



The PPPL Highlights for the week ending August 8, 2020, are as follows:

NSTX-U RECOVERY (J. GALAYDA) AND RESEARCH (S. KAYE)

Recovery (J. Galayda):

Management — Project personnel are working with the “Return to Work” (RTW) process managers to simplify the process of reviewing/approving RTW requests. A standard agenda for Plan-of-the-Day (PoD) meetings has been drafted. A dry run of the first meeting has been scheduled.

Coils — Sigmaphi is on vacation until Aug. 17. Two coils (PF1C#1 and PF1A#2) shipped to PPPL on July 30 were at JFK airport, and were scheduled to be delivered to PPPL the week of Aug. 8. PF1B#2 vacuum pressure impregnation (VPI) preparation was completed and the VPI will be conducted on Aug. 25. PF1C#2 metrology was completed and the paperwork will be reviewed at PPPL while Sigmaphi is on vacation. The coil will be shipped upon the Sigmaphi's return, and spare coil preparations will begin when the vendor returns to work.

Center Stack Casing (CSC) — Machining continued in Camden, New Jersey, on the center stack casing. The spiral groove for the heat transfer tube was machined into both ends and the ID of each end underwent final machining. This phase of machining continued through Aug. 8, and the CSC was shipped to Turtle Creek to attach the collar pieces on each end. The CSC will be returned back to Camden in mid-August for more machining. In addition, vacuum testing of the spare bellows was performed at PPPL since they may have to be sent to ORT/Holtec for installation.

Machine Core Structure (MCS) — Many fabrication activities continued at the three facilities currently making sling parts. Precision Boring in Michigan continued fabrication of the PF1A and PF1B capture and common flanges and of the PF1C capping flanges for the sling supports. In South Carolina, Carolina Fabricators first articles and production of PF1A sling parts continued, and partial shipment was sent Aug. 5. G. J. Oliver finished radiograph inspection and resumed final machining of the welded parts of the PF1C supports. Additional procurement activities to award contracts for the remaining MCS components neared completion this week.

Interspace Vacuum Pumping System (IVPS) — On-site activities to install power to the vacuum pump and perform mechanical installations of the vacuum system components will resume upon approval in mid- August.



ITER PROJECTS (H. NEILSON)

Electron Cyclotron Emission — ECE (G. Paraiso):

The ECE team reported continued progress in the integration of its components with the Equatorial Port 09 infrastructure. Highlights of recent advances include progress in updating the layout of the optical components (microwave waveguides and mirrors) inside the diagnostic shield module, and in defining apertures in the diagnostic first wall, through which the ECE system will collect plasma emission. The ex-vessel compliant seal assembly has been modified to be compatible with the current window design. Progress is being coordinated with ITER-India partners in the ECE project, with PPPL's port integration lead, and with Central Team responsible officers.

Low Field Side Reflectometer — LFSR (S. Shirey):

Manufacturing partner General Atomics (GA) submitted the first draft of the Manufacturing & Inspection Plan (MIP) for the Test Antenna Block Assembly that GA will fabricate as the focus of the project's manufacturing development program. The MIP is a key document to begin the TABA manufacturing, while the initial welding development study is already under way. After an internal review, PPPL will provide feedback to GA to refine this first draft prior to approval. As we develop and refine the TABA manufacturing over the next few months, the MIP will be refined in parallel and will ultimately become the first draft of the LFSR In-Vessel Antenna Block Assembly MIP.

THEORY (S. HUDSON)

E. Feibush presented a visualization of a Rayleigh-Taylor astrophysics simulation at the ACM conference on Practice and Experience in Advanced Research Computing. The movie and short paper were jury-selected for the PEARC20 Visualization Theater. One frame of the movie was chosen for the cover of the conference video trailer. Visualization techniques were illustrated for exploring, verifying, and presenting data on a 3D compute grid. The movie was generated using the VisIt software with custom Python scripts written to apply numerical threshold operators and geometric slicing to show data within the grid. These techniques are not limited to this example and can be readily applied to other applications that are based on a 3D compute grid. This work was performed in collaboration with Princeton University's Institute for Computational Science and Engineering (PICSciE).



The paper titled, “Validated two-dimensional modeling of short carbon arcs: Anode and cathode spots,” by J. Chen, A. Khrabry, I. Kaganovich, A. Khodak, V. Vekselman, and H.-P. Li has been published online in *Physics of Plasmas*: <https://doi.org/10.1063/5.0011044>. The authors developed a self-consistent model of the ablated arc and successfully reproduced the experimentally observed arc spots at the anode. Theoretical analysis shows that the anode spot forms not due to a plasma instability, as was commonly believed before, but rather occurs due to the highly nonlinear nature of heat balance in the anode.

COMMUNICATIONS & PUBLIC OUTREACH (A. ZWICKER)

Communications (L. Bernard):

The Office of Communications posted one press release to the PPPL website. It reported on research by graduate student S. Jin that revealed a novel way to prevent pesky magnetic bubbles in plasma from interfering with fusion reactions — delivering a potential way to improve the performance of fusion energy devices. And it comes from managing radio frequency (RF) waves to stabilize the magnetic bubbles, which can expand and create disruptions that can limit the performance of ITER. The story was also posted to the *Newswise* and *EurekaAlert* press release distribution services.

L. Bernard participated remotely in the U.S. Department of Energy Office of Science, Office of Communications and Public Affairs monthly meeting on Aug. 6.

DIRECTOR’S OFFICE (S. COWLEY)

Laboratory leadership has been communicating ongoing updates to staff regarding the COVID-19 virus and PPPL.

The Laboratory Leadership Council (LLC), elected officials, community/business leaders, and students participated in a virtual town hall meeting with C. Fall (Director of the Office of Science) on Aug. 5. Fall and S. Cowley led a discussion about the future of the national labs and the critical role of PPPL and the Princeton community in shaping that future.

S. Cowley participated in the Princeton University Academic and Administrative Managers Group (AAMG) meeting on Aug. 6.



S. Cowley participated in the Aug. 7 bi-monthly National Laboratory Directors Council (NLDC) Coordination meeting, which discussed the status and plans of the national laboratories.

This report is also available on the following web site:

<http://www.pppl.gov/publication-type/weekly-highlights>