

# sPHENIX Newsletter

## PD-4 review taking place today (11/18)

The end of the sPHENIX MIE project is determined by successfully passing the PD-4 review. This is taking place today starting at 9am ET. The Indico page for the review is here:

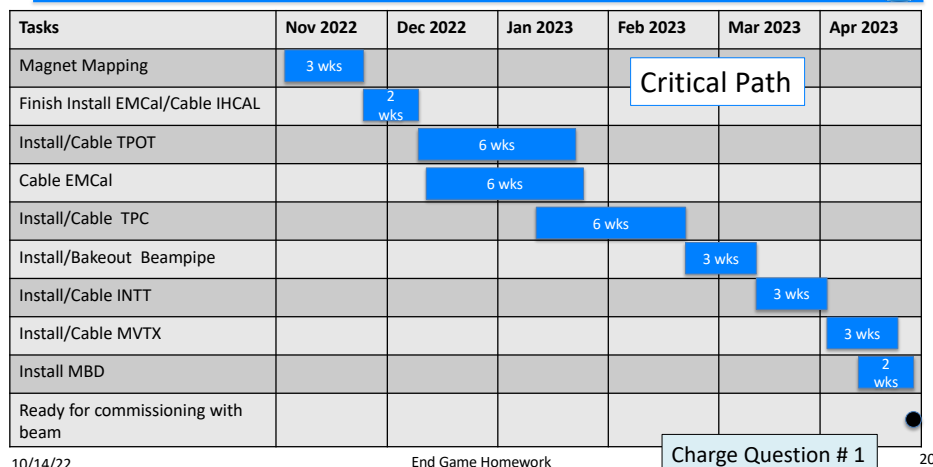
<https://indico.bnl.gov/event/17794/>

## “End Game” review and sPHENIX schedule

A review was held October 13-14 to examine the plan for finishing sPHENIX installation. Ed O’Brien spoke briefly about this at the last general meeting which took place just as the review ended. Since then, the draft report has been checked for factual accuracy, but the final written report has not been released. The review was generally positive, though it noted the large amount of work remaining to be done.

A key focus of the review was the detailed schedule leading to the end of installation. The following schedule was shown at the review:

### Q4: Task Not on Critical Path



In this schedule, the installation finishes near the end of April 2023. The review panel asked, as an overnight homework question, for an estimate of how much the schedule could be accelerated if

one assumed the availability of all needed workforce, multiple shifts per day, and for work to continue through weekends. With those assumptions, sPHENIX installation could conceivably finish 4-5 weeks sooner.

The sPHENIX plan for Run-23 is described in the beam use proposal (<https://indico.bnl.gov/event/15845/>). The top priority for the run is to make sure that sPHENIX is fully commissioned and operating correctly. To accommodate 24 cryoweeks before the end of FY'23 would require starting operations in mid-April; to accommodate 28 cryoweeks would require starting in mid-March.

## sPHENIX PD-4 review

The final step in the sPHENIX MIE project will be to secure PD-4 approval. The review that we hope will lead to that approval takes place today (Friday, November 18) starting at 9am ET. The meeting is completely remote, only online. Ed O'Brien and Glenn Young will make the presentations to the panel, but it's important that the L2 managers be available to answer questions.

Zoom link:

<https://bnl.zoomgov.com/j/1604221042?pwd=a29iZjQxSE8xQW1zaSsyWjNiaHNNQT09>

## Additional steps before operation

The RHIC accelerator complex has to produce a current Safety Assessment Document (SAD) relevant to an agreed-upon Accelerator Safety Envelope (ASE). These need to be reviewed and approved by DOE's BNL site office (BHSO). Getting to that requires an Internal Readiness Review (IRR) followed by an Accelerator Readiness Review (ARR). These are substantial reviews.

The sPHENIX magnet mapping (see below) did require limited operation of the RHIC cryo system; that operation was approved in a more targeted way as an Unreviewed Safety Issue (USI).

sPHENIX had been defined to be part of the RHIC ASE/SAD, meaning that the experiment itself would be part of the accelerator-focused IRR/ARR process.

