

## NSTX-U Weekly Report (Feb. 29, 2013)

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

The paper by R. Kaita (PPPL) et al., "Characterization of Fuelling NSTX H-Mode Plasmas Diverted to a Liquid Lithium Divertor," *Journal of Nuclear Materials* (2013), 10.1016/j.jnucmat.2013.01.100, describes deuterium fuelling experiments with the NSTX Liquid Lithium Divertor (LLD). With the diverted outer strike point on the LLD, the difference between the applied D gas input and the plasma D content reached very high values without disrupting the plasma, as would normally occur in the absence of Li pumping. When constant fuelling was applied as the LLD temperature was varied to change the surface from solid to liquid, the D retention was relatively constant and about twice that achieved without Li PFC coatings. (R. Kaita)

The paper by M. Jaworski (PPPL) et al., "Observation of non-Maxwellian electron distributions in the NSTX divertor," *Journal of Nuclear Materials* (2013), 10.1016/j.jnucmat.2013.01.076, describes a kinetic interpretation for Langmuir probe data in NSTX that has yielded non-Maxwellian electron distributions in the divertor. They are characterized by cool bulk populations and energetic tail populations with temperatures of 2– 4 times the bulk. Spectroscopic analysis and modeling confirms the bulk plasma temperature and density that can only be obtained with the kinetic interpretation. (M. Jaworski)

The paper by T. Abrams (Princeton University) et al., "Response of NSTX liquid lithium divertor to high heat loads," *Journal of Nuclear Materials* (2013), 10.1016/j.jnucmat.2013.01.057, describes the results of samples of the NSTX Liquid Lithium Divertor (LLD) with and without an evaporative Li coating were directly exposed to a neutral beam ex-situ at power densities of 1.5 MW per square meter for up to 3 seconds. The lithium-coated sample had a lithium hydroxide coating, which did not change even when the front face temperature exceeded the pure lithium melting point. These results imply that heating alone may not expose pure liquid lithium if the melting point of surface impurities is not exceeded, and suggest that flow and heat are needed for future PFCs requiring a liquid Li surface. (R. Kaita, PPPL)

Rajesh Maingi and Stan Kaye of PPPL participated in the first conference call on 2/26/13 of a USBPO-sponsored committee (chaired by Rajesh Maingi) on US participation in ITER. The mandate of the group is to set out guidelines for the ways in which the U.S. community can provide input on ITER design and technical issues, and on developing guidelines for how U.S. fusion physicists can lead and/or participate experiments once ITER starts operating. (S. Kaye)

Stan Kaye (PPPL) and Dave Smith (U. Wisc.) were asked to participate in an AAS/AIP committee on "Public Access to Research Results: Data Accessibility in Physics and Astronomy". The purpose of the committee is to provide guidelines and recommendations to Plasma Physics and Astronomy communities on the general topic of making published data publicly available through, as one example, on-line links between publications figures and the data that went into creating that figure. The committee will hold three workshops, and a report with these recommendations is expected by the end of 2013. The first conference call of this committee was held on 2/26/13. (S. Kaye)

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

NSTX Upgrade construction activities continued this week with the epoxy vacuum impregnation (VPI) of the first TF inner quadrant. The TF quadrant and mold are currently in the oven undergoing a high temperature cure. The in and ex-vessel welding of the new Bay L Nozzle for the MPTS diagnostic is nearing completion. The new cryogenic platform for the second neutral beam (NB2) has been fabricated and installed on that beam-line.

Preparations for plasma operations in the NSTX-U configuration also continued with the planning for the calibration of the NSTX neutron detectors, and the ongoing assembly and testing of the new firing generators for the field coil power conversion system rectifiers.

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