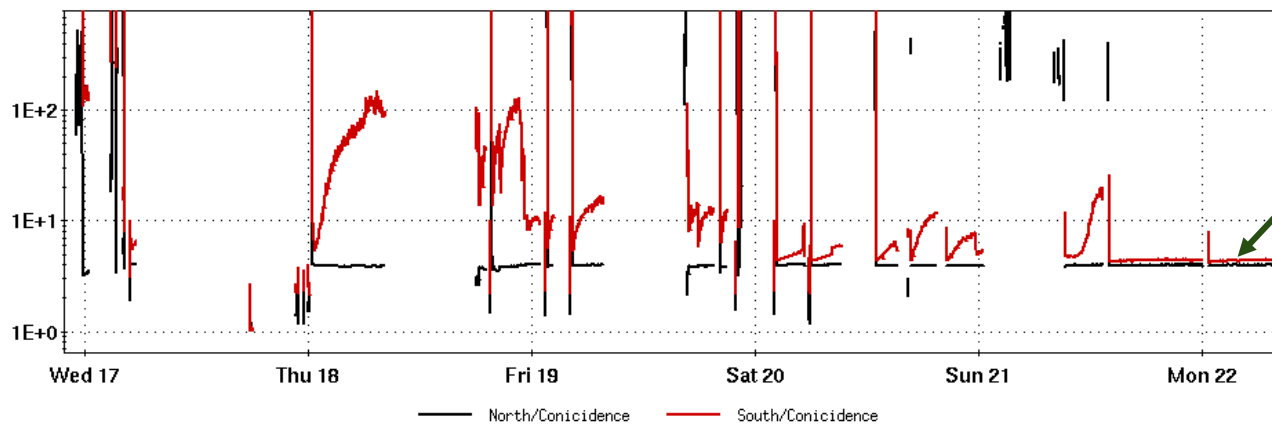
Plot by Hanpu, Shuhang, Oliver,
Virginia, Dan, JaeBeom

iHCal-oHCal Correlation

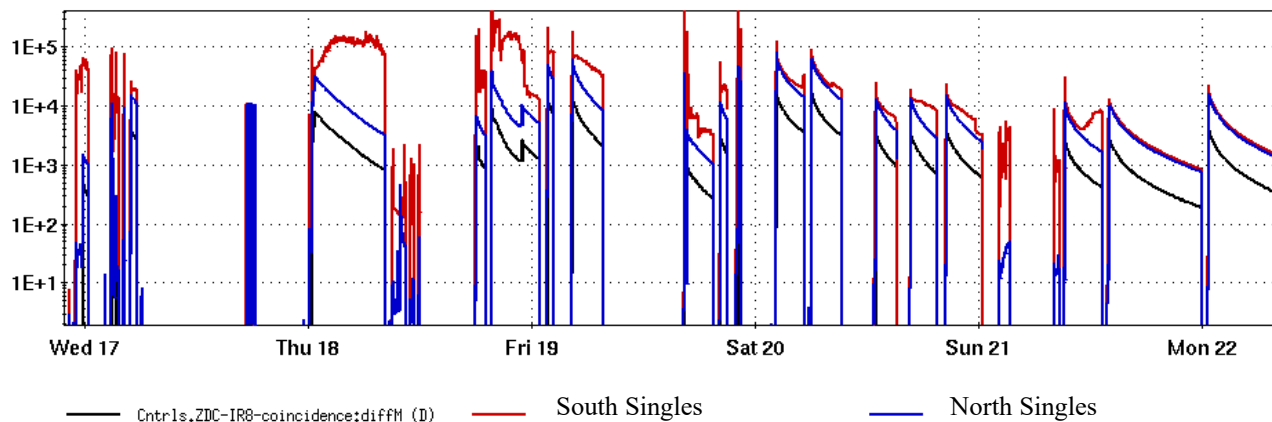


- Sunday night's data
- MBD coincidence trigger with > 20 tubes on each side
→ trigger on central events, i.e. “clean”

Plot by Hanpu, Shuhang, Oliver, Virginia, Dan, JaeBeom



- Beam has been much cleaner after “full collimation” was established since Sunday afternoon.



- Since we’re just starting to commission INTT today, we are paying even more attention to beam background than before.

Plot by Ben

12 week sPHENIX Commissioning Plan



- 2 weeks of stores with 6-28 bunches @ zero crossing angle (<2 kHz) for initial tune-up of timing and trigger.
 - The magnet doors will be closed and the magnet ramped at the earliest at one end of this period.
- 2 weeks of stores with 111 bunches @ zero crossing angle (1-5 kHz) for optimizing trigger, plus data analysis & diagnosis.
 - The trigger developed in the first two weeks will provide physics triggers for all other detectors
- 1 week of machine studies of optimizing crossing angle.
 - The major goal of this period will be to demonstrate the narrower vertex distribution and reduced rates in the TPC allowed by the crossing angle. The evidence for this will come from the vertex distribution from the trigger and hit distribution in the TPC and the silicon detectors.
- 1 week of 111 bunches @ non-zero crossing angle for calorimeter timing/tune-up.
 - As the luminosity nears the design, the experiment will continue to collect data from as many of the sub-detectors as possible, and the radiation damage to the silicon photomultipliers will be carefully monitored.
- 4 weeks of 111 bunches @ non-zero crossing angle (1-5 kHz) for operating tracking detectors including TPC.
 - This running period is designed to collect data from all detectors which will asymptotically approach physics data at modest rate. Any detectors which are having problems taking data or keeping up with the rate will be debugged during this period.
- 2 week of 111 bunches @ non-zero crossing angle with increasing collision rates (15-20 kHz).
 - This period is a dry-run of operation for physics which will develop software and procedure for physics data taking, which immediately follows this period.