

## **NSTX-U Weekly Report (October 4, 2013)**

### **NSTX-U is in the Upgrade Project outage in FY 2013**

Stefan Gerhardt (PPPL) submitted the FY2013 Joint Research Target (JRT) report to the Office of Fusion Energy Sciences on September 30th. This report was compiled by the JRT team, composed of Max Fenstermacher (LLNL) and Andrea Garofalo from DIII-D, Amanda Hubbard and Dennis Whyte from C-Mod, and Stefan Gerhardt and Rajesh Maingi from NSTX-U. The report focusses on both the operational space and underlying physics of high-confinement regimes with no large ELMs and stationary conditions. The NSTX-U contribution presented results on the Enhanced Pedestal H-mode, on the pedestal transport characteristics in ELM-free regimes, and on observed low-amplitude edge harmonic oscillations. Many members of the NSTX-U team contributed to the report, including participation in DIII-D and C-mod experiments and analysis. (S. Gerhardt)

The paper 'Edge microstability of NSTX plasmas without and with lithium-coated plasma-facing components' by J.M. Canik (ORNL) et al., Nuclear Fusion **53** (2013) 113016, is now published online at <http://iopscience.iop.org/0029-5515/53/11/113016/article>. The article reports on linear gyrokinetic simulations of the NSTX pedestal in discharges with and without lithium. Microtearing is found to be unstable at the pedestal top without lithium, and is stabilized by the increased density gradient when lithium is applied. This correlates with a reduction in the electron heat transport inferred from experiment in the pedestal-top region. In the region outside of  $\psi_N=0.95$ , ETG is found to be driven strongly unstable in the case with lithium, suggesting a possible role of ETG transport in the stiffness of the Te profile observed near the separatrix. Kinetic ballooning mode stability was analyzed, with KBM onset found to strongly track the ideal ballooning stability boundary. At NSTX pedestal parameters, the pedestal is in the second-stable region, with growth rates that decrease as the pressure gradient is increased. (J. Canik)

The NSTX-U Team Meeting was held on Oct. 4, 2013. The meeting material is available on [http://nstx.pppl.gov/DragNDrop/NSTX\\_Meetings/Team\\_Meetings/2013/2013\\_10\\_04/](http://nstx.pppl.gov/DragNDrop/NSTX_Meetings/Team_Meetings/2013/2013_10_04/). (M. Ono, PPPL)

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

NSTX Upgrade construction activities continued with the removal of the freshly epoxy impregnated full TF inner bundle from the mold. The TF bundle has now been sanded, threaded holes are being cleared of excess epoxy, and steel spacers are being removed. Electrical insulation tests (hiPots) will be performed upon completion of this work. The TF mold has now been removed from the coil shop, and the commissioning of the OH Winder in that area is making good progress. New electronic racks are being installed and commissioned in the FCPC Junction Area for the Digital Coil Protection System (DCPS).

Preparations of non-upgrade equipment for plasma operations in the NSTX-U configuration also continued with the ongoing re-commissioning of the experimental power systems. About half of the new FCPC rectifier firing generators have been retrofitted to work with the original fault detectors, and most of the rectifier wiring has been completed for the new PLC based fault status system. Re-commissioning of the neutral beam power systems continued with the testing of

vacuum bottles for the Fast Vacuum Interrupters. A conceptual design of the proposed new plasma current calculator is scheduled for this week.

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