

## **NSTX Weekly Report (July 2, 2004)**

For FY2004 Joule milestone: 18 weeks; programmatic goal: 20 weeks.  
Completed: 16.1 weeks producing 1825 plasmas.

### **Run Coordination (S. Kaye, J. Menard)**

NSTX experimental operation resumed on Friday July 2 with an experiment on a solenoid-free current start-up scenario utilizing outer poloidal field coils. The main aim of the experiment was to establish a plasma breakdown/avalanche condition. Using a combination of poloidal field coils including the newly commissioned PF 4, a field null region of  $\sim 0.5$  m diameter with Lloyd parameter of  $E_T B_T / B_p > 0.1$  kV/m was created. The fill pressure and poloidal field coil timing was scanned. While ECH was not available, a combination of HHFW (high harmonic fast wave) and NBI allowed preionization down to  $\sim 1 \times 10^{-5}$  Torr range. The fast camera showed a creation of a bright plasma region in the null region however it did not result in an avalanche condition needed for the current start-up. Some comparison shots from the previous XP 443 were also ran under a similar condition. This scenario has a much larger field null region of  $\sim 1$  m diameter. This scenario was successful in creating the avalanche process and resulted in up to 15 kA of plasma current at lower toroidal field (3.5kG) than used previously (4.5kG). These results narrowed the range of the required field null condition to help develop more optimized solenoid-free start-up scenarios. (M. Ono, J. Menard)

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

The beginning of this past week was devoted to the recovery from an electrical fault between a water fitting and TF buswork under the umbrella structure but well outboard of the TF hub, and to continue with the commissioning of the PF4 coil and the RWM system. Additional time was also spent in finding and correcting an outer vacuum vessel ground fault that was traced to an insulated sliding joint on the vacuum vessel support stand. By Thursday, the two RWM coils were complete and tested, and integrated system power testing (ISTP) of the newly commissioned PF 4 coil was in progress. Upon completion of the ISTP, experimental operations resumed with an experiment on PF only plasma startup, XP-425. Testing of the Lithium Pellet Injector has also been completed, and has been loaded with 42 pellets, ready to support an experiment early next week.

NSTX will be operating extended shifts until 7:00pm on Tuesday and Thursday each week until the end of the run. The NTC will be open after the run until 10:00pm each evening. (A. von Halle)

### **Research Operations (M. Bell)**

### Diagnostic Operations (R. Kaita)

- The diagnostics that were removed to accommodate the installation of the Resistive Wall Mode (RWM) coils have been successfully reinstalled. The hardware that was temporarily displaced included the waveguides for the multichannel reflectometry system and the solid-state neutral particle analyzer array.
- A new fast camera has been installed on NSTX. It is being used by a PPPL graduate student and a National Undergraduate Fellowship summer student to image the visible emission observed from a mid-plane view of the plasma.