

## **NSTX Weekly Report (May 25, 2007)**

**FY 2007 NSTX plasma operations started on Feb. 19, 2007.**

**Planned: 10 weeks**

**Completed: 8.23 weeks with 1165 plasma discharges (through May 23, 2007)**

Professor Werner Boeglin spent his spring 2007 sabbatical from Florida International University on the National Spherical Torus Experiment (NSTX) at the Princeton Plasma Physics Laboratory (PPPL). Among his activities was the design of components for a tunable high-throughput spectrometer under development by R. Bell of PPPL. Professor Boeglin also worked on calculating dust trajectories in NSTX, to determine what C. Skinner of PPPL could expect to measure with a detector inside the vacuum vessel. He developed software as well with W. Davis of PPPL, to display plasma images from a new fast visible camera. (R. Kaita)

Tom Osborne visited NSTX to continue development of edge profile and stability analysis tools. A set of kinetic EFITs with tightly constrained edge plasma profiles was completed for a discharge from the DIII-D/MAST/NSTX pedestal similarity experiment, and edge stability analysis with the ELITE code will soon follow. (R. Maingi, ORNL)

There will be an NSTX Physics Meeting on TUESDAY, 5/29 at 1:30 pm in LSB318. We will have summaries of XPs run last week, and a special presentation on a "Proposal for the LLD Radius and Width" by H. Kugel. (S. Kaye)

### **Run Coordination (D. Gates, M. Bell)**

On Monday May 21<sup>st</sup> XP-725 entitled "Optimization of CHI current" was run. Nice results were obtained wherein results with slightly higher closed flux current (~170kA) were achieved using a reduced number of capacitors.

On Tuesday May 22<sup>nd</sup> XP-726 entitled "Coupling CHI plasmas to Ohmic Ramp-up" was run. Scenarios were developed wherein the plasma current was ramped up.

On Wednesday May 23<sup>rd</sup> XP-720 entitled "EBW emission in H-mode plasmas" was run. Building on previous observations plasmas were run with high elongation, and as the day progressed lithium was added using LITER-1d. Without lithium substantially less emission was observed. An antenna angle scan was performed and an optimum location was found for the emission.

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

NSTX Operations resumed this past week after a one week maintenance period to reinstall the lithium pellet injector reconfigured for lithium powder injection, and to perform maintenance on various power, neutral beam and diagnostic systems. After a vacuum vessel boronization over the weekend, plasma operations resumed on Monday with experiments on Coaxial Helicity Injection (CHI), both in maximizing the closed-flux current in a CHI driven discharge and in coupling a CHI discharge to an OH driven plasma. The Electron Bernstein Wave (EBW) two antenna and radiometer system was used in

conjunction with the lithium Evaporator (LITER) and neutral beams in an experiment on EBW mode conversion in H-mode plasmas, and the NSTX error field coils were used in a collaborative experiment with DIII-D to evaluate the impact of field perturbations on ELM suppression. Also this week, pre-operational testing of the new NSTX plasma control system continued, and collaborators from Johns Hopkins University continued the commissioning of the transmission grating spectrometer.

The NSTX test cell will be in restricted access during plasma operations this coming week, with plans to extend the run day to from 5PM to 7PM on Tuesday and Thursday. Access to the test cell will be available from the end of the run day to 10PM each evening.

### **Research Operations (M. Bell)**

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

- LITER-1d was operated to support XP-720.
- The LPI was loaded with sabot cartridges containing lithium powder in preparation for XP-738.
- A talk entitled "Review and Adoption of a Proposed LLD Radius and Width", H. Kugel was presented at an NSTX Edge Physics -ETG Meeting.

#### **Diagnostic Operations (R. Kaita)**

- The new UCSD Dynamo head was tested this week during CHI experiments. Three coils in a perpendicular arrangement measuring  $B_r$ ,  $B_{\perp}$  and  $B_{\parallel}$ , built by PPPL, were incorporated into one of the UCSD fast probe heads. The head was installed in the UCSD probe during the maintenance week. The coils will be used to look at magnetic reconnection during CHI and magnetic turbulence. (J. Boedo, UCSD)
- A. Tolea and L. Delgado-Aparicio, collaborating graduate students from the Johns Hopkins University (JHU) spectroscopy group visited PPPL last week. Among their primary activities on NSTX was to mount the transmission grating (TG) spectrometer on the tangential Bay K port. The installation was successfully completed, and tests are in progress in preparation for taking data during plasma operations.