

## NSTX Weekly Report (February 1, 2008)

### FY 2008 NSTX plasma operations

**Planned: TBD**

**Completed: 0 weeks**

- Frank Jenko of Max-Planck Institut fur Plasmaphysik, Garching, Germany, visited PPPL for several days last week to hold discussions with PPPL scientists, and to make progress on “GENE” gyrokinetic simulations of NSTX plasmas. He gave a talk at the Monday NSTX Physics meeting on 1/28, presenting an overview of GENE results and more specific results from linear simulations of NSTX discharges. The GENE code can be run linearly or non-linearly. In the linear regime, the code can see both dominant and sub-dominant modes at a single wavenumber, not just the fastest growing mode, which allows determination of critical gradients for these different modes. Dr. Jenko showed in the non-linear simulations that Zonal Flows are most important in the lower-k ITG regime; they have little stabilizing effect in the TEM regime. Coupled-scale calculations do show that ITG modes have a stabilizing effect on the ETG mode, leading to reduced heat flux at high-k. He also presented initial results from an NSTX case that is presently being used as a basis for comparison among the transport simulation codes, GENE, GS2, GYRO and GTC. (S. Kaye)
- The February NSTX Team Meeting will be held on Thursday, February 7, 2008 at 1:00 – 2:30 P.M. in B318. [Note the change in the meeting time from the previous announcement because of the NSTX plasma operation being extended into this week.] The team will be updated on the plasma operation and experimental plan. A summary of the NSTX PAC meeting held last week and the preparation status toward the Budget Planning Meeting will be also presented.
- There will not be a Monday Physics Meeting this week (S. Kaye)

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

The return to NSTX experimental operations continued this week with plasma operations to evaluate machine conditions and to commission/test the new plasma control system. Beam injection into these test plasmas also allowed us to tune the Motional Stark Effect (MSE) diagnostic optical filters and to test/evaluate other diagnostic systems. A second vacuum vessel boronization was performed to improve the oxygen/carbon emission ratio, and to lengthen the plasma pulse during beam injection.

A decision has been made to continue plasma operation for the first two days of this coming week which had been originally scheduled as a maintenance period. The NSTX test Cell will be in restricted access on Monday and Tuesday during plasma operations, with test cell access available each evening. Access to the test cell is expected to be available during the day on Wednesday through Friday.

### Research Operations (M. Bell)

#### Diagnostic Operations (R. Kaita)

- The new illumination probe for the multipoint Thomson scattering (MPTS) diagnostic is operational. Window transmission measurements are being made with the light source at two radial positions.
- The tangential “optical” soft X-ray (tOSXR) array was reinstalled on NSTX by personnel from Johns

Hopkins University last week.

### Boundary Physics (H. Kugel)

- LITER FY08: Preparations for FY08 lithium loading are in progress. Draft revisions of the Failure Modes and Effects Analysis (FMEA) and Safety Assessment Document (SAD) for LITER FY08 operations were completed and sent to the Safety Review Committee (SRC)
- LITER Bay K: Assembly of the oven and thermocouple electrical connections started. Preparations for installation of the garage spool and probe motion limit switches started.
- LITER Bay F: A trial fitup of the formed-bellows support mechanism was performed, optimizations were identified, and minor modifications are in progress.
- LLD Test Facility: The pumpdown of the LLD test chamber in L245 was performed. The Residual Gas Analyzer was maintained and is operational. Minor leaks were corrected. The vacuum now qualifies for installation of LITER for lithium wetting and conditioning tests. Preparations for loading and installation are in progress.
- Lithium Powder Development: The Operating Procedure for lithium powder testing with the recently assembled test apparatus and data acquisition system was approved, and preparations are in progress to begin testing. (D. K. Mansfield)
- Quartz Micro-balance: Four quartz microbalances recorded deposition in the NSTX vessel during the boronization. Based on an assumed film density of  $1.6 \text{ gcm}^{-3}$ , the recorded film thicknesses of the deposited film are Bay H bottom -  $88 \text{ \AA}$ , Bay H top -  $63 \text{ \AA}$ , Bay I midplane -  $1290 \text{ \AA}$  and Bay B midplane radial -  $6 \text{ \AA}$ . The Bay B midplane crystal is aligned radially and does not directly face the plasma, whereas the other three do. (C.H. Skinner)

### Diagnostic Upgrades (B. Stratton)

Peter Beiersdorfer of LLNL and Jaan Lepson of the Space Sciences Laboratory of the University of California visited PPPL from Jan 28 - Feb 1st to commission two soft-x-ray spectrometers. XEUS (X-ray and extreme ultraviolet spectrometer) is now providing real time data on hydrogen-like oxygen and carbon as well as on hydrogen-like boron and nitrogen impurities in NSTX plasmas. VXCS (vertical x-ray crystal spectrometer), which is located in Bay D, has been successfully started up. Once fully focused it will provide time-resolved oxygen and iron impurity data.