

NSTX-U Weekly Report (November 1, 2013)

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

Several enhancements and updates were made to the NSTX-U H-mode pedestal analysis software. An ability to include the fast ion pressure computed with the TRANSP transport code into the MHD equilibrium pressure profile was added which significantly improved the quality of the equilibrium fits. A new model for the bootstrap current based on results from the XGC0 code was added to the equilibrium reconstruction tool; in addition an overall scale factor for the bootstrap current was added to the kinetic EFIT tool. A number of improvements were made to the codes to simplify their application including simplification and consolidation of the code run control tables, improved auto-knotting for the spline fits, and improved documentation. Several improvements in the visualization tools for equilibrium reconstruction and profile analysis were made. An iteration scheme was implemented which remaps the pressure profile in the kinetic EFIT to bring it into agreement with the measured pressure profile. A similar iteration scheme was also implemented in the 'VARYPED' EFIT equilibrium generation. The VARYPED EFIT mode is used to create a grid of variations in pedestal current density and pressure keeping the plasma beta fixed for pedestal stability analysis with ELITE. In the new iteration scheme the profiles are renormalized to the total stored energy and plasma current based on the flux geometry of the varied equilibrium. This gives a more rectangular variation grid and keeps the overall plasma beta fixed. The rotation profiles were more accurately extrapolated beyond the separatrix to allow better determination of the zero crossing for the radial electric field. A provision was added to allow reconstruction of the impurity density profile from the carbon density rather than the Zeff profile. (Tom Osborne, General Atomics)

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

NSTX Upgrade activities continued with the completion of air and then heat curing of the Aquapour application on the TF inner bundle to provide the base for OH winding. OH winding set-up and braze qualifications continue. Tray-work for new NB2 power cabling is being installed between the neutral beam power conversion building and the NSTX Test Cell, and is now about 50% complete. On track to begin pulling in the power cabling by mid-November.

Preparations of non-upgrade equipment for plasma operations in the NSTX-U configuration also continued with the assembly of the second two prototypes of the Stand Alone Digitizer (SAD) modules for use by NSTX diagnostics. Testing of the first SAD prototype continues. The RF test stand is operational, and successfully completed tests to baseline the original High harmonic Fast Wave (HHFW) rigid center conductor. Tests are now being planned to qualify a proposed new compliant center conductor capable of withstanding increased NSTX-U loads.

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