NSTX Weekly Report (Sept. 2, 2005)

FY2005 Planned Operations: 17 weeks
Completed: 17.13 weeks producing 2086 plasmas
Maintenance Week - No plasma operations

NSTX Department, Project, Program (M. Ono, M. Peng, E. Synakowski)

• Kouji Shinohara (JAERI, Japan) completed his visit to NSTX under the Large Tokamak Implementing Agreement. An objective of this visit was to measure the energetic ion transport in fast events such as a bursting Alfven eigenmode. The typical time scale of these event of interest is less than a few ms. By replacing the original camera with a fast camera from JAERI on the existing Scintillator Fast Lost Ion Probe on NSTX, the time resolution was significantly improved from 17 ms to 0.075ms. As a result, the effect on energetic ions of fast event, e.g. bursting MHDs, was measured successfully on NSTX for the first time. (K. Shinohara)

• Nobuhiro Nishino from Hiroshima University concluded a month-long visit to NSTX. During that time, he was able to obtain visible images with his fast camera under a variety of plasma conditions. Nishino will be presenting his analysis of filamentary structures and other transient phenomena associated with "ELM's" in his invited talk at the upcoming Symposium on Fusion Engineering (SOFE '05 Conference) in Knoxville, Tennessee in September. (R. Kaita)

• Brett McGeehan, a summer undergraduate laboratory intern who just graduated from Dickinson College under the advisorship for R. Kaita, investigated velocity measurements of turbulence structures on NSTX with high speed cameras. Through the use of a high speed digital camera, manufactured turbulent structures are captured at framing rates between 4500 and 40,500 frames per second with exposure times of 222 and 25 microseconds, respectively. Images from the edge of the plasma were obtained using a helium filter in a helium plasma, and from the region around the center stack in a deuterium plasma using a deuterium filter. He made a presentation of his work to other students in the program and PPPL staff about his research on NSTX. (R. Kaita)

• Colin Parker (Harvey Mudd College), a National Undergraduate Fellowship student under the advisorship of Charles Skinner, investigated the fate of carbon dust landing on an electrostatic dust detector. A new technique to deliver a known amount of dust in a test vacuum chamber was successfully developed. Experiments showed that majority (80-90%) of dust particles impinging on the detector circuit board were ejected from the board.

• There will no NSTX Physics Meeting this coming week due to the Labor Day

holiday (S. Kaye)

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

NSTX completed a maintenance week. Testing/repair of the SYSTRAN for the plasma control system on the switching power amplifier took place and the system is operational. A full boronization of the vacuum vessel was completed on Thursday. The TF joint voltage monitoring system is being reconfigured for next week's higher field operation and the TF over-current limits were raised on the ACP and RIS. The scrub of the machine and test cell will be completed by the end of first shift today and the areas locked for the start of NSTX operations on Tuesday morning. (W. Blanchard)

Research Operations (M. Bell)

Diagnostic Operations (R. Kaita)

• A check of the laser flight tube for the multipoint Thomson scattering diagnostic indicated a slight misalignment. It was moved by about 0.5 mm to reducing interference ("vignetting") with the laser beam.

• Measurements of the motion of the toroidal field flag joints on opposite sides of the machine were made with two fast cameras during test shots. They will continue to be used to monitor the flag joints when higher field operation is attempted next week.

• A hydrogen sensor on loan from the Sandia National Laboratories has been installed on NSTX. The connections to the electronics were completed during the past maintenance week.

• Improvements to operating diagnostics last week included the installation of a larger fiber optic bundle for the fast camera viewing the lower divertor region, and the capability for remote power reset between shots for the General Atomics filterscope system. A fast camera was also relocated to mid-plane view as part of a student thesis project to develop an edge neutral density imaging diagnostic.

Boundary Physics Operations (H. Kugel)

The first data has been obtained from a new hydrogen microsensor diagnostic installed on NSTX under a collaboration with Sandia National Laboratories. This metal-insulator-semiconductor (MIS) sensor is a small low-power device that detects hydrogen using a catalytically-active metal (palladium) incorporated into a semiconductor device. It will monitor the particle flux to plasma facing components at Bay H and, in the future, can be used to study the energy spectrum, and spatial and directional anisotropies of hydrogen neutrals

impinging on plasma facing components. (Charles Skinner)