sPHENIX Status
RHIC Coordination

September 2nd, 2025

Rosi Reed
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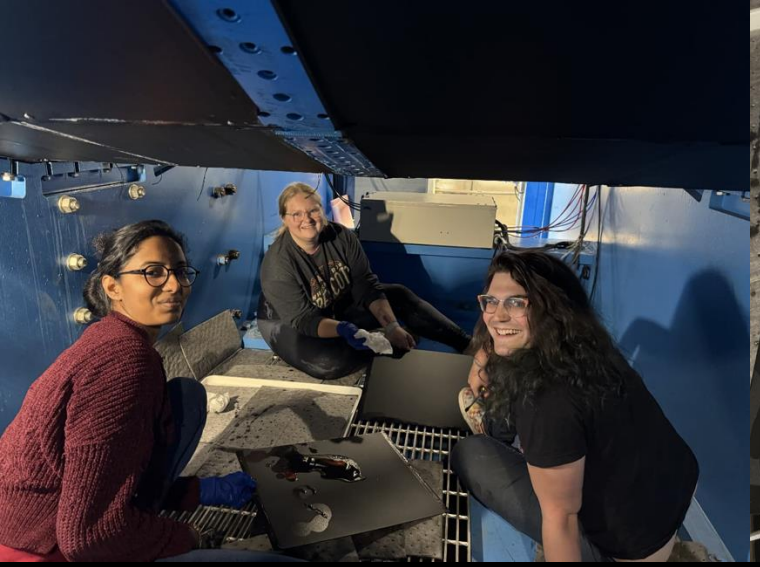
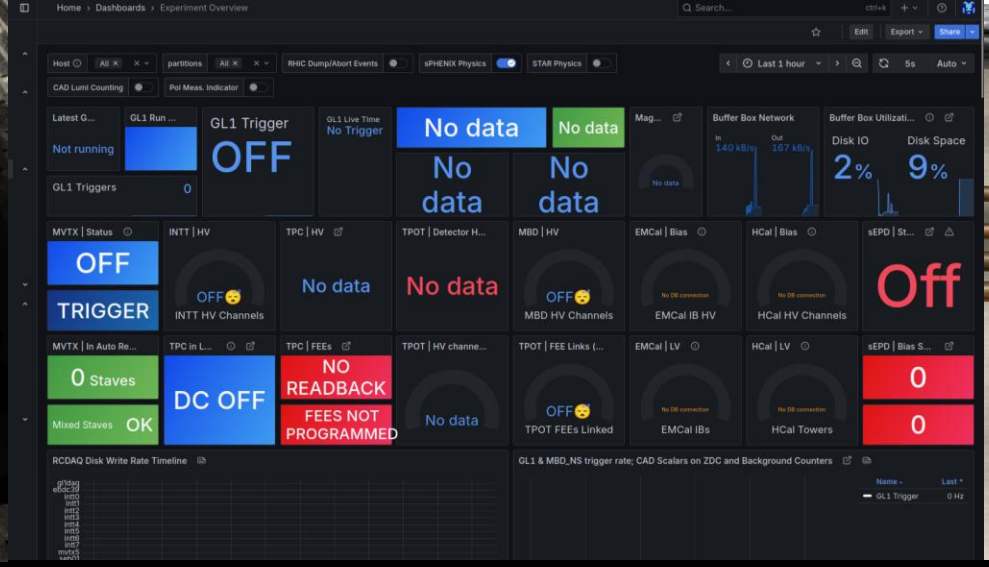
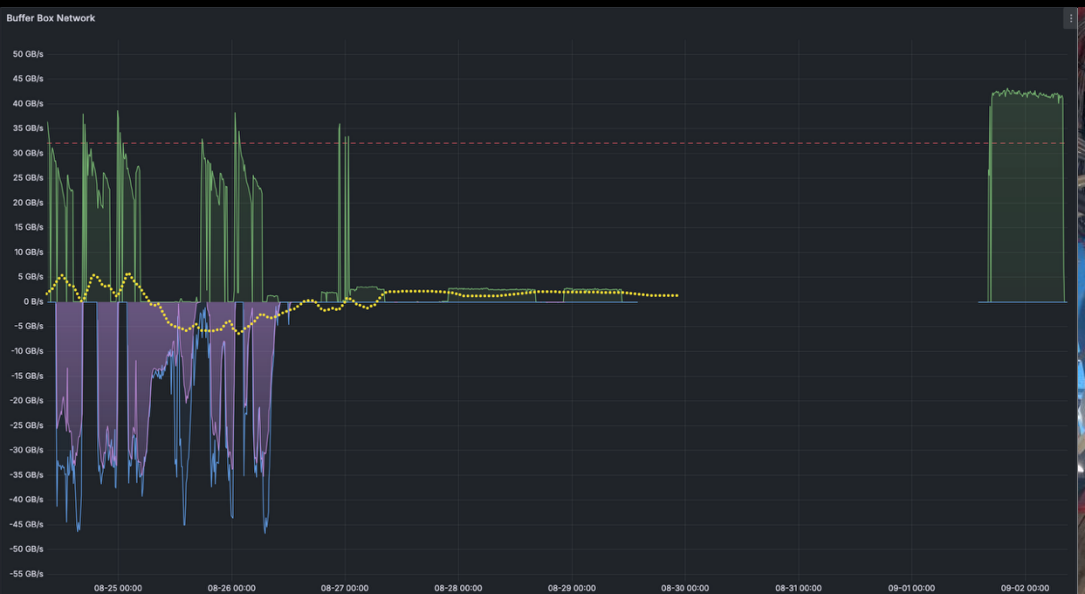
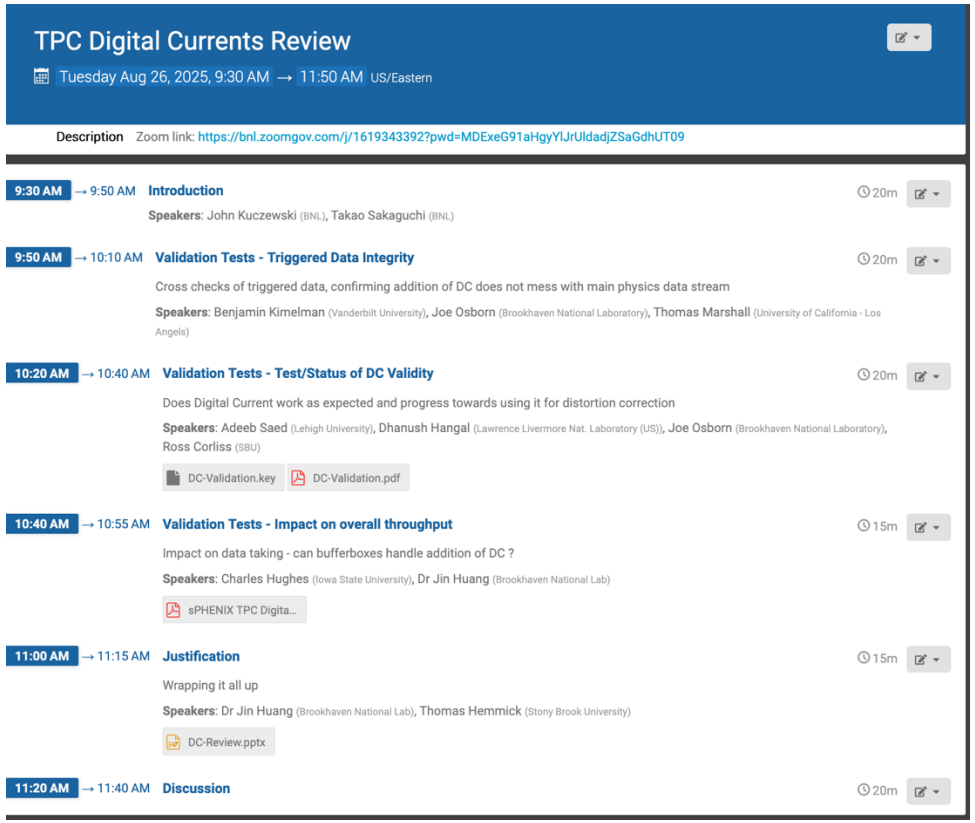




