NSTX-U Weekly Report (October 30, 2015)

NSTX-U is in the Upgrade Project outage in FY 2015

The paper "Simulations towards the achievement of non-inductive current ramp-up and sustainment in the National Spherical Torus Experiment Upgrade", by F. Poli (PPPL) et al, Nucl. Fusion 55 (2015) 123011, has been published online and is available at http://stacks.iop.org/0029-5515/55/123011. Time-dependent free-boundary simulations have been performed with TRANSP to project non-inductive ramp-up and sustainment with a combination of EC, HHFW and NB. An interesting synergy has been found between EC and HHFW which indicates that, with 1 MW of EC, and with the smallest launched wavenumber from the HHFW antenna, the requirements on the amount of HHFW power that needs to be absorbed in the plasma to drive 300 kA of direct fast wave current are relaxed from 6 MW to below 2 MW. A dynamical changing of the launched wavenumber of the antenna can be beneficial to optimize the transition between the RF and the NB phase. (F. Poli)

M. Ono (PPPL) visited the Plasma Research Center at Tsukuba University, Japan on October 30, 2015. He met with Prof. T. Imai and his colleagues at the University to discuss the 28 / 35 GHz gyrotron development at the Center. He also discussed the NSTX-U collaboration with the Plasma Research Center. (M. Ono)

Experimental Research Operations (S. Gerhardt, R. Kaita)

The Far-Infrared Tangential Interfereometer-Polarimeter (FIReTIP) diagnostic is being installed through a UC Davis-PPPL collaboration for line-averaged plasma density measurements . A key element is an enclosure ("cage") immediately outside of the NSTX-U Test Cell to house the laser. The dimensions and access requirements that satisfy safe egress specifications and electrical utility needs have been finalized. Construction will begin once the fabrication drawings are completed. (R. Kaita, PPPL)

Engineering Operations (A. von Halle, P. Titus)

Vacuum leak checking for a small air leak that developed during the cool-down after the vessel bake continued this week. Secondary volumes and internal cooling lines are being isolated and pumped. Commissioning of controls on diagnostic system Torus Isolation Valves (TIV's) is in progress, and the vacuum controls for the deuterated trimethylboron (dTMB) system are being configured for operations. Pre-operational testing of the dTMB system is scheduled to start this coming week. Checkout of the Resistive Wall Mode (RWM) coil current sensors has started, and any loop faults associated with the Category 2 (diagnostic), 3 (inner vessel), and 4 (outer vessel) grounds have been identified and corrected. The NSTX Test cell was locked up for ~ 4 hours a day this past week for neutral beam and HHFW antenna conditioning.

Access to the NSTX-U Test Cell will be available for diagnostic system installations this coming week.