

NSTX Weekly Report (May 30, 2008)

FY 2008 NSTX plasma operations

Planned: 15 run weeks

Completed: 11.52 run weeks, 1740 plasmas (through May 27, 2008)

There will be an NSTX Physics Meeting on Monday, 6/2 at 1:30 PM in LSB318. We will have XP updates from the following: E. Mazzucato, H. Yuh, and S. Gerhardt. The presentation material is available on the NSTX web page. (S. Kaye)

The May NSTX Team Meeting was held on Wednesday, May 28, 2008. The status of the NSTX operations and plans was given and the upcoming NSTX Five Year Review was discussed. The presentation material is available on the NSTX web page.

Run Coordination (M. Bell, R. Raman)

Four experiments received run time in the three days of operation during this week.

On Thursday May 22, we began with the experiment "Magnetic Shear and Transport" [XP-829, H. Yuh] with deuterium plasmas and using LITER. Interestingly, the internal transport barrier was moved outwards relative to earlier plasmas run without lithium coating. The broader temperature profile was consistent with MSE measurements of the shear region extending to larger major radius. The L-H threshold was reduced to just above 2MW, so that even a small amount of HHFW heating power pushed the plasma into H-mode. In these H-mode plasmas, shear reversal was not observed, although core heating of a beam heated discharge by the HHFW power was observed in H-mode for the first time. We had intended to switch to investigating the "Dependence of the H-mode Pedestal Structure on Aspect Ratio" [XP-529, R. Maingi]. However, a problem developed in the NBI system which prevented this, so we switched to "Edge Electrode Biasing" [XP-806, Zweben] for the remainder of the day. This experiment was then completed in the afternoon on Tuesday May 27. The experiment compared the effects on the local SOL profile between biasing with a 'floating double probe' configuration and the normal biasing with respect to vacuum vessel ground. The floating bias circuit worked as expected to reduce the current drawn by the electrodes, but the bias effect on the SOL density profile was not as large as the normal bias configuration at the same voltage. It remains to be seen whether the advantage of the lower current outweighs the smaller effect on the SOL control.

On Friday May 23, we began the experiment "Halo Current Dependencies" [XP-833, S. Gerhardt] which was continued at the end of the day on Tuesday May 27. The first investigations were done in high-triangularity ohmically heated, helium plasmas, where vertical displacement events were produced by freezing the vertical control. The poloidal halo current was found to scale approximately linearly with I_p^2/B_T . An attempt was then made to develop a suitable low-triangularity target plasma, which was only partially successful. A brief repeat of the same scan was then done, confirming the dependence above and generating halo currents up to 120kA. A single case was repeated in deuterium, generating similar levels of halo current.

On Tuesday May 27 after the Memorial Day holiday, we performed the NSTX Machine Proposal "MPTS Calibration" [XMP-55, B. LeBlanc] to measure, and to correct if necessary, the alignment between the two laser beams of the multi-point Thomson scattering following the

replacement of a damaged rod in one of the lasers in the preceding maintenance week. The alignment was found to be satisfactory and a new calibration factor for the density measured by the repaired laser was determined.

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

NSTX plasma operations continued during part of this past week in parallel with investigation and repair of the vacuum leak in the neutral beam calorimeter. The calorimeter assembly has been decontaminated and moved outside the test cell to allow experiments utilizing the new lithium evaporator (LITER) to continue. The repaired calorimeter will be re-installed during the scheduled June 9th maintenance week.

There will be no access to the NSTX test cell during plasma operations this coming week. Access to the test cell is expected to be available during 2nd shift each evening.

Research Operations (M. Bell)

Diagnostic Operations (R. Kaita)

- An alignment check of the lasers the multipoint Thomson scattering diagnostic was performed using Ohmically-heated plasmas. The data are still being analyzed, but the initial conclusion is that they will permit a new calibration that will compensate for the present laser alignment.