

NSTX Weekly Report (March 21, 2008)

FY 2008 NSTX plasma operations

Planned: 15 weeks

Completed: 4.18 weeks (through March 19, 2008)

Eighteen NSTX-related experimental and theory papers were selected by the U.S Program Selection Committee for the IAEA Fusion Conference for submission to the international selection committee. (S. Kaye)

A first generation python/java utility allowing “between-shots” TRANSP runs has been developed and tested. The utility can be run from an application or from the Web, and will allow a user to set up and submit either a time slice or limited time-dependent TRANSP run for assessing plasma performance and local transport characteristics during experiments. The TRANSP run is based on a generic namelist, but the namelist can be modified by the user. The purpose of this application is for feedback during experiments; users making full TRANSP runs, with detailed namelist changes, should still use the (e.g.) TRSETUP or xTRANSPIN programs. The between-shots TRANSP utility will be further tested, and integrated with experiments, during the upcoming run weeks. (S. Kaye)

N. Nishino (Professor, Hiroshima University, Japan) completed his visit to NSTX at the beginning of the week. He brought a 12-bit fast visible camera that he is using with S. Paul on two-dimensional flow imaging diagnostic. The camera was set up with the filters and optics previously assembled for NSTX, and calibration data were obtained. N. Nishino was provided with the basic concepts for the white plate and “pixel-to-pixel” calibrations. The latter are needed because the technique requires a comparison of identical fields-of-view that are imaged on the same camera chip, but through different filters. N. Nishino is expected to prepare the analysis software after he returns to Japan. He was also given the data from the 2007 run with the 8-bit camera he brought during his last visit. The limited dynamic range restricted the number of shots where useful data could be obtained. There might be some plasmas where the images did not saturate, however, but still have enough light for a flow measurement to be extracted. He is being encouraged to look for these cases. (R. Kaita)

The March NSTX Team Meeting was held on Friday, March 21, 2008 at 1:30 P.M., in B318. The team was updated on the NSTX Plasma Experimental Operations, the outage plan, the recent Budget Planning Meeting, and the programmatic items. The presentation material is available on the NSTX web page.

There will be no NSTX Physics meeting on Monday, 3/24. (S. Kaye)

Run Coordination (M. Bell, R. Raman)

Two experiments were conducted in the week March 13 - 19, 2008.

On Thursday 3/13, we performed XP-813 "Momentum transport using $n=3$ braking" [W. Solomon]. This experiment used non-resonant magnetic perturbations to distort the local rotation profile to investigate the roles of diffusion versus convection for momentum transport. Although the development of $n=1$ MHD activity compromised some discharges, a good scan of the gradient scale length for the momentum density was obtained in the range 16 - 34 cm. This will be useful in discriminating two competing theories of a momentum pinch. In addition, a scan in plasma current at fixed toroidal field was completed.

The experiment XP-820 "Modulation of core rotation using beam blips" [S. Kaye] was run on Friday 3/14. The goal was to assess the momentum transport characteristics in the plasma core using perturbative application of neutral beams. With two steady sources and a perturbative third source, a range of plasma currents and toroidal fields was explored. Preliminary analysis of the data indicates that a separation of the momentum diffusivity from the momentum pinch should be possible.

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

NSTX began a maintenance week after work on an experiment to further characterize momentum transport utilizing the machine's error field coils. A temporary platform was then constructed at bay K to install the new lithium evaporator (LITER) probe and associated power/control cabling. The new LITER probe is currently in place, aligned and under vacuum, but still isolated from NSTX machine vacuum. The original LITER probe will be re-installed at bay F during the next scheduled maintenance week in April. That probe has just completed operations on the test stand, testing coating techniques for the proposed liquid lithium divertor. A calibration of the high K scattering diagnostic, and a vacuum vessel boronization, will be performed before resuming plasma operations Monday morning.

NSTX Test Cell access will be restricted during plasma operations this coming week. Test Cell access will be available from 5PM to 10PM each evening, with the possible exception of Thursday evening for HHFW antenna conditioning.

Research Operations (M. Bell)

Boundary Physics Operations (H. Kugel)

Lithium Evaporator (LITER)

An unloaded LITER cartridge mounted on its insertion probe was installed on the new port at Bay K top. The cartridge in its local vacuum chamber is now undergoing purge and pump cycles with argon gas to promote achieving a satisfactory pressure to allow its isolation valve to be opened to the main torus vacuum. This will allow checking the alignment of the probe with the opening between the upper outer divertor plates through which the lithium will be evaporated.