NSTX-U Weekly Report (June 6, 2014)

NSTX-U is in the Upgrade Project outage in FY 2014

NSTX-U researchers attended the 21st International Conference on Plasma Surface Interactions in Controlled Fusion Devices from May 26-30 held in Kanazawa, Japan. This meeting highlights research around the world on physical processes at the plasma-material interface, material erosion and migration, plasma fueling and particle control, wall conditioning, impurity sources and transport, edge and divertor plasma physics as well as plasma-material interaction issues related to future fusion reactors. NSTX-U research in these areas was presented by PPPL personnel M. Ono, R. Maingi, M. Jaworski, D. Stotler, R. Goldston, A. Capece, and T. Abrams; ORNL personnel T.K. Gray and J.-W. Ahn; and LLNL personnel F. Scotti and E. Meier. Initial results from the Material Analysis and Particle Probe (MAPP) diagnostic on the Lithium Tokamak Experiment (LTX) (being readied for NSTX-U by professor J.-P. Allain's U-Illinois group) were also presented by PPPL graduate student M. Lucia. In addition, NSTX-U researchers E. Kolemen (PPPL) and V. Soukhanovskii (LLNL) gave presentations on DIII-D collaboration experiments on the plasma control and snow-flake divertor experiments, respectively. A. Hubbard (MIT) also gave a PSI talk on the 2013 Joint Research Target including contributions from three major facilities (C-Mod, DIII-D, and NSTX-U) which was led by a NSTX-U researcher S. Gerhardt (PPPL). NSTX-U presentations and manuscripts submitted to the Journal of Nuclear Materials will be available on the NSTX-U "Drag'n'Drop" website. (M. Jaworski, R. Maingi)

Princeton University graduating senior Alex Creely '14 was awarded the Jeffrey O. Kephart '80 Prize in Engineering Physics for outstanding independent thesis research. His thesis, entitled "Characterization of Thermal Desorption from Hydrogen-Carbon Co-Deposition Layers for Fusion Applications via Crystal Microbalance Measurements with Gallium Orthophosphate Crystals", tested the ability to thermally desorb hydrogen from carbon codeposit layers while simultaneously measuring mass loss. This research was conducted in the NSTX-U Lithium Technology Development Laboratory under the direction of PPPL researcher Michael Jaworski. This work lays the groundwork for performing thermogravimetric analysis within the NSTX-U vacuum vessel as a means of characterizing fuel and PFC material mass fluxes at various locations within the device and will continue to be developed in the Materials and PFCs topical science group. (M. Jaworski)

During the week of June 2, M. Ono (PPPL) visited National Institute for Fusion Science, Gifu, Japan to discuss various US-Japan NSTX-U/LHD collaboration topics including the LHD long-pulse ICRF/ECH experiments with Profs. Mutoh and Seki and the LHD rf team members. He also discussed the superconducting ST "JUST" design with Prof. Nagayama and the liquid metal R&D activities at NIFS with Prof. Hirooka. M. Ono gave a seminar entitled "National Spherical Torus Experiment -Upgrade Status and Plans". He then visited the QUEST group at Kyushu University where he discussed with Prof. Hanada and his associates on the CHI experimental preparation on QUEST as the design is being finalized for the upcoming CHI QUEST modification this summer. He also discussed the 28 GHz ECH/EBH start-up and sustainment experiments on QUEST with the QUEST team. (M. Ono)

Engineering Operations (A. von Halle, C. Neumeyer)

NSTX Upgrade activities continued with the successful completion of fit-ups of the upper and lower halves of the OH/TF mold. Assembly of the molds seals, O-rings and valving needed for the subsequent vacuum impregnation with epoxy (VPI) is now in progress. In the NSTX-U test cell, the installation of the neutral beam #2 High Voltage Transmission lines has been completed. Calibrations of the MAPP and sFLIP diagnostics continued this week, and the Bay J port cover has been installed on the vessel.

Development of the new Digital Coil Protection System (DCPS) continued with ongoing testing of system software and user interfaces, and the design of hardware and I/O layouts. The final design review of the DCPS hardware interface was held this past week.

Preparations for plasma operations in the NSTX-U configuration also continued with the ongoing in-vessel installations of the new compliant center conductors on the HHFW Antennas. Neutral Beam and Field Coil Power Conversion Subsystems are being made ready for power testing with the exercise of pre-operational test procedures. A new layer of new stone has been installed in the NB switchyard. Good progress is being made on the testing of the Stand Alone Digitizer (SAD II) system prototype, and on the design of circuit boards for the new Ip Calculator. Both of these systems should be ready for their final design reviews by late June or early August.

Access to the NSTX test cell will be available only through previous arrangement with the Upgrade Work Control Center.