Just yesterday, we learned that BHSO has agreed that sPHENIX does not need a separate SAD/ASE document with the associated IRR/ARR. Instead, BNL will request USI approval from BHSO to operate sPHENIX. This is a very positive development and should reduce the process of bringing sPHENIX into operation.

# Collaboration meeting and commissioning workfest

The next sPHENIX collaboration meeting will take place at BNL December 12-14. We're actively working on the agenda, but there is an Indico page up <https://indico.bnl.gov/event/17774/>

Please take a moment to register for the collaboration meeting and indicate whether you'll be attending in person. There is a lot happening with sPHENIX at BNL, so it's a fantastic time to come in person and see the activity for yourself.

As sPHENIX nears first data-taking, there are significant ongoing efforts by the scientific collaboration in the many areas needed to deliver production-ready, high-quality data and the first sPHENIX physics. This includes impressive work by many collaborators in the software/simulations meetings, the physics topical groups, the tracking team, the DAQ/trigger group, the calibrations groups, and other efforts.

For junior collaborators who are planning to do sPHENIX physics and are looking where to get involved, this is the best possible time to take ownership of critical items needed before data-taking and have a real impact. Please reach out to the leaders of the Simulations, TG, Calibrations, etc., efforts above, or the Physics Coordinator (Dennis Perepelitsa) if you would like help identifying these opportunities.

The Collaboration has had dedicated discussions on ideas and plans for first physics in the summer Collaboration Meeting, and in follow-up sessions in August and September (the latter focused on the computing model for early data access), and these informally continue in the topical groups and other venues. We plan to continue our Collaboration-wide discussion about early ("Day-1") physics in a centralized way at the December Collaboration Meeting.

Following the collaboration meeting, we'll have a workfest on December 15-16. It will be a hands-on "commissioning workfest", taking place at BNL after the Collaboration Meeting and it will focus on urgent tasks in low-level reconstruction, online monitoring, calorimeter calibration, tracking alignment, and space charge corrections.

The Indico page, with registration, for the commissioning workfest is here: <https://indico.bnl.gov/event/17618/>

## sPHENIX in Asia meeting

The 3<sup>rd</sup> sPHENIX in Asia meeting took place this week at National Central University, in Taoyuan City, Taiwan. It was well attended with participants coming from regional collaborating institutions and also from the US. The Indico page for the meeting is here: <https://indico.bnl.gov/event/17532/>

You might enjoy a youtube video shown at the meeting illustrating the work done at NTU and NCU in Taiwan to help build the INTT. It's really well done: <https://youtu.be/x3tfzPeGfwU>

## Magnet mapping

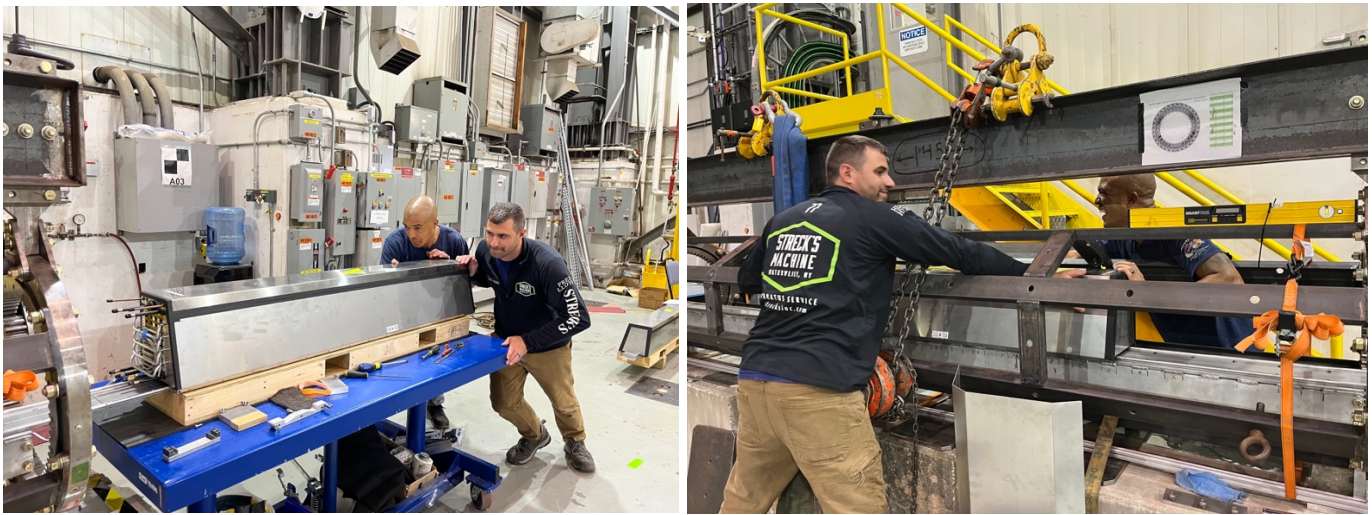
A team of four experts from CERN arrived at BNL on October 31 and got started mapping the magnetic field of the sPHENIX magnet. Their apparatus was installed in the bore of the magnet, mounted on the same rail system that the EMCal sectors use. Coarse and fine maps of the magnetic field were made at both full and half-field strength. The peak field at operating current was measured to be 1.4T, as expected.