A lot has gone on since the last coordination meeting.....



TPC Digital Current Review
Tuesday August 26th



TPC Digital Currents Review

Tuesday Aug 26, 2025, 9:30 AM → 11:50 AM US/Eastern

Description Zoom link: https://bnl.zoomgov.com/j/1619343392?pwd=MDExeG91aHgyYlJrUldadjZSaGdhUT09

9:30 AM → 9:50 AM **Introduction** 20m

Speakers: John Kuczewski (BNL), Takao Sakaguchi (BNL)

9:50 AM → 10:10 AM **Validation Tests - Triggered Data Integrity** 20m

Cross checks of triggered data, confirming addition of DC does not mess with main physics data stream

Speakers: Benjamin Kimelman (Vanderbilt University), Joe Osborn (Brookhaven National Laboratory), Thomas Marshall (University of California - Los Angeles)

10:20 AM → 10:40 AM **Validation Tests - Test/Status of DC Validity** 20m

Does Digital Current work as expected and progress towards using it for distortion correction

Speakers: Adeeb Saed (Lehigh University), Dhanush Hangal (Lawrence Livermore Nat. Laboratory (US)), Joe Osborn (Brookhaven National Laboratory), Ross Corliss (SBU)

DC-Validation.key DC-Validation.pdf

10:40 AM → 10:55 AM **Validation Tests - Impact on overall throughput** 15m

Impact on data taking - can bufferboxes handle addition of DC ?

