

NSTX-U Weekly Report (December 9, 2016)

FY 2017 status: NSTX-U is in a maintenance and repair outage.

NSTX-U Research (J. Menard)

Several NSTX-U researchers participated in the Max-Planck / Princeton Center for Plasma Physics held December 5-8, 2016 at the Princeton Center for Theoretical Science in Jadwin Hall at Princeton University. NSTX/NSTX-U-related contributions included: J. Menard: “Tearing and kink physics in NSTX and NSTX-U”, C. Myers: “A multi-machine scaling of halo current duration and rotation”, D. Pfefferle: “Vertical displacement events and reconnection”, T. Stoltzfus-Dueck: “Parallel electron force balance and the L-H transition”, and F. Ebrahimi: “3D plasmoid reconnection during CHI”.

Stan Kaye represented PPPL at the ITPA Coordinating Committee (CC) and IEA-CTP meetings held on Dec. 6-8, 2016 at the ITER Headquarters in Cadarache, France. The CC meeting consisted of reports from ITPA Topical Group leaders, IO scientists and program descriptions of each of the Domestic Agency programs. Personnel exchanges and associated science topics were discussed at the IEA-CTP meeting.

Lucas Morton (an ORAU postdoc based at PPPL from General Atomics) gave a presentation to the NSTX-U MHD Stability Topical Science Group (MS-TSG) entitled “Aspect ratio dependence of tearing stability: comparing NSTX, NSTX-U, and DIII-D” and discussed tearing mode stability status and plans for the GA collaboration on NSTX-U. Zhirui Wang described recent “Progress in Resistive DCON Applications”. The MS-TSG meeting presentations are available at this [link](#).

Otto Asunta, Steven McNamara, and Adrian McFarland from Tokamak Energy, LLC in the UK visited PPPL during the week of December 5, 2016. They met with R. Majeski to discuss the use of lithium in tokamaks including benefits and pitfalls. They also received tours of LTX and information on LTX power supplies and new neutral beam injectors. Al Von Halle provided a tour of NSTX-U including the control room, test cell, and power supplies and provided information on NSTX-U grounding, boronization, neutral beam injection systems, and motor generators. Steve Sabbagh provided extensive information and assistance on NSTX-U EFIT and on usage and setup of EFIT for the ST40 device under construction at Tokamak Energy. Finally, Stefan Gerhardt and Dan Boyer provided information on the NSTX-U Plasma Control System.

M. Reinke (ORNL) visited the MIT Plasma Science and Fusion Center (PSFC) to work on calibrating the NSTX-U prototype IRVB diagnostic to enable quantitative interpretation of test data obtained on Alcator C-Mod during the September 2016 operational period.

S. Gerhardt led a meeting for NSTX-U researchers on December 7, 2016 to discuss the utility of the NSTX-U PF1B divertor coils for conventional/standard divertors, snowflake-minus/X-divertors, and coaxial helicity injection (CHI) and to address questions raised at the previous PF1B meeting. Presentations from this meeting are available at this [link](#).

J. Menard visited the MIT Plasma Science and Fusion Center (PSFC) on December 9, 2016 to discuss MIT/NSTX-U collaboration status and plans, and to give a research seminar entitled

“Progress and plans for research on NSTX Upgrade”.

The electrical wiring was completed in the TFTR Test Cell for the NSTX-U Lithium Evaporator Fill Station. Completion of this work will enable the Lithium Evaporators (LITERs) to be loaded with lithium while NSTX-U is operating. The LITERs were formerly filled in the NSTX-U South High Bay which will no longer be accessible during plasma operations due to increased radiation levels.

NSTX-U Recovery Project (R. Hawryluk)

The recovery project Responsible Engineer's focused on preparing for Design Verification and Validation Reviews. The first step of this process is preparing System Design Descriptions (SDDs) for the Design Validation Phase. Determining the resources required to develop draft SDDs and clarifying the scope of the SDDs was the focus of this effort. Various sources of information (databases, spreadsheets, and web sites) have been identified that will be beneficial for assessing the systems and components. These are being assembled for the upcoming reviews.

The NSTX-U center column is in its stand in the High Bay Area. Procedures for the centerstack casing lift and removal have been reviewed and approved, and a Pre-Job Briefing held. The lift is scheduled for this coming Tuesday. Preparations continue for the removals of the PF1A-L coil from the center column, and the lower ceramic break from the vacuum vessel. Hydrostatic testing of the PF1C coils has been successfully completed.

Re-commissioning of the coil winding facility continued with the calibration of the taping machine controller for the new PF conductor size.

The Field Coil Power Conversion (FCPC) Test Stand is being prepared for magnetic testing of an ITER diagnostic Piezo Actuator during the week of December 12th, and will then be reconfigured to support power testing of PF Inner Coils.

The refurbishment of two neutral beam (NB) ion sources continues in the NB decon facility and clean room.

The installation of the OH water heater in the NTC began with a series of seven lifts (two were critical lifts) in a single shift.

A meeting of the Fusion Facilities Operations Committee was held with remote participation by Mark Foster (FES), Josh King (FES), Jim Irby (MIT), Arnie Kellman (GA), and Charles Neumeyer, Tim Stevenson, Stefan Gerhardt and Al von Halle of PPPL.