BValT = -1.411592	-0.004703, 0.005511
BValT = -1.401875	0.004362, 0.005242
BValT = -1.397893	0.002913, 0.009079
BValT = -1.399307	0.003422, 0.009062
BValT = -1.406711	0.006496, 0.008555
BValT = -1.409695	0.008401, 0.008233
BValT = -1.394770	0.005816, 0.008268
BValT = -1.396441	0.005674, 0.008015
BValT = -1.403802	-0.002153, 0.009974
BValT = -1.410893	-0.000813, 0.008565
BValT = -1.395020	0.001417, 0.005830
BValT = -1.402785	-0.007759, 0.006783
BValT = -1.410036	-0.002677, 0.006435
BValT = -1.396462	0.002534, 0.019376
BValT = -1.396144	0.001487, 0.010420
BValT = -1.398499	0.003867, 0.010660
BValT = -1.399691	-0.000845, 0.006624
BValT = -1.395372	0.000135, 0.006064
BValT = -1.404349	-0.009320, 0.009690
BValT = -1.401328	-0.002459, 0.011862
BValT = -1.407547	-0.004231, 0.011727
BValT = -1.408966	-0.002889, 0.007306
BValT = -1.405653	-0.004271, 0.005376

Figure 1: (left) The CERN team in front of the magnet mapping apparatus; (right) preliminary data from the mapper showing that the field reaches 1.4T, as expected.

Now that the mapping is done, the focus returns to completing the installation of the remaining EMCal sectors.



*Figure 2: Aaron Allen and Jeff Hoogsteden moving an EMCAL sector into the installation jig.*

## **RHIC Science and Technology review**

The biennial RHIC S&T review was held November 8-10 at BNL. Gunther Roland spoke about the sPHENIX science program, Ed O'Brien presented the installation status and remaining work, and Dave Morrison showed the commissioning plan (drawing on the work of the Commissioning Task Force). Also, Krishna Rajagopal presented a summary of the PAC report.

The panel members were taken on tours of STAR and sPHENIX. They were also able to visit the former PHENIX magnet pole tips which are stored out in the open near IR12.

