

NSTX-U Weekly Report (May 12, 2017)

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

NSTX-U Recovery Project (R. Hawryluk)

The second of the two planned Extent of Condition (EoC) reviews is being held this week.

Recommissioning of the coil winding facility continued this week with the installation of insulation on the oven extension as needed for the VPI of a PF-1A prototype, and on the sealing of the PF1A Lead Box mold.

TF, OH and CHI bus from NSTX to the bus tower continues to be removed for inspection and silver plating as required.

A peer review of procedures for the fabrication of a PF-1 prototype coil was held last week.

PPPL staff were on-site at Everson Tesla to witness the priming of PF1 conductor.

The first entry into neutral beam #2 after last year's full three source operation at 90keV was made. The inspection indicated that all beam impinged copper surfaces and alignments look good.

Planning is underway to use the neutron generator in the NSTX Test Cell and Gallery to test penetration shielding during the week of May 22nd.

NSTX-U Research (J. Menard)

Michael Jaworski remotely participated in the EUROfusion Liquid Metal Strategy Meeting on May 10th and 11th. Jaworski presented the talk "Experience and development of lithium and liquid metal experiments on the NSTX and NSTX-U devices" to provide international context for EU researchers who are developing a long-range plan for addressing the European DEMO Roadmap activity evaluating liquid metals as a possible power exhaust option for fusion.

A simulation of the equilibrium evolution in NSTX-U has been developed. The simulation is built in Simulink around a block named GSEVOLVE. This code is fully nonlinear and can be run for an entire discharge. The simulation comes with a model-predictive controller (MPC) that can use any conceivable equilibrium quantities as targets. One example of application with the MPC is to control the simulation so that it reproduces the diagnostic signals from a real shot. Using this approach, the simulation matches the evolution of the plasma boundary reasonably well. It is also possible to replace the MPC with an interface that connects the simulation to the actual NSTX-U plasma control system (PCS). This can facilitate development of new PCS codes and preparation for experiments. (Anders Welander, General Atomics).