Speakers: Charles Hughes (Iowa State University), Dr Jin Huang (Brookhaven National Lab)

sPHENIX TPC Digita...

11:00 AM → 11:15 AM **Justification** 15m

Wrapping it all up

Speakers: Dr Jin Huang (Brookhaven National Lab), Thomas Hemmick (Stony Brook University)

DC-Review.pptx

11:20 AM → 11:40 AM **Discussion** 20m

Some homework for final validation, however no issues with the data we have recorded → Continue operations

Commissioning Timeline

- Jul 9: Production version of the FEE firmware was uploaded to FEEs
- Jul 10: Confirmed LVL-1 data are consistent between old and new firmware
  - Without turning on any DC-related function running.
- Jul 11: Enabled digital current (DC) packets, still LVL-1 triggers only
- Jul 14-Aug 4: Enabled DC-self and LVL-1 triggers at low-rate collisions
  - When ZDC NS rate is less than 18KHz.
  - Self-triggered and LVL-1 triggered data, and DC packets are sent (100% streaming)
  - Since Jul 14, DC + 100% streaming has been the default operation mode at ZDC NS < 18KHz.
- Aug 5: Pre-physics test 1. Turned on DC and LVL-1 only (no streaming)
  - Confirmed operation parameters for DC.
- Aug 7: Pre-physics test 2. One full store (from high to low rate) for DC +LVL-1 only
  - Found sizable amount of self-triggered packets were found in data stream (“leakage”).
  - Data from TPC were beyond buffer box writing rate limit.
- Aug 12-13: Modified version of the FEE firmware was uploaded to FEEs.
  - Self-triggered packets in data stream was significantly reduced.
- Aug 15-: DC in Physics. Turned on DC+LVL-1 for production

Digital Current has been a part of our program since August 15th

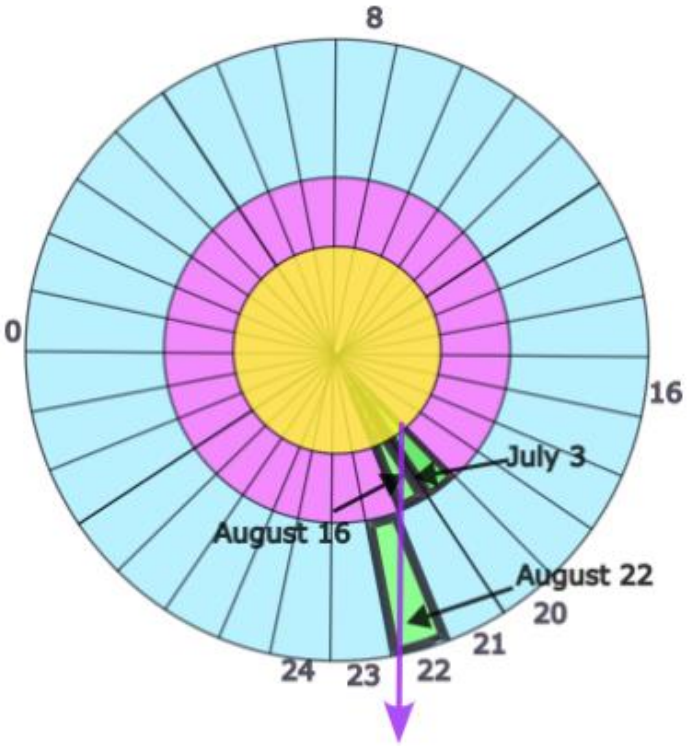
Power Dip Monday 8/25

- Magnet tripped at 4:33 am
  - Power off + pump tripped)
- 8B substation was down due to all 3 fuses being blown
  - Found a crispy squirrel in the 13.8 kV line cage
  - Both 8A and 8B will use underground lines
- After recovery magnet was ramped, finishing at 14:18
- With quick CA for further checks needed for the calo repair, we were taking physics data 17:40

