The PPPL Highlights for the week ending August 16, 2013, are as follows:

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

Requisitions were submitted and Subcontract Proposal Evaluation Boards (SPEBs) established for design support for the ITER ECE and Upper Camera diagnostics.

A draft Final Report entitled "ITER ECE Front End Optical Design Modifications" was received for review from a U.S. expert team led by University of Texas. This report documents refinements, which reduce the size of the in-situ hot calibration source for the ECE diagnostic, relieving crowding and simplifying design.

In preparation for the FDR for the Diagnostic Equatorial Port Plug Generic Structure, scheduled for November 14-15, Y Zhai at PPPL has been performing EM analysis for various disruption scenarios, and this week posted the results of another case for access by the IO. This work is funded through Task Agreement C55TD36FU.

NSTX (M. ONO):

Professor Yong-Seok Hwang of Center for Advanced Research in Fusion Reactor Engineering, Seoul National University (Korea) visited NSTX-U/PPPL. He discussed on-going collaboration activities on the VEST device experiments, the superconducting ST reactor design, and the high harmonic fast wave current drive modeling on the K-DEMO with NSTX-U/PPPL researchers. Future collaboration between NSTX-U and his group was also discussed.

Preparations for plasma operations in the NSTX-U configuration also continued with the ongoing maintenance of the power supply and distribution equipment for the neutral beams. All Fast Vacuum Interrupters required for two beam operation have undergone full maintenance and are now ready for pre-operational power testing. The retro-fitting of the new firing generators in their final positions in the field coil power conversion (FCPC) system rectifiers is in progress. A first of three prototypes to test various aspects of the planned stand alone digitizers for use by NSTX diagnostics has been assembled, and is being tested in preparation for a preliminary design review scheduled for late September.

ITER & TOKAMAKS (R. WILSON):

DIII-D (R. Nazikian)

B. Ellis visited DIII-D this week to inspect the EC mirrors and launchers and to work with E. Kolemen on testing of new prototype motors and encoders for the EC mirror control system. The new high-speed motors and encoders were successfully tested on the latest PPPL launcher. The goal is to significantly increase the speed and accuracy of the mirror control for improved NTM suppression and plasma profile control. A design review for the mirror control upgrade is anticipated in early FY14.

The upgrade to the main ion edge CER system on DIII-D for pedestal studies is progressing with procurement actions for new CCD cameras. Fiber assemblies for an increased number of spectroscopic sightlines are being tested in the DIII-D diagnostics lab for conformance with spatial resolution requirements. Installation of new fiber optics is scheduled for the next vent, with planned operation of new sightlines during the next run campaign. This upgrade will significant advance our understanding of main ion flows in the pedestal and also enhance the spatial resolution of the radial electric field from carbon measurements.

A. Nagy led a team of DIII-D engineers and technicians for the reinstallation of the repaired B-coil coax. The installed was successful and electrical testing was completed.

The Gyrotron 8 water manifold fabrication continues at the vendor. The manifold is scheduled to ship to DIII-D at the end of August.

ADVANCED PROJECTS (H. NEILSON):

Detailed planning for the next phase of the U.S. collaboration on Germany's Wendelstein 7-X stellarator continued. At PPPL, a kickoff meeting of the x-ray imaging crystal spectrometer (XICS) diagnostic project was held on August 16. Initial budget and schedule estimates were developed along with a design principles document. This information will be passed on to Dr. Rainer Burhenn who was named as the contact person at IPP-Greifswald. In addition, H. Neilson visited ORNL to discuss plans for designing the prototypical divertor scraper element for use in the initial phases of Wendelstein 7-X operation. The design work on the XICS (led by PPPL) and the divertor scraper (led by ORNL) will proceed in parallel and on similar schedules throughout FY-2014.

THEORY (A. BHATTACHARJEE):

I. Dodin participated in the International Conference "Frontiers of Nonlinear Physics" (Nizhny Novgorod, Russia) and presented an invited talk titled "Nonlinear plasma waves with trapped particles: variational theory and simulations".
A. Reiman is organizing a benchmarking activity for 3D equilibrium calculations for the DIII-D tokamak. There are presently ten codes that are participating: the linearized equiilibrium codes IPEC (J-K Park) and MARS (Turnbull), the time-dependent MHD codes M3D-C1 (Ferraro), M3D (Breslau), and NIMROD (Sovinec, Zhu), as well as VMEC (Lazarus, Lazerson), NSTAB

(Garabedian's code: Cerfon, McFadden), PIES (Reiman), HINT (Suzuki in Japan) and SPEC (Hudson). The names in parentheses are the people running the codes for this exercise. This activity is an outgrowth of work on the FY 2012 Fusion Energy Sciences Theory Milestone. In the past week, Dr. Reiman distributed specifications for data files to be used in comparing the solutions of multiple codes.

