



The PPPL Highlights for the week ending March 28, 2020, are as follows:

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

Recovery (J. Galayda):

FY 2020 status: NSTX-U is in a maintenance and repair outage.

The organization is rapidly adjusting to work from home. The sequence of regularly scheduled project meetings has been largely uninterrupted. APMs regularly check on vendors' statuses via phone call, and some vendors have reported lighter staffing.

Sigmaphi, the vendor of the poloidal field coils, has stopped work. Project personnel have continued the weekly teleconference with Sigmaphi through this week, and the project is assured that work will re-start work as soon as possible. At this time, however, there is no firm re-start date.

Preparations for the Director's CDE-3b review continue with finalizing presentations and updating documents. The project and PPPL purchasing continue to process requisitions. Project personnel have also been communicating with vendors to reduce the number of deliveries while the lab is closed. Commodities and other items that are not schedule-critical will be held at the vendor.

Research (S. Kaye):

NSTX-U researchers have been actively and productively working with those who are developing proposals for NSTX-U collaborations. This is to prepare their records of discussion and estimates for PPPL resources for diagnostic interfaces and research support of collaborative science proposals. NSTX-U researchers also continue to develop the written, "refreshed" Five-Year Research Plan for 2021-2025 as they work toward an NSTX-U PAC meeting on May 13-14 and an external panel review of the plan and diagnostic proposals on June 9-11. It is expected that the first draft of the written plan will be done by the first week of April.

U.S. ITER FABRICATION (H. NEILSON)

As has been reported frequently, the Low Field Side Reflectometer (LFSR) in-vessel antenna assembly has complex interfaces with its enclosing shield box, involving space reservations, shielding, structural mounting, and services such as water supply. The agreements between the so-called "tenant" (the LFSR in this case) and the Equatorial Port 11 integrator (the Russian Domestic Agency) are formally documented in an Interface Sheet. This week, the LFSR team submitted its input to the LFSR-EP11 Interface

Weekly

HIGHLIGHTS



Sheet, including references to models that identify the key spatial interfaces and attachment points, as well as a detailed listing of tolerances whose achievement is critical to ensuring proper interface. The agreements on interfaces are the product of an intense collaboration between the two teams over the past year. The effort on the U.S. side was led by PPPL engineer A. Basile.

The LFSR team has met an important readiness target in its preparation for a final design review of the in-vessel antenna assembly, by documenting compliance with over 90% of the applicable system requirements. A Design Compliance Matrix is used as a tool to map each of over 200 requirements to the documentation that justifies compliance of the design with that requirement. A strong team effort, led by engineer M.-A. de Looz and including design partner General Atomics, enabled the project to address a very wide range of subject matter, from top level performance criteria to smaller scale packaging signage, in a timely manner. The project has reached the target set for a U.S. ITER readiness review in May, weeks ahead of schedule.

ITER & TOKAMAKS (R. NAZIKIAN)

DIII-D (B. Grierson):

Research:

An Office of Science Fusion Energy Sciences Research Highlight — [“Magnetic Ripples Calm the Surface of Fusion Plasmas”](#) — has been posted online and describes how new nonlinear fluid MHD simulations show that ELMs in the DIII-D tokamak are suppressed when the magnetic ripples applied to the outside of the plasma drive narrow magnetic islands just inside of the plasma. The highlight is based on a recent paper by Q. Hu, R. Nazikian, et. al. titled, “The density dependence of edge-localized-mode suppression and pump-out by resonant magnetic perturbations in the DIII-D tokamak” published in *Physics of Plasmas*.

ADVANCED PROJECTS (D. GATES)

Stellarators (D. Gates)

On March 24, D. Gates gave a short presentation to the virtual EU-US collaboration workshop entitled “Stellarator Optimization.” The talk outlined a proposed collaborative research plan between the US and EU stellarator programs. The EU counterpart for the talk was P. Helander from IPP Greifswald. The workshop was organized by M. Lanctot of DOE’s Fusion Energy Sciences office.



The Stellarator Seminar Series hosted by the Advanced Projects department has successfully transitioned to a remote participation format. The talk given by Princeton University graduate student T. Qian (*Tabletop Permanent Magnet Stellarator Experiment for Physics and Education*) on March 19 had more than 60 remote participants on Zoom. An active, extended, and lively discussion period continued after completion of the talk. This seminar series is expected to continue uninterrupted throughout the period of lab curtailment, with weekly talks already scheduled throughout April.

DIRECTOR'S OFFICE (S. COWLEY)

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

PPPL and DOE Fusion Energy Sciences co-hosted the EU-US Technical Workshop on Fusion Energy virtually on March 23 and 24. The objective of the workshop was to continue the long history of collaboration between the European Atomic Energy Community (EURATOM), represented by the Commission of the European Communities, and the U.S. Department of Energy, and to explore the capabilities and readiness for conducting collaborative works on identified topics of immediate relevance for the respective fusion R&D programs.

On March 23, Janine Sharif joined PPPL as the executive assistant to C. Ferguson. Please join us in welcoming her to the Laboratory.

This report is also available on the following web site:

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