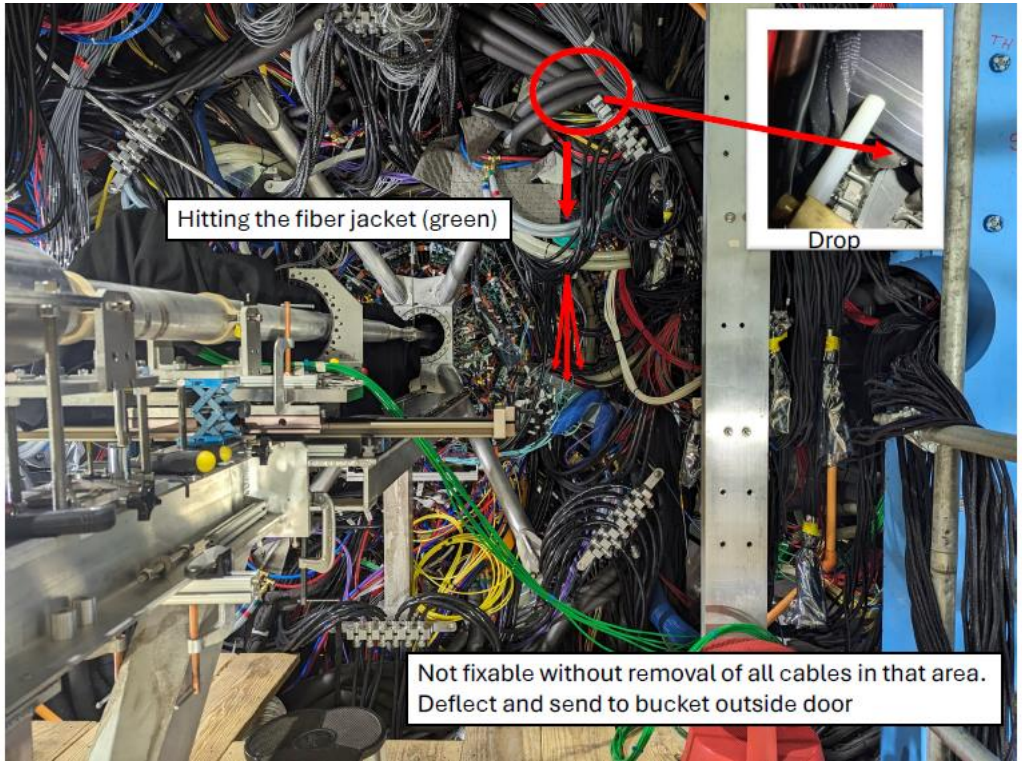
Calorimeter Repair

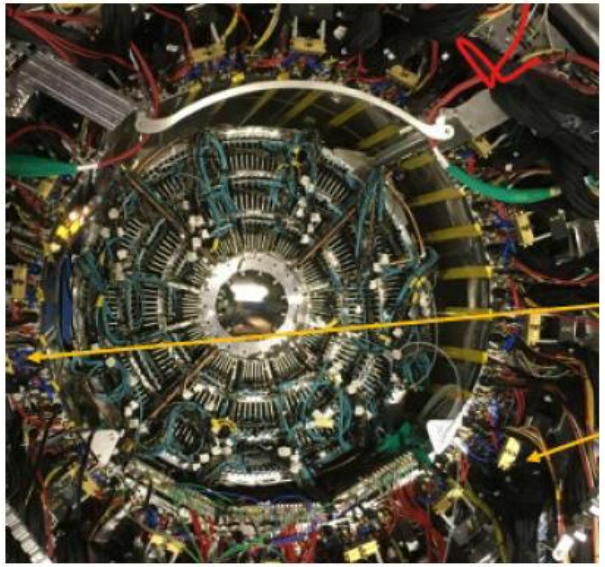
- Glycol leak discovered July 30th, but at that time it did not affect operations so we did not want to open bore due to risk/benefit evaluation
- We have developed 3 shorted sectors in the South inner (2) and outer HCAL (1)
- We opened the poletips 8/26 (North and South) after RHIC 69 kV line issue to better examine the issue
  - sEPD panels removed for bore access

Mock up of leak path



Calorimeter Repair





Not fixable without removal of all cables in that area.
Deflect and send to bucket outside door

Two leaks were located, one was fixable the other is not. We can redirect glycol/water mix to outside the detector

Calorimeter Repair

- Repair interrupted due to personpower being devoted to the shutdown and recovery due to 69 kV line repair
  - We also need continued access to the bore (and scaffolding inspection each day) which has required us to “borrow” Aaron Allen from Atlas
- HCal panels opened to let glycol/water drain before closing back
  - Only one HCal preamp was damaged and replaced
  - Inner HCal sectors are inaccessible so we can not remove the suspected bad towers so the two half sectors of the IHCal are not recoverable
- Remain open as we turn the EMCal chillers back to nominal and turn on the electronics
  - Thermal cycling will occur

sPHENIX Turn on Activities

- Safety systems remained on (UPS/generator) during the power outage
- Infrastructure (gas, cooling) turned on shortly after power restoration on Saturday
- Computing system turned on Monday afternoon
- Gas shifts resumed at 8 am this morning
  - TPC isobutane mixture restored → TPC to be turned on Thursday
  - PLC PS replaced (recall earlier issue from 4 weeks ago)
- Breakers in racks turned on this morning
- All subsystems under expert control until fully restored
- Once we are back up, we will take field off-cosmics to compare with earlier data (and will be helpful for TPC digital current tests)
  - Magnet turn on Friday
- sPHENIX is on track to be fully functional by COB Friday
  - Ready and excited for collisions!