

NSTX Weekly Report (February 8, 2008)

FY 2008 NSTX plasma operations

Planned: TBD

Completed: 0 weeks

- R. Maingi (ORNL) traveled to MIT to participate in the small ELM similarity experiment between C-MOD, MAST, and NSTX (ITPA PEP-16). Excellent progress was made in that many discharges with small ELMs were obtained in C-MOD plasma with scaled poloidal cross sections to NSTX and MAST. The ELM characteristics were documented in the soft X-rays, gas-puff imaging, and fast magnetics. (R. Maingi)
- Tom Osborne (GA) visited NSTX and updated the profile analysis and kinetic equilibrium tools needed for stability analysis with ELITE. A series of discharges with giant ELMs and varied Thomson laser timing was analyzed in detail, showing rather wide pedestals just before the ELM crash. Another series of discharges with smaller, more routine Type I ELMs was also analyzed. Edge stability analysis will soon commence on these discharges. (R. Maingi, ORNL)
- Because of the on-going NSTX Operation schedule this week, we are rescheduling our February NSTX Team meeting to Tuesday, Feb. 12 at 10:30 - 12:00 in LSB 318. The team will be updated on the plasma operation and experimental plan. A summary of the recent NSTX PAC meeting, the NSTX budget update, and the preparation 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)

NSTX plasma operation continued into this past week, originally scheduled as a maintenance week, in order to complete the Plasma Control System (PCS) testing, further evaluate machine conditions before beginning experiments, and to calibrate the Motional Stark Effect (MSE) diagnostic. The MSE diagnostic calibration required TF field operation to 5.5kG, and neutral beam injection into a gas filled torus. Upon evaluating machine conditions, the decision was made to perform an abbreviated vessel bake, expected to start this coming Monday. Also this week, the lithium evaporator (LITER) to be installed at bay K was assembled. The LITER to be installed at bay F is mounted on a test chamber to support liquid lithium divertor tests.

The NSTX test Cell will be in restricted access this week during the vessel bake. Limited, escorted access can be arranged through the bake-out crew.

Research Operations (M. Bell)

Physics Operations (D. Muller)

- An end-to-end test of the signal propagation delay, or latency, of the plasma control system was performed. This revealed some anomalies in the communication between the control computer and a

subgroup of the power supplies for the poloidal field coils which shared a common digital link. The problem was found to be caused by the occasional overflow of a communication buffer. After a software correction was made to avoid the problem, the measured latency on all the PF power supplies was measured to be less than 0.8ms. An operational issue was also discovered in one of the signals used in the plasma vertical position control. When this was corrected, vertical stabilization and shape control with the rt-EFIT control algorithm was restored for NBI-heated plasmas with elongation up to 2.2. However, these discharges had higher impurity levels and resistive flux consumption than comparable discharges run in 2006 and 2007, suggesting that additional baking of the vacuum vessel would be of benefit. (M. Bell)

Diagnostic Operations (R. Kaita)

- The major activity in diagnostic operations last week was the calibration of the Motional Stark Effect (MSE) diagnostic for plasma current profile measurements. Reliable neutral beam injection enabled this to be successfully completed.

Boundary Physics (H. Kugel)

- LITER (Lithium Evaporator)
 - A review of planned LITER FY08 operations has been scheduled by the Activities Certification Committee (ACC).
 - LITER Bay K - Mechanical and electrical assembly of the oven to the probe was completed. Final installation of the garage spool, and special probe motion limit switches are pending adjustments to the formed-bellows support mechanism.
 - LITER Bay F - A trial fitup of the formed-bellows support mechanism was successful and final assembly was completed.
- LLD (Liquid Lithium Divertor)
 - Test Chamber: LITER_Bay F was loaded with 37 g of lithium and mounted on the LLD Test Chamber. LASER alignment measurements were performed. The chamber was pumped down and is progressing toward operating vacuum.
 - LLD design activity progressed on a conceptual design for the plate heaters, cooling lines, fasteners, and cabling layout. A Conceptual Design Review has been scheduled for Wed, 2/20/08, 1:30 pm, B318. (R. Ellis III)
- Lithium Powder Development
 - A prototype lithium powder dropper was laboratory tested successfully. Preparations are in progress for a Final Design Review Wed, 2/13/08, 9:30am, NSTX Aux Control Rm. (D. K. Mansfield)

Diagnostic Upgrades (B. Stratton)

- A Conceptual Design Review was held 2/7/08 to introduce a design for the Nova-Photonics Motional Stark Effect LASER Induced Fluorescence (MSE-LIF) diagnostic which is supported by the OFES Innovative Diagnostic Initiative as an upgrade to NSTX. This CDR covered the diagnostic and its requirements, the installation on and near Bay G, interferences, required services, resulting diagnostic data expected, estimated costs, and schedule. This CDR generated 4 charts regarding magnetic shielding and bolometer interferences. Per the results document attached, this CDR is deemed

acceptable pending resolution of the chits. As agreed at the review, a Work Plan will be initiated. (T. Stevenson)