The PPPL Highlights for the week ending November 15, 2013, are as follows:

U.S. ITER FABRICATION (D. JOHNSON):

At the winter meeting of the American Nuclear Society held in Washington, DC, R. Feder presented an invited talk (see invited talks section).

At the APS Division of Plasma Physics meeting in Denver, Colorado, there were six contributed presentations on U.S. ITER diagnostics.

Continuing procurement activities for the ITER Steady State Electric Network, a Request for Proposals was issued for 6.6kV Switchgear, and a pre-proposal conference call was held.

Contract signature for HV Substation Hardware is pending approval from the US ITER Project.

NSTX (M. ONO):

NSTX-U physicists attended the APS Division of Plasma Physics meeting held in Denver, Colorado on November 11-15. There were seven NSTX/NSTX-U related Invited Talks (see invited talks section). In addition, there were 13 NSTX/NSTX-U related oral contributed talks and 39 contributed posters. During the meeting, Stefan Gerhardt gave a talk entitled "Overview of the 2013 Joint Research Target" via remote participation to the Edge Coordinating Committee (ECC) technical meeting describing the research done as part of the three large facility FY13 Joint Research Target.

ITER & TOKAMAKS (R. HAWRYLUK):

DIII-D (R. Nazikian):

D. Battaglia presented an invited talk at the APS Division of Plasma Physics meeting (see invited talks section). In this paper, Battaglia detailed the comparison of XGC0 simulations with measurements in H-mode plasmas on DIII-D and NSTX. W. Solomon, R. Nazikian and E. Kolemen presented contributed talks on high-density QH modes, pedestal response to RMPs and edge plasma control, respectively, in the DIII-D experimental session.

A. Nagy led the successful effort to install the Gyrotron 8 water manifold into the ECH vault. The installation went as planned, and the manifold is now being bolted into place. Nagy has also

developed and successfully tested two new techniques for determining short-to-ground locations inside the I-coils on DIII-D. He is also leading the effort to develop in-vessel techniques for dissecting the I-coils for diagnosing damage and conducting repairs.

KSTAR (R. Ellis):

R. Ellis visited KSTAR on November 11-12 to discuss the Electron Cyclotron Heating collaboration, and other potential opportunities.

D. Mueller presented a poster on plasma control in KSTAR at the APS-DPP meeting.

ITER:

F. Poli presented a talk in the ITER session on modeling of steady-state operating regimes. R. Budny gave a poster on JET and ITER modeling using TGLF. S. Scott gave a poster on modeling of the polarization signal in C-Mod to improve the signal to noise. This is potentially applicable to the ITER MSE system.

ADVANCED PROJECTS (H. NEILSON):

In the Laboratory's collaboration on Wendelstein 7-X (W7-X), progress was made in establishing the conceptual layout for the U.S. x-ray imaging crystal spectrometer (XICS). Due to crowded conditions near the W7-X machine, it is essential to define a safe space envelope for the XICS, free of current interferences and having low risk of future interferences with neighboring equipment. A feasible location was identified that provides sight lines for the XICS out to a plasma radius of 0.83 times that of the last closed flux surface. A study by the Max-Planck Institute for Plasma Physics (IPP) team showed that alternative locations have significantly increased risk of interferences with negligible increase in spatial coverage. Computer models showing the XICS in relation to neighboring equipment were transferred by IPP to PPPL.

A draft "Declaration of Incorporation," document the conformity of the PPPL-supplied W7-X trim coils to IPP's technical specifications, was transmitted to IPP for review. The document includes as-built drawing of the coils and the associated input-output (I/O) interface modules as well as an operating manual describing the safe operating conditions for the coils. Upon completion of this document, the trim coil project will be complete. The trim coil power supply project remains open but, with all equipment having now been shipped, is nearing completion as well.

THEORY (A. BHATTACHARJEE):

(see invited talks section)

ENGINEERING AND INFRASTRUCTURE (M. WILLIAMS):

NSTX Upgrade (R. Strykowsky, E. Perry, L. Dudek, T. Stevenson):

Construction: All of the splice plates for the lower TF outer supports are tack welded in place and full welding will start in a day or two. The spacers for the TF turnbuckles have been completed for the upper ring and the lower ring is in progress. Reinforcement of the vacuum vessel leg feet is in progress. The upper ex-vessel flux loops have been installed and the lower vessel thermocouples are in progress. Temporary scaffolding has been removed from around the machine and handrails have been re-established around the 109' platform.