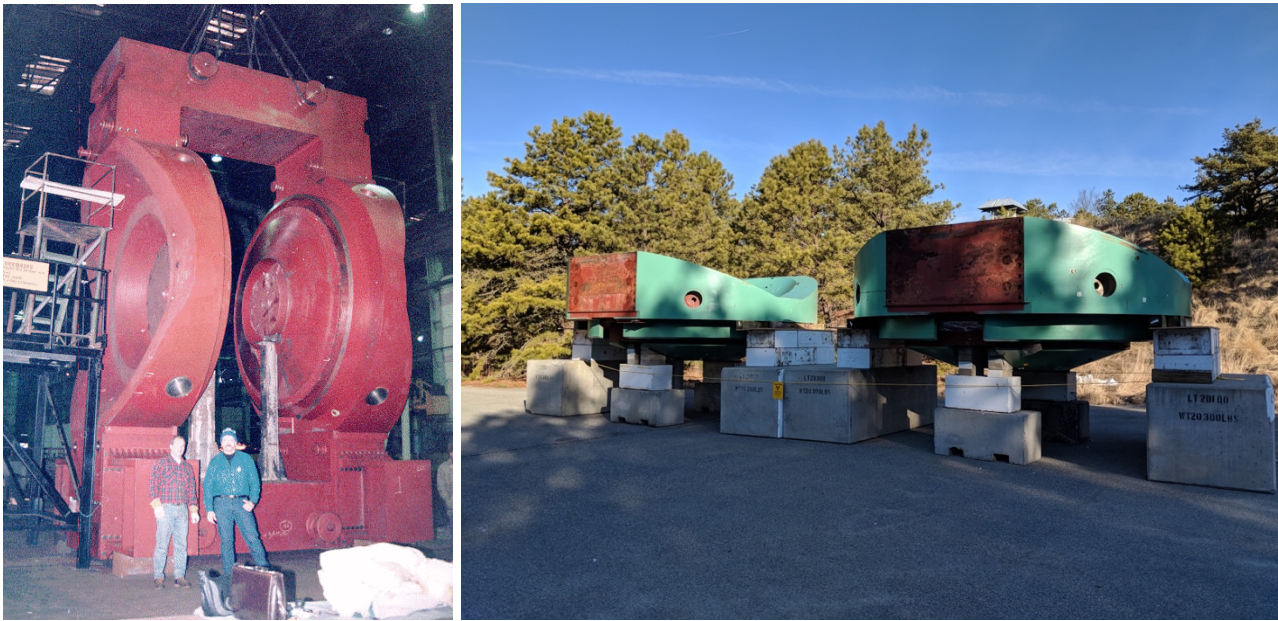


Figure 3: (left) PHENIX central magnet at the Izhora Steel Works (St. Petersburg, Russian Federation); (right) the pole tips of the PHENIX central magnet en plein air near IR12.

The closeout of the review took place on November 10. The parts of the closeout focused on sPHENIX were very supportive. The closeout did note the substandard “user experience” currently provided by BNL for its users. The draft report has been circulated for fact checking.

DOE Heavy Ion program manager Ken Hicks arrived at BNL a day before the review to talk with people and see all the work that is going on.



Figure 4: Rachid Nouicer showing Ken Hicks details of the INTT construction.

# Delegations visiting sPHENIX

Tours of sPHENIX have been very well-received by visits of high-level delegations to BNL. DOE Under Secretary for Science and Innovation Dr. Geri Richmond visited BNL on October 26. She participated in a ceremony to break ground for the Science and User Support Center (SUSC) now under construction as part of BNL's Discovery Park. She then took a whirlwind tour of many facilities at BNL, including sPHENIX.



*Figure 5: (left) Ceremony to break ground for the Science and User Support Center (SUSC); (right) Dave Morrison describing sPHENIX to Dr. Richmond and Doon Gibbs.*

A delegation from the Japanese Embassy visited BNL on November 1-2. The party consisted of Dr. Okamura, First Secretary, Science Section in Embassy of Japan; Mr. Kadoya, First Secretary, Science Section in Embassy of Japan; and Mr. Sakuraba, Consul of the Consulate General of Japan in New York. They visited with RBRC Director Hideto En'yo, toured the INTT lab in Bldg. 510, visited sPHENIX in IR8, then saw the BLIP (BNL's isotope production) and NSLS-II.

