NSTX-U Weekly Report (May 23, 2014)

NSTX-U is in the Upgrade Project outage in FY 2014

The paper entitled "Full wave simulations of fast wave heating losses in the scrape-off layer of NSTX and NSTX-U" by N. Bertelli (PPPL) et al., was published in Nuclear Fusion **54,** 083004 (2014) (http://stacks.iop.org/0029-5515/54/083004). Recent experimental studies of high harmonic fast wave (HHFW) heating on the NSTX have demonstrated that substantial HHFW power loss can occur along the open field lines in the scrape-off layer (SOL). In this paper, fast wave heating losses in the SOL of NSTX and NSTX-U were examined by the full wave code AORSA. Numerical simulations show a direct correlation between the location of the fast-wave cut-off, radiofrequency (RF) field amplitude in the SOL and the RF power losses in the SOL observed in the NSTX. In particular, the RF power losses in the SOL increase significantly when the launched waves transition from evanescent to propagating in that region. Subsequently, a large amplitude electric field occurs in the SOL, driving RF power losses when a proxy collisional loss term is added. A 3D reconstruction of absorbed power in the SOL is presented showing agreement with the RF experiments in NSTX. A prediction for the NSTX-U experiment is also presented, indicating a favorable condition for the experiment due to the higher magnetic field and, consequently, a wider evanescent region in edge density. (N. Bertelli)

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

NSTX Upgrade activities continued with the completion of the winding of the new OH coil, and the start of ground wrapping on that coil. The OH winding equipment is being decommissioned and prepared for storage. A trial fit-up of the new PF1C coil on the centerstack casing has started. In the NSTX-U Test Cell, installation of the new RWM coils continues. The bay JK coil is in place and the bay J port cover is being installed. All three NB2 Transmision Lines are now in place, and the installation of ground cables has started. In the NSTX-U Vacuum Vessel, calibrations of the CHERS and sFLIP diagnostics are in progress.

Development of the new Digital Coil Protection System (DCPS) continued this week with ongoing testing of system software and user interfaces, and the design of hardware and I/O layouts. Commissioning of the new Water System PLC and the Halmar Signal Conditioners (DC Current feedback system) also continued.

Preparations for plasma operations in the NSTX-U configuration also continued with the preparations of the Field Coil Power Conversion (FCPC) and Neutral Beam Power systems for upcoming power testing. The procedure to configure NSTX-U coil connections/polarities (D-NSTX-OP-G-141) has been approved, and links are being configured for the CD-4 run. Test procedures for NB system power recommissioning are in review/approval. Systems and crews are now ready to start the D-Site MG#1 weld repairs on the week of June 2nd. In-vessel work on the new HHFW Antenna Compliant Center Conductors also continued.

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