

## NSTX Weekly Report (June 3, 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**

The paper entitled "Edge transport and turbulence reduction with lithium coated plasma facing components in the National Spherical Torus Experiment" by J.M. Canik (ORNL) et al, has been published in Physics of Plasmas **18**, 056118 (2011). This paper presents 2-D edge modeling of NSTX plasmas without and with lithium coated PFCs, along with measurements of turbulence. Modeling shows a broadening of the edge barrier region, with a ~75% drop of the D and  $\chi_e$  from  $0.8 < \psi_N < 0.93$  needed to match the profile relaxation with lithium coatings. Turbulence measurements using an edge reflectometry system as well as high-k microwave scattering show a decrease in density fluctuations with lithium coatings. These transport changes allow the realization of very wide pedestals, with a ~100% width increase relative to the reference discharges. (J.M. Canik)

Princeton University graduate student Tyler Abrams won the 8th Thomas H. Stix \*54 Plasma Physics Graduate Prize. This was based in part on studies he did to simulate heat loads on a sample of the NSTX liquid lithium limiter with a diagnostic neutral beam. Abrams intends to use the award to attend the ENEA summer school on "Plasma Wall Interactions in Fusion Devices: Physics and Technology" in Erice, Italy this summer, and discuss his research with the FT-U group at the ENEA laboratory in Frascati. (R. Kaita, PPPL)

### Engineering Operations (A. von Halle, C. Neumever)

Preparations for upcoming NSTX operations continued this week with the calibration of the expanded Multi-Pulse Thomson Scattering (MPTS) diagnostic system. Both MPTS Lasers were used in alignment scans, and in scattering measurements taken at various NSTX vessel pressures. A three-week bake of the NSTX vacuum vessel is scheduled to begin next week after the completion of the MPTS calibrations. Also this past week, the clean-up of the neutral beam helium refrigerator process gas was completed, and that system is now liquifying helium in preparation for the cool-down of the neutral beam cryo-panels and the start of ion source conditioning.

Access to the NSTX test cell will be restricted this coming week during MPTS diagnostic calibrations and the subsequent vessel bake. Some access time is expected to be available mid-week during the final bake-out preparations.

### Research Operations (M. Bell)

#### Boundary Physics Operations (H. Kugel)

- Lithium Centrifugal Granule Injector
  - The fabrication drawings were completed and are under review.