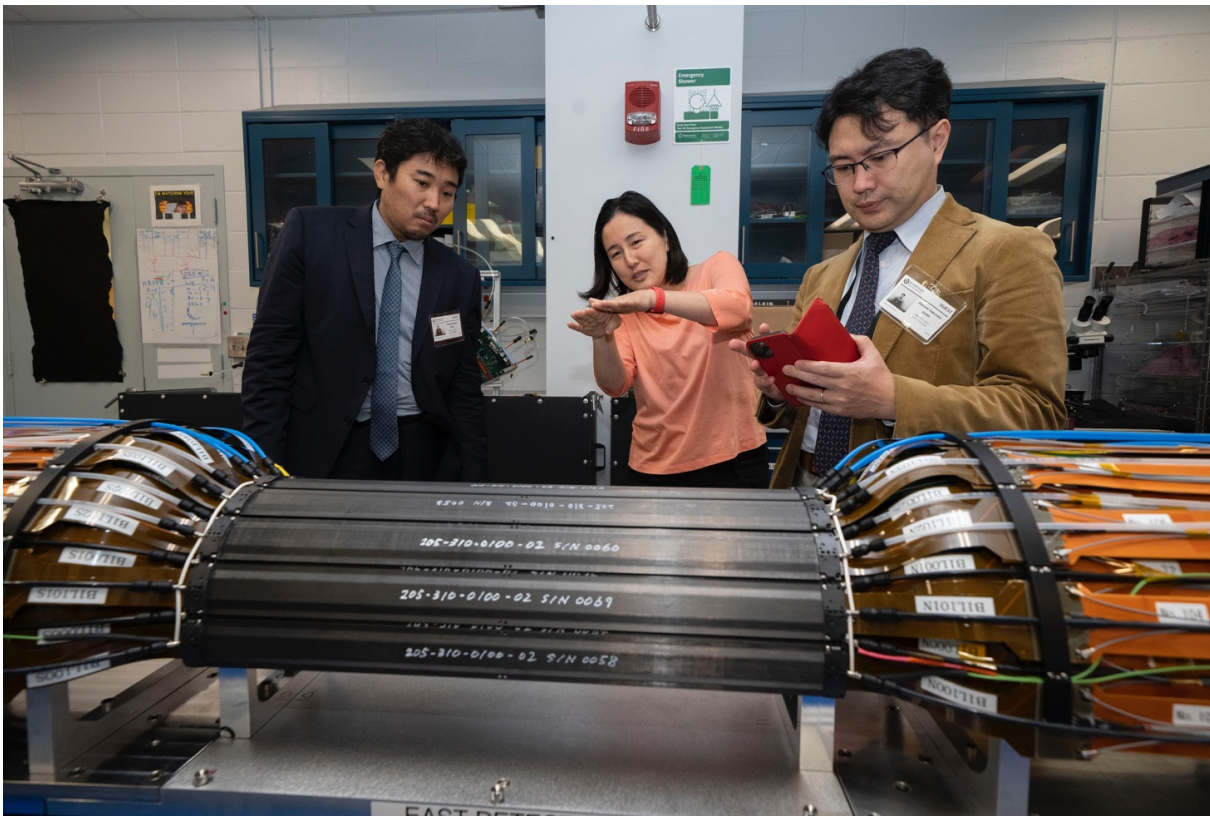
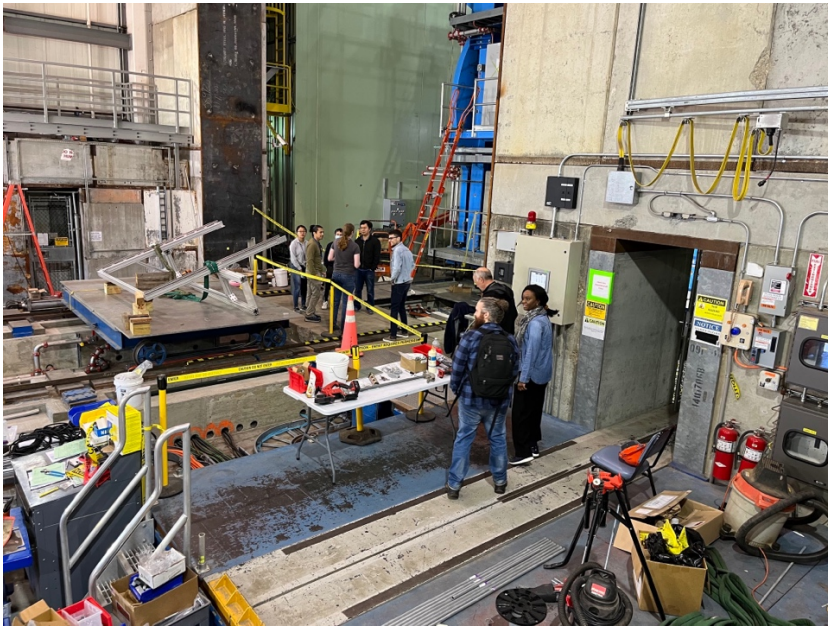


Figure 6: Maya Shimomura describing the INTT to Mr. Kadoya and Mr. Sakuraba.

