NSTX Weekly Report (June 04, 2010)

FY 2010 NSTX plasma operations
Planned: Total - 15 run weeks (Base - 14 run weeks, ARRA - 1 run week)
Completed: Base - 1.65 run week and 281 plasma shots
Completed: ARRA -1.01run week and 171 plasma shots

Dennis Mansfield visited the EAST device at ASIPP, China from May 1 to May 22, 2010. He installed an NSTX lithium dropper on EAST during the last part of their 2010 experimental campaign. The dropper control system was tested in place and eventually used briefly to inject lithium aerosol into the EAST plasma scrape-off layer. About 90-100 mg/s of lithium were first injected near the upper outer strike point of a double-null discharge with and without lower hybrid heating. At least a 50% increase in the core ion temperature was observed, although the contributions to this from the lower hybrid and from lithium have not been isolated. Additionally the plasma macro-stability behavior was observed to change significantly with the lower level (about 20-50 mg/s) of lithium application. (D. Mansfield)

Run Coordination (E. Fredrickson, S. Sabbagh - Columbia University)

On Thursday, May 27 Egemen Kolemen completed an Experimental Machine Proposal "Relay Control" to test a "relay control" algorithm needed to refine parameters for feedback control system. Then moved on to Experimental Proposal "Combined X-point height and outer strike point control" (XP-1003) whose goal was to develop combined X-point height and Outer Strike Point (OSP) control. XP-1003 was continued through Friday, and good progress was made on control of the lower X-point height, but upper X-point control still remains to be finished.

Monday, May 31 was Memorial Day and operations resumed on Tuesday, June 1. Jon Menard completed the shot list for XP-1004 on refining Early Error Field Correction. Detailed analysis of the data remains to be completed, but n=1 error field corrections were found to result in increased central rotation, and apparently allow for stable operation with lower startup density. On Wednesday, June 2, Stan Kaye completed his shot list from XP-1028 "Density dependence of L-H threshold". Again, detailed analysis of the data remains to be done. There was time for Steve Sabbagh to take four development shots for XP-1031 "Global MHD and ELM stability vs. edge current", of which two successful shots will be targets for the XP when it runs.

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

NSTX plasma operations continued this past week utilizing dual probe lithium evaporation (LITER), Liquid Lithium Divertor (LLD) pumping, neutral beam heating, and RWM error field correction. Preparations are underway to refill a spare LITER probe and install in the Bay F position over the weekend. In parallel with machine operations, the HHFW antennas were reconditioned to 20kV operations, and commissioning of the new Beam Emission Spectroscopy (BES) diagnostic continued with the successful local testing of the vacuum vessel shutters.

Access to the NSTX test cell will be restricted next week during plasma operations. Access will be available each evening after 5PM.

Research Operations (M. Bell)

Boundary Physics Operations (H. Kugel)

• Lithium Evaporators (LITERs)
- LITER units F2 and K2 were used to support work on Experimental Proposals (XPs) 1004,1028,1027, 1064, and 1043.
- LITER units F1 and K1 were craned from the Test Cell to the South High Bay for reloading.
- LITER unit F1 was reloaded with 84.70 grams of lithium.

• Liquid Lithium Divertor Diagnostics
- First light from NSTX divertor plasmas was detected by the DIMS (divertor imaging spectrometer) system. At present, the old VIPS fibers and machine lens were used for this initial test together with the DIMS data acquisition system working semi-automatically. Assessment of DIMS ultraviolet capabilities will be performed when the integrated system test procedure for the DIMS data acquisition system is completed. (V. Soukhanovskii, LLNL)