B. Tang participated in SciDAC-3 EPSi All Hands Meeting at LBNL, August 14-15 in his role as the Chairperson of the Program Advisory Committee for this FES/ASCR jointly-funded project. On August 16 Tang also met with LBNL Deputy Director Horst Simon to discuss collaborations opportunities.

COMPUTATIONAL PLASMA PHYSICS GROUP (S. JARDIN):

Aaron Redd, from the University of Wisconsin, visited PPPL this week to receive instruction on using the Tokamak Simulation Code (TSC). His immediate application is to model current penetration in the extremely low-aspect-ratio Pegasus experiment. However, his future modeling will include using techniques developed on Pegasus in the NSTX-U experiment at PPPL.

Four CPPG summer students completed their internships and presented at PPPL's summer poster session. Ante Qu completed his National Undergraduate Fellowship on Multi-threaded GPU Acceleration of ORBIT with Minimal Code Modifications, directed by S. Ethier, E. Feibush, and R. White. Matthew Lotocki worked on Visualization of Gyrokinetic Simulations, directed by E. Feibush. Michael Knyszek presented elvispy - Scientific Graphics for Python, supervised by E. Feibush. Jared Miller developed Validation of in-situ Measurement of Li Coating Thickness on a High Z Substrate through Monte Carlo Methods, with D. Mueller and E. Feibush.

ENGINEERING AND INFRASTRUCTURE (M. WILLIAMS):

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

Construction: The in-vessel welding of the JK stiffeners and S-Flip port continues. The grinding to enlarge the hole for the new tFIDA tube was completed, but the work is on hold while the design is being reviewed. The installation of the outer TF support upper ring continues with the custom machining of the splice plates that get welded between the outer leg weldments. This welding will begin next week.

CS Upgrade: The first two quadrants have been married together and are ready for insertion into the taping station for overwrap. The second pair are being married and will be ready to go into the taping station on Monday. The lifts into the taping station are scheduled for early next week. The hydraulic tubing for the OH winder braking system was completed. The taping stations are being mounting on the stand. Next week the taping stations and tensioning sled will be aligned to the conductor winding paths. Everson has contracted with a new supplier for the mandrel weldments in the Inner PF coils. The new supplier has provided a new schedule with delivery of the first mandrel to Everson during the first week of October. QA released the last nine (9) TF conductors for shipment from Major Tool to PPPL. The conductors will arrive early next week and will mark the end of the TF Inner Conductor manufacturing contract. Some of the

Inconel studs on the CS casing are breaking off during the thread chasing operations. A rework procedure to add TIG weld tacks to reinforce the welds is being investigated.

NBI Upgrade: Welding and leakchecking of LHe line in the TTC has been completed. Decon of the area for upcoming support installations and electrical subcontract work continues. Fabrication and leakchecking of LHe cryo line for the NTC continues in the NB shop. Installation of cryo line in NTC continues. The Nitrogen system is almost complete. The DI water system subcontract continues with pipe prep and fitting, welding, and installations in the Pump Room and the MER. The piping installation in the Pump Room is complete. The Ion Source and Ion Dump DI H2O Pump procurement process continues. The power system cable and tray procurement process is in progress. Bids have been received and are being evaluated. The cable tray support structure order is in progress. Delivery is expected early next month for installation on the TTC East wall. The HVE transmission line support structures and the spool sections have been completed. The NBI Duct central spool section of the duct was completed and moved to NBPC for leakcheck. The spool piece passed its leakcheck. The JK VV reinforcements and SFLIP piece installation on the VV continues.

BUSINESS OPERATIONS (K. FISCHER):

PPPL submitted the following proposals to NASA:
"Collaborative Research on the Role of Guide Field on Electron Dynamics and Waves During Fast Magnetic Reconnection." The Principal Investigator is H. Ji. The total budget request is $533,300 for the three-year period of performance.

"Multi-fluid Studies of Chomosphere Reconnection in Partially Ionized Laboratory Plasmas." The Principal Investigator is H. Ji. The total budget request is $578,300 for the three-year period of performance.

"Laboratory Study of MagneticFlux Rope Eruptions in the Corona." The Principal Investigator is M. Yamada. The total budget request is $580,500 for the three-year period of performance.

ENVIRONMENT, SAFETY, HEALTH & SECURITY (J. LEVINE):

Environmental Services Division (ESD):

A team of safety and risk analysis representatives from PPPL, GA and the INL STAR facility visited Japanese and Chinese fusion facilities as part of the commitment to the US Joint Working Group charter to review present and future safety conditions and programs.

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