

NSTX Weekly Report (June 8, 2007)

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

Planned: 10 weeks

Completed: 10.16 weeks with 1,468 plasma discharges (through June 6, 2007)

On June 6, 2007, the NSTX Plasma Operation reached 10.16 weeks with 1,468 successful plasma discharges, achieving the 10 run week FY 07 DOE Joule Milestone.

The following talks were given by H. Kugel at the Plasma Facing Components Meeting, Argonne National Laboratory, Argonne IL, June 4 - June 7, 2007: "Update on Lithium Experiments in NSTX", and "PPPL Effort on NSTX Liquid Lithium Divertor- Status, Plans, and Issues"

There will be an NSTX Physics Meeting on Monday, 6/11 at 1:30 pm in LSB252. We will have short summaries of XPs run last week, and a presentation entitled "First Results From The New High Resolution X-Ray Imaging Spectrometer on Alcator C-Mod" by J. Rice and A. Ince-Cushman of MIT: Abstract: A new high resolution X-ray crystal spectrometer has been installed on Alcator C-Mod. The spectrometer consists of a pair of spherically bent crystals and multiple 2D pixel array X-ray detectors arranged in the Johann configuration. This geometry allows for spatially resolved spectral measurements from a single spectrometer. The spectrometer has been designed to measure line emission from highly ionized argon. Preliminary ion temperature and toroidal rotation velocity profiles from this new diagnostic will be presented. (S. Kaye)

Run Coordination (D. Gates, M. Bell)

On Thursday May 31st XP-705 entitled "Multi-mode beam fast ion loss power scan" was run. A plasma that was fast ion MHD quiescent was developed by operating with very low NBI beam power and voltage. The remaining experiment will document the transition into the previously observed Alfvén Turbulence or "sea" of Alfvén wave regimes by increasing the NBI beam power and voltage.

On Friday June 1st XP-710 entitled "High bootstrap current fraction plasmas at high elongation" was run. A multi-parameter scan was performed in an effort to find a scenario with elevated beta-limits in this high field low current high elongation regime. LITER-1d was used in this experiment.

On Monday June 4th XP-728 entitled "RWM active stabilization and optimization – ITER scenario" was run. The RWM feedback system configuration was optimized by using different sets of detectors which measured either the radial or the poloidal component of the perturbed magnetic field. The feedback gain was also varied.

In the morning on Tuesday June 5th XP-721 entitled "Small ELM regime comparison" was run. This is a joint XP sponsored by the ITPA which looks to investigate small ELM regimes observed on NSTX, MAST, and C-Mod. The low elongation plasma that was developed previously was run with a lower X-point position and small ELMs were observed.

In the afternoon of the 5th XP-746 entitled “ELM characterization in NSTX” was run. Three ELM regimes were investigated with scans of diagnostic settings, including USXR filter settings and reciprocating probe position. A systematic dataset was obtained.

In the evening of the 5th XP-744 entitled “Edge electrode biasing for SOL control” was run. This was the first use of the biased electrode and probe (BEaP) during an XP on NSTX. Data was obtained as the electrode bias voltage was varied.

On Wednesday June 6th XP-728 (see above) was run. Additional data was obtained using the n=3 braking capability while using the n=1 feedback capability.

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

NSTX Operations continued this past week, using the remaining inventory of the LITER 1d lithium evaporator in an experiment to develop high elongation discharges with high bootstrap fraction. LITER 1d was then removed from NSTX and is being prepared to be reloaded with lithium. The NSTX error field coils, powered via switching power amplifiers, were used in an experiment investigating active Resistive Wall Mode (RWM) stabilization at low plasma rotation and in another on plasma braking. All three neutral beam ion sources were used in an experiment to compare small Edge Localized Mode (ELM) regimes with C-MOD and MAST, and in another to measure the phases of ELM development. The new Biased Electrode and Probe (BEaP) system was used in support of an experiment on the control of the plasma edge scrape off layer. Also this week, pre-operational testing of the new NSTX plasma control system was completed.

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)

- The LPI was removed from NSTX to facilitate NPA vertical scan measurements.
- LITER-1d expended its remaining lithium load and was removed from NSTX for lithium reloading. Then, Friday, before the start of operation, the LITER-1d assembly, reloaded with about 50g of lithium, was reinstalled on the vacuum vessel behind its valve. It is planned to pump on the vacuum space and provide a mild bake with external heater tapes over the weekend. On Saturday, the LITER-1d heaters will be added to the bake and used to continue the bake during normal operation early next week. A plan for further outgassing of LITER-1d is being discussed.

Diagnostic Operations (R. Kaita)

- Integrator problems have been repaired for the halo current Rogowski coils on the center stack.
- Installation of fixed-frequency and correlations reflectometer hardware and the 1 mm interferometer system was completed by UCLA.