

NSTX Weekly Report (Mar. 13, 2009)

FY 2009 NSTX plasma operations

Planned: 16 run weeks

Completed: 0.7 run weeks

The paper "Study of turbulent fluctuations driven by the electron temperature gradient in the National Spherical Torus Experiment" by E. Mazzucato et al., has been accepted for publication in Nuclear Fusion. This paper presents localized high-k scattering measurements of density fluctuations in the range of $k\rho_{te}\sim 0.1$ to 0.4, and compares the strength and spectrum of fluctuations to gradients in the electron temperature profile and magnetic shear. The turbulence level is higher when the electron temperature gradient is higher, but can be suppressed by strongly reversed magnetic shear. The results indicate that the measured high-k turbulence is consistent with theoretical expectations of the characteristics of Electron Temperature Gradient (ETG) modes. (S. Kaye)

Run Coordination (R. Raman , University of Washington, Deputy: E. Fredrickson)

March 9-11: NSTX started experimental operations on March 9. March 9 and 10 were spent on XMP48 "Startup Plasmas"- Initial plasmas were run to verify NSTX readiness to support plasma operations. Target shots needed for the NSTX FY09 Joule Milestone (deuterium retention and pumping with lithium surfaces) were developed. March 11 was spent on developing the target shot needed for XP904 "Strike point dynamics", the goal of which is to develop an algorithm for controlling the lower strike point location.

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

Plasma operations in support of NSTX experiments began this week with the completion of the experimental machine proposal (XMP) to evaluate plasma conditions and to develop the reference shots needed to support experimental proposals (XP's). An XP utilizing neutral beams to better understand strike point dynamics, and another using both beams and the machine's error field coils to study locked modes in high-beta plasmas were performed this past week. Also this week, a design review was held for a new sample probe being developed in collaboration with Purdue University to study particle control and hydrogenic fuel retention. Access to the NSTX Test Cell will be available during planned maintenance this coming week.

Research Operations (M. Bell)

Boundary Physics Operations (H. Kugel)

- Liquid Lithium Divertor (LLD) (M. Viola)

A teleconference was held with SNL and PPPL to discuss LLD progress and planning:

SNL Status:

- 6 Plates shipped from SNL to molybdenum coating vendor and received on 3/6/09.
- NSTX received 12 samples from SNL (end cuts of the plates).
- Tentative coating schedule: 2 weeks tooling, then 3 weeks for spraying, then delivery end of April.
- Received updated control rack report; updated control rack delivery schedule 5/5/09

PPPL Status:

- The step-bending vendor completed bending of one aluminum test plate, and one brazed copper plate
- The final single-heater test in vacuum was completed. Set up for 3-heater test started

- Lithium Evaporator - LITER 2009

- Preparations were started for loading and installing 2 LITER units on 3/17/09 during the maintenance week. (J. Winston)

- Lithium Dropper (D. Mansfield)

- Work continued on the pumpdown of unit-1.

- Edge Sample Probe (C. H. Skinner)

- The Final Design Review for the Sample Probe was successful pending resolution of the CHITS.

Diagnostic Operations (R. Kaita)

- The calibration of the motional Stark effect diagnostic was completed with neutral beam injection into a gas-filled NSTX vacuum chamber at a variety of fields. The first window calibration for the multipoint Thomson scattering diagnostic was also performed for the present run period. No transmission degradation was observed from the bakeout and glow discharge cleaning needed for plasma operations.