

NSTX Weekly Report (May 18, 2007)

FY 2007 NSTX plasma operations started on Feb. 19, 2007.

Planned: 10 weeks

Completed: 7.60 weeks with 1060 plasma discharges (through May 11, 2007)

Several NSTX physicists attended to 17th Topical Conference on Radio Frequency Power in Plasmas that was held in Clearwater, Florida on May 7-9. Steffi Diem presented an invited talk entitled "Electron Bernstein Wave Research on NSTX and Pegasus", Joel Hosea presented a contributed poster paper entitled "HHFW Heating Efficiency on NSTX Versus B_f and Antenna $k_{||}$ " and Gary Taylor presented a poster paper entitled "Plans for Electron Bernstein Wave and Electron Cyclotron Heating in NSTX", J. Decker (MIT) presented a poster entitled "Current Drive by Electron Bernstein Waves" which qualified the physics of current drive in high-beta, and A. Ram (MIT) presented a poster entitled "Mode Conversion Coupling to Electron Bernstein Waves" which showed that a change in the density gradient at the edge (e.g., in going from L to H mode) can be detrimental to the O-X-B mode conversion even if the parallel wave number is chosen to be the one that is most optimum. (G. Taylor, A. Ram)

David Mikkelsen worked with Frank Jenko at IPP-Garching to develop plans for collaborative gyrokinetic simulations of NSTX. Benchmarks of the flux tube geometries used by PPPL and IPP researchers will begin shortly, followed by linear stability calculations in the ITG, ETG, and ETG-with-kinetic-ions regimes, and then nonlinear simulations. (D. Mikkelsen)

There will be an NSTX Physics Meeting on Monday, 5/21 at 1:30 pm in LSB318. "Edge Electrode Biasing Experiments on NSTX" by Stewart Zweben, "H-mode fueling optimization with SGI-Upgrade" by Vlad Soukhanovskii, and "Status of small ELM comparison expts" by Rajesh Maingi. (S. Kaye)

Run Coordination (D. Gates, M. Bell)

On Thursday May 10 XP-710 entitled "High bootstrap fraction plasmas at high elongation" was run. Plasmas with steady state elongations greater than 2.6 were achieved with $\beta_N \sim 4$ and $B_t = 5.5\text{kGauss}$. These plasmas were the lowest flux consumption plasmas produced to date on NSTX. Non-inductive current drive analysis is ongoing.

On Friday May 11th XP-737 entitled "Investigation of ion transport with beam modulation" was run in support of Princeton Ph.D. thesis student P. Ross. A partial NPA scan during modulated neutral beam injection to help gain insight into observed depletion of the full energy beam particles in NPA spectrