

NSTX Weekly Report (February 11, 2011)

FY 2011 NSTX plasma operations started on October 4, 2010

FY 2011 NSTX Outage started on October 25, 2010

Planned Run Weeks: TBD

Run Weeks Completed: 4.21 run weeks and 839 plasma shots

A paper "Suppression of Electron Temperature Gradient Turbulence via Negative Magnetic Shear in NSTX" by H.Y. Yuh et al. was published in Physical Review Letters [PRL **106**, 055003 (2011)]. In this work, ETG was identified as the micro-turbulence mode that, once suppressed with sufficiently negative magnetic shear, was responsible for the formation of NSTX electron channel internal transport barriers. The ETG mode was identified by using density fluctuation measurements from the high-k microwave scattering diagnostic to match measured rest frequency and linear growth rate to gyrokinetic calculations. Electron temperature gradients significantly exceeding ETG critical gradients were achieved in experiments with ETG mode activity reduced to intermittent bursts, while electron thermal diffusivity improved to below 0.1 electron gyro-Bohms. (H. Yuh, Nova Photonics)

S. Kaye and J. Menard attended the FSP Workshop held at General Atomics on Feb. 8 - 11, 2011. J. Menard presented material at and helped coordinate the Experimental Validation subgroup. (S. Kaye)

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

The NSTX outage continued this past week with the successful cleaning of a section of the molybdenum surface on one of the Liquid Lithium Divertor (LLD) plates. Fabrication and installation of new LLD mounting hardware and a new thermocouple system is now in progress. The plasma cutting procedure developed and tested for the upcoming NSTX upgrade was used yesterday to successfully cut the first penetration in the vacuum vessel for the new tFIDA diagnostic. Modifications of tile mounting rails at bay K bottom needed for the installation of MAPP is in progress, and the installation of molybdenum covers on the Bz coils is nearing completion.

Access to the NSTX test cell will be available weekdays this coming week, but will be in restricted access from the evening of Friday Feb 18th through Sunday February 20th for a calibration of the NSTX vessel neutron detectors.

Research Operations (M. Bell)

Boundary Physics Operations (H. Kugel)

• Liquid Lithium Divertor (LLD)

- A small region of LLD Plate-EB was test cleaned successfully. Thick coarse lithium compound deposits, black carbon-like deposits along the rims, and other deposits were removed after 20 minutes of flowing vinegar. Additional soaking would have removed more deposits. This demonstrated that the LLD plates are cleanable, and can proceed to machining, and will be cleanable after machining. After the removal of deposits, the

molybdenum surface of the Test Area showed no indication of any damage.

- Preparations continued for a Peer Review of the LLD plate and nearby diagnostic sensors.
- Lithium Evaporators (LITERs)
 - Work Requests were submitted the fabrication of 4 new LITER units, fabrication of improved connectorization, and installation of eye-bolts to facilitate lifting
 - A meeting was held to review the LITER bellows motion controls.
- Disruption Mitigation
 - The Final Design Review of "Modifications to the LDGIS system for Disruption Mitigation Studies in Support of ITER" was presented by R. Raman (U Wa) and found successful. No CHITs were received. Approval was received for installation. A Work Permit was submitted.