

## **NSTX Weekly Report (Apr. 13, 2007)**

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

**Planned: 10 weeks**

**Completed: 3.82 weeks (through Apr. 6, 2007)**

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

Two experimental proposals were performed during this period.

On Thursday April 4th XP-723 entitled "Momentum Confinement and Effect of Rotation on Energy Confinement" (S. Kaye, W. Solomon) was performed utilizing the  $n=3$  non-resonant perturbations to brake the rotation of the plasma both in steady-state and transiently. It was found that the rotation in the confinement region of the plasma,  $R=131$  cm, was affected almost immediately by the applied fields, while it took some time for the applied torque to diffuse into the center. Higher amplitude  $n=3$  fields clearly had more of an effect on the rotation than lower applied fields.

On Friday April 5th XP-714, entitled "High-k scattering measurements in H-mode" (D. Smith) was completed. High-k scattering data was obtained during toroidal field and scattering volume position scans in H-mode.

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

After successfully taking data for most of the planned plasma conditions on an experiment measuring high-k scattering in H-modes, NSTX began a maintenance week to replace the neutral beam ion source in the center or "B" position with a spare unit. This refurbished ion source is now being conditioned and is expected to be ready to support plasma operations by the middle of this coming week. Integrated system testing of the new LITER 1d lithium evaporator was completed this week, and initial evaporations were performed through the full thermal operating range. Also this past week, a radiometric calibration of the high-k scattering receivers was performed, and testing of new gas injection hardware in the real-time control system was completed. NSTX plasma operations will resume with an experiment on Coaxial Helicity Injection on Monday, April 16th.

The NSTX test cell will be in restricted access during plasma operations this coming week. Access will be available from 5 to 10PM each evening.

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

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

- LITER-1d1 was inserted into the vessel, and ISTP-278 to commission LITER-1d1 was completed. Initial evaporations were then performed under XMP-50 with the lithium reservoir temperature reaching 603 °C with the output snout aperture at 657°C. The available heater power allowed the operating regime to be reached expeditiously, and useful operating data were operated in the NSTX environment during the temperature ramp-up, flat-top and cool-down. Nominally, about 200 mg of lithium was evaporated, but analysis of the data is still underway. The vessel pressure rose considerably during the heating of the evaporator with water being converted to hydrogen once the lithium started evaporating.

The base pressure returned to about  $4\text{E-}8\text{Torr}$  the following morning with the residual vessel water partial pressure less than before. The Bay H Lower Quartz Deposition Monitor was used to measure the local lithium deposition rate. (H. Schneider, W. Blanchard, C. Skinner)

- LPI was loaded with candidate 304-SS sabots for future experiments and velocity measurements were started for selecting the optimum style. (T. Czeizinger, D. Mansfield, G. Gettelfinger)
- Supersonic Gas Injector (SGI) commissioning tests were completed successfully. The SGI is now ready for high-pressure operation during plasma operations. (V. Soukhanovskii, LLNL)

#### Diagnostic Operations (R. Kaita)

- A new high-speed visible camera has been installed on NSTX. This ten-bit instrument is capable of capturing images at rates up to 90,000 frames per second. Its first use in support of experimental proposals will be to obtain wide-angle plasma images during coaxial helicity injection (CHI) in the upcoming week.
- Extensive calibrations of “high-k” turbulence diagnostic were performed during the maintenance period last week. These included a calibration of the settings for the microwave launching and collecting components, and measurements to help determine both the relative gains and the absolute response of the five detector channels.