CS Upgrade: The TF Bundle has been mounted into the OH Winding station, aligned and tested. The pre-job briefing for the OH Winding procedure was conducted on the morning of November 15. Wet layup of glass epoxy over the Aquapour is scheduled for the weekend of November 16-17. Tension calibrations on the OH winder drag sled were successfully completed. Failure of the MTS test machine during the cyclic tests has halted the qualification tests of technician braze samples. External sources for the tensile tests are being investigated to complete the remaining tests. The OH, PF-1 and CHI Bus drawings are complete. The TF Bus drawings should be completed early next week. The FDR is scheduled for November 22. Fabrication of the OH Bus and supports continued this week. The installation procedure and JHA are completed and the hardware bill of materials is being prepared. The CS pedestal completed incoming inspection successfully. The last remaining diagnostic parts, Macor insulators for the langmuir probes, were completed and delivered.

NBI Upgrade: Installation of vacuum and gas system components on OMA box lids took place this week. Thermocouple testing on OMA scrapers was performed. Leak checking of the nitrogen line took place in the NTC. Progress on services includes DI water manifold and valve installations, vacuum component purchases, and pneumatics installation procedure development. The Ion Dump pumps were received and Ion Source pumps are also expected soon. Armor tile and quadrant fit-up, assembly, and adjustments are in progress. A few additional tiles will be needed and material is on-hand. Work continues and nears completion on subcontract cable tray and conduit installation. Floor supports are installed. Setup for cable pulling will began. NB and TVPS duct component installation is imminent based on access and resources. Management participated in the monthly Integrated Project Team meeting.

Facilities and Site Services (M. Viola, M. Donohue, F. Cargill):

Material Services: Property Management met with ITER Fabrications Department's to discuss and provide ORNL required documentation for the shipment and transfer of fabricated items and systems that PPPL is employing on behalf of ITER. A clear path forward to address appropriate documentation for submittal to ORNL was achieved.

BUSINESS OPERATIONS (K. FISCHER):

A proposal entitled, "Electron energization by Alfven waves in the Jovian magnetosphere," was submitted to NASA. The Principal Investigator is P. Damiano. The total budget request is $448,100 for the three-year period of performance.

OFFICE OF COMMUNICATIONS: (K. MACPHERSON):

C. Cane represented PPPL in a Peer Review of the external website by the DOE Web Council on November 14. PPPL was selected to be the first National Laboratory to participate in this process. The Web Council was highly complimentary of PPPL's site.

DIRECTOR'S OFFICE (C. AUSTIN):

On November 12, A. Cohen participated in a meeting of U.S. MAC Members in Washington, DC in advance of the upcoming ITER Council Meeting.

INVITED TALKS:

Feder, R., "The Status of US-ITER Diagnostic Port Plug Neutronics Analysis Using ATTILA," American Nuclear Society held in Washington, DC

Bertelli, N., Fast wave heating and edge power losses in NSTX and NSTX-U, APS Division of Plasma Physics, Denver, Colorado

Berkery, J. (Columbia), Measured Improvement of Global MHD Mode Stability at High-beta, and in Reduced Collisionality Spherical Torus Plasmas, APS Division of Plasma Physics, Denver, Colorado

Ebrahimi, F., Physics of fast flux closure in coaxial helicity injection experiments in NSTX, APS Division of Plasma Physics, Denver, Colorado

Fredrickson, E., Fast-ion energy loss during TAE avalanches in the National Spherical Torus Experiment, APS Division of Plasma Physics, Denver, Colorado

Goldston, R., The Heuristic Drift Model of the Scrape-Off Layer: Physics Issues and Implications, APS Division of Plasma Physics, Denver, Colorado

Menard, J., Rotation and kinetic resonance effects on the spherical tokamak ideal-wall limit, APS Division of Plasma Physics, Denver, Colorado

Taylor, C. (INL/ Purdue), Differentiating the role of lithium and oxygen in retaining deuterium on lithiated plasma-facing components, APS Division of Plasma Physics, Denver, Colorado

Battaglia, D., "Kinetic Neoclassical Transport in the H-mode Pedestal," APS Division of Plasma Physics, Denver, Colorado

Bhattachajee, A., *"Magnetic Reconnection in High-Energy-Density Plasmas,"* High Energy Density Science Association (HEDSA) Symposium on November 10

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