

NSTX Weekly Report (June 13, 2008)

FY 2008 NSTX plasma operations

Planned: 15 run weeks

Completed: 12.41 run weeks, 1894 plasmas (through June 5, 2008)

- No NSTX Physics Meeting on Monday, June 16, 2008. (S. Kaye)

Run Coordination (M. Bell, R. Raman)

Two experiments were conducted in the one day of operation in this week.

On Thursday, June 5, we began with the experiment "Ohmic H-modes" [XP-506 (Rev. 2008), C. Bush]. Persistent H-mode transitions were reproduced in ohmically heated plasmas and with the improved and faster reflectometer, strong evidence was found for a change in the character of the core fluctuations with a strong reduction in correlation length within 2 ms of the transition. The fast reciprocating probe showed reduced fluctuation levels near the separatrix and the edge rotation diagnostic showed a strong spinup in poloidal velocity. Measurements of high-k fluctuations were made in the core of these plasmas for the first time.

In the afternoon we performed the second part of the experiment "Li pumping and retention on NSTX" with the aim of measuring dynamic deuterium retention during operation while LITER was depositing lithium on the lower divertor. The vessel pressure rise with ohmic and RF heated plasmas was monitored with the torus interface valves closed. The retention immediately after the end of the plasma current was more than 99%. After 3 hours the fraction was 79%, after 24 hours, 61%. This compares to the before-lithium result of 36% retention after 21 hours.

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

NSTX was off-line for scheduled maintenance this past week, with an emphasis placed on the completion of the neutral beam calorimeter repairs, and the removal, refilling and reinstallation of the two lithium evaporator (LITER) probes. The neutral beam calorimeter has now been re-installed, the beam-line cryogenically cooled, and the ion sources conditioned to full operating levels. Each of the LITER probes was removed and refilled with lithium to >55 grams, and both probes are now in-place, baked, and have been opened to the vacuum vessel to complete alignments. Also this week, a laser tracker was temporarily utilized in the NSTX test cell to make measurements for the proposed installation of the MSE-LIF system, and service was performed on one of the MPTS lasers.

There will be no access to the NSTX test cell during plasma operations this coming week, and plasma operations will be extended 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)

Diagnostic Operations (M. Bell for R. Kaita)

- The Spectra-Physics Lasers service engineer completed the maintenance work on laser 2 of the MPTS diagnostic; the internal reflectors were rinsed with a weak solution of a biodegradable acid.
- N. Nishino from Professor, Hiroshima University has brought a Photron 12 bit fast camera to measure plasma flows in NSTX using the SWIFT diagnostic.
- Excellent data were obtained with the new long wavelength extreme ultraviolet spectrometer (Loweus) from LLNL for about one week of plasma operation. However, the TIV for the system has developed a leak in the bellows actuator so operation has been suspended until repairs can be made during the next opening.
- The x-ray transmission grating spectrometer from Johns Hopkins U. will be operational for selected ohmic and RF discharges in the next week. An upgrade to the pumping system will be required for operation in NB discharges which involve higher gas fueling rates.

Boundary Physics Operations (H. Kugel)

- Lithium Evaporator (LITER) - LITER-F was reloaded with 58.2g and LITER-K with 56.65g of lithium. Both units were reinstalled, realigned, controls tested, out-gassed and are now ready for operations.
- Liquid Lithium Divertor (LLD) - The thermocouple configuration of the LLD plates was finalized. This information was given to the control and diagnostic engineers so that the wiring and signal processing requirements can be defined. As a result of manufacturing studies and vendor contacts, a simplified fabrication scheme, with the plates manufactured in a flat configuration, and then bent into the final shape, was developed, and a set of drawings was produced. This scheme is similar to that recently used for the LTX shells. Drawings were sent to SNL Friday 6/13. (R. Ellis, III)
- Lithium Powder Dropper - Offline laboratory testing and calibration of the unit was completed. Mechanical installation on the vessel was initiated and is in progress. The engineering of the control software was initiated and is in progress. (D. Mansfield)