

NSTX Weekly Report (July 30, 2004)

For FY2004 Joule milestone: 18 weeks; programmatic goal: 20 weeks.
Completed: 20.3 weeks producing 2358 plasmas.

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

- No NSTX Physics meeting on Monday, Aug. 2, 2004. (C. K. Phillips)

Run Coordination (S. Kaye, J. Menard)

During this week, the experiment to document changes in the current profile due to non-inductive drive, as measured by MSE, was finished. In addition, the MSE calibration was completed for 8 channels. Discharges were run in order to assess EBW emission with different antenna configurations, and CHI breakdown experiments were initiated. The highlights of the week were:

- MSE data was obtained for 3 discharge conditions with both central and off-axis MSE channels. The discharges studied include the low- n_e , high T_e target from the locked-mode experiment, and PF1B early H-mode 800kA and 1.2MA flat-top discharges. This data should be useful for documenting the early q -profile evolution and non-inductive current drive fraction for a range of poloidal beta values. (J. Menard)
- Coaxial Helicity Injection experiments were conducted on Wednesday, Thursday and Friday. For these experiments, a new capacitor based power supply was used to initiate CHI discharges. The capacitor bank was successfully commissioned and used without the occurrence of any technical problems. On the first day the capacitor bank was used in a reduced capacitance configuration to explore the lowest neutral pressure at which CHI discharges could be initiated. In addition to the electron cyclotron system used during previous experiments, for the first time the HHFW system was also used for pre-ionization assistance. These systems were useful as the pressure at which discharges could be initiated was reduced by a factor of three over what was previously possible. During the remaining two days the capacitor bank was used to initiate transient CHI discharges. Discharges were produced at several different injector flux conditions. Discharges produced using the lowest neutral pressure were able to generate about 140 kA of toroidal current using only about 4kA of injector current. This factor of 35 in current multiplication is a new and very desirable result for CHI research. M. Nagata (Prof., the University of Hyogo, Japan), T.R. Jarboe and B.A. Nelson (Profs., the University of Washington) were on site at NSTX to participate in these experiments. (R. Raman)

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

NSTX plasma operations continued this past week, continuing work on long pulse single null plasmas with MSE measurements (XP-432), and completing XP-405, measuring EBW emission. A gas-filled torus calibration of the MSE diagnostic was then completed, using fields and neutral beams (XMP-33). the remainder of the week was devoted to CHI experiments, developing plasma breakdown scenarios using the new CHI transient start-up capacitor bank, and expanding CHI operations to include neutral beam heating and coupling to OH driven plasmas.

Good progress has been made on the commissioning of the supersonic gas injector

and that system was opened to NSTX vacuum over the weekend. Also, the new turbo-pump in the TMP#2 position has completed bake-out and is now pumping on the vessel. The NSTX run has been extended through Wednesday of this coming week to continue the CHI experiment, as well as the PF-only start up and hi-beta experiments.

By the end of this past run week, NSTX had completed 20.3 run weeks this year, producing 2358 plasmas. (A. von Halle)

Research Operations (M. Bell)

Boundary Physics Operations (H. Kugel)

The Supersonic Gas Injector / Edge Magnetic Sensor probe was connected to Bay-I and probe bakeout is in progress.