Colleagues from BNL's Computational Science Initiative (CSI) are working with sPHENIX on AI/ML projects to compress our streaming data. They visited sPHENIX and were very obviously impressed by the experience.





*Figure 7: Ejiro Umaka describing sPHENIX to colleagues from CSI.*

## **Many, many other activities**

No matter where you look, you can see sPHENIX work going on these days.

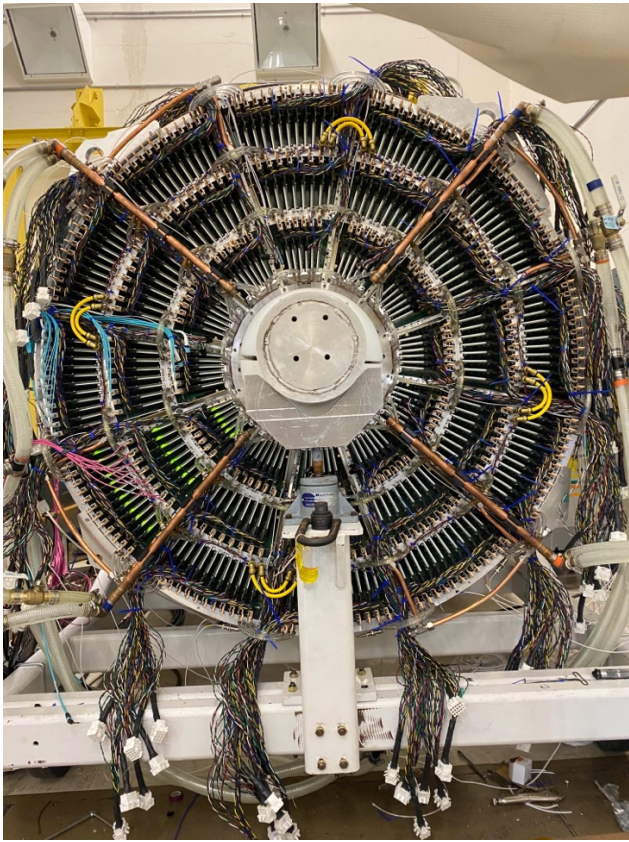
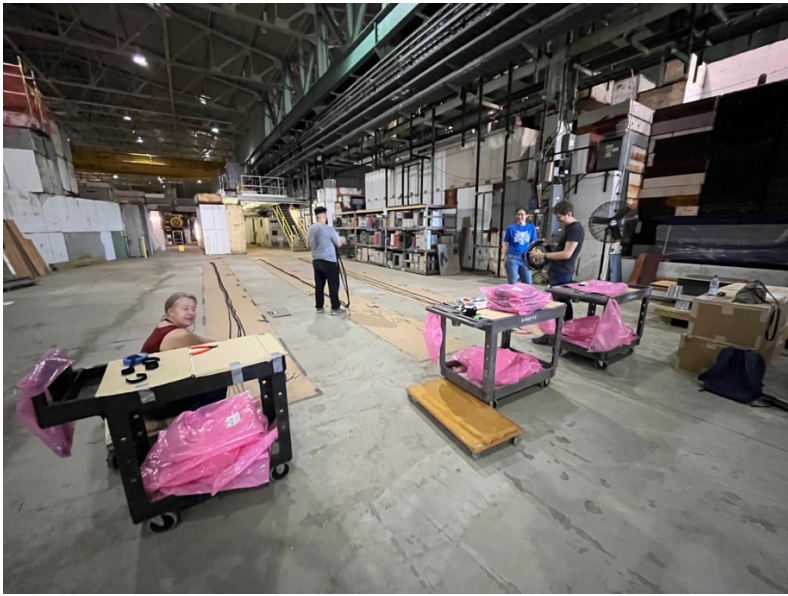


Figure 8: One end of the sPHENIX TPC at SBU fully instrumented.



Figure 9: Cameron Dean inspecting the MVTX. Both halves of the detector have been successfully delivered to BNL.



*Figure 10: Caroline Riedl, Anthony Hodges, Anne Sickles, and Tim Rinn bundling EMCable cables in Bldg. 912 in preparation for their installation in sPHENIX.*