



The PPPL Highlights for the week ending March 10, 2018, are as follows:

NSTX-U RECOVERY AND RESEARCH (J. MENARD)

Recovery:

For the PPPL prototype poloidal-field coil, the inner lead flag and water fittings have been brazed on and successfully checked for helium leaks. The inner lead is being set into the mandrel.

A purchase order for the inner poloidal-field production coil conductor has been issued.

A preliminary design review for the vacuum vessel and internal hardware field scope was completed on Feb. 23.

Research:

A research proposal by PPPL (and NSTX-U) researcher/principal investigator E.-H. Kim submitted to the NASA Heliospheric Guest Investigator program has been selected. The proposal is entitled, "Generation and Propagation of Non-Thermal Terrestrial and Kilometric Continuum Radiation." The goal of this proposal is to investigate the excitation and propagation of non-thermal terrestrial continuum (NTC) and kilometric continuum (KC) radiation. Because such continuum radiation is a primary observable associated with strong density gradients, non-thermal electrons, and upper hybrid waves near the equatorial plasma-sphere and/or magnetopause for every magnetized planet to date (except Mercury), understanding the physical processes leading to these emissions is fundamental to understanding planetary magnetospheres.

U.S. ITER FABRICATION (H. NEILSON)

The low-field-side reflectometer (LFSR) team continues to make progress in completing analyses and documentation in preparation for upcoming reviews. A critical feature of the in-vessel design is a cooled steel block with penetrations to support the six microwave launcher horns. The block is capped by an attached cooled plate facing the plasma. Key engineering issues for this design were cooling and manufacturability. The cooling solution consists of gun-drilled passages in the block and a maze of passages defined by an arrangement of ribs in the plate. The manufacturing solution relies on a perimeter weld to attach the plate to the block with no brazing required. With this design feature now complete, fluid dynamic and thermal analyses are now in progress.



The LFSR team met by video conference this week with Russian Federation Domestic Agency (RFDA) colleagues responsible for integration of Equatorial Port No. 11, where the LFSR equipment will be installed. The teams reviewed details of the CAD models and resolved some clashes between components.

The Laboratory hosted a visit by U.S. ITER Project Director N. Sauthoff. The ITER diagnostics team presented a briefing on the design and status of the LFSR project and discussed U.S. ITER work priority options for the next 12 months.

ADVANCED PROJECTS (H. NEILSON)

Stellarators (D. Gates):

PPPL physicist S. Lazerson has submitted seven experimental proposals for the upcoming OP1.2b experimental campaign on Wendelstein 7-X. These proposals covered a wide range of topics including magnetic fine-tuning of the island divertor, error field assessment and correction, the effect of error fields on energetic particle confinement, scraper element loading, and assessment of argon puffing with respect to plasma operation. These proposals make extensive use of U.S. investments in W7-X including the trim coil system, scraper element, and X-ray imaging crystal spectrometer. In addition, Lazerson will continue his role at the scenario and integration task force leader for the rest of this campaign.

THEORY (A. BHATTACHARJEE):

J. TenBarge attended the 17th Annual International Astrophysics Conference in Santa Fe, New Mexico, this week and gave a talk titled, "Diagnosing Heating and Energy Transfer in Collisionless Kinetic Plasmas."

S. Jardin attended the 31st ITPA MHD Disruption and Control Topical Group meeting at the Naka Fusion Institute, QST, in Japan. He gave a presentation titled, "Progress on Disruption Modeling," in which he highlighted recent progress by the SciDAC Center for Tokamak Transient Simulations (CTTS) in the areas of (1) soft vs. hard beta limits, (2) vertical displacement event (VDE) modeling, (3) modeling of shattered pellet injection (SPI), and (4) modeling of DIII-D mitigation experiments.

Copies of the above presentations are available on
<https://theory.pppl.gov/news/seminars.php?scid=3&n=invited-talks>



SITE PROTECTION (F. WHITE)

Members of ESU completed their annual Haz-Mat refresher training. Engine 66 responded to a mutual-aid assignment in Princeton Township; a mutual-aid weather-related incident of downed trees in Plainsboro Township; two mutual-aid weather-related incidents of downed power lines in Princeton Township; and Ambulance 166 responded to three mutual-aid assignments in Plainsboro Township.

COMMUNICATIONS (L. BERNARD)

The Office of Communications posted a press release to the PPPL website, focused on several new papers by PPPL scientists about the synthesis of nanoparticles. The research could help with the development and selective fabrication of nanomaterials with prescribed structures. This basic research could pave the way toward manufacturing advances in a variety of sectors. The story was also posted on the *Newswise* and *EurekAlert!* press release distribution services.

This report is also available on the following web site:
<http://www.pppl.gov/publication-type/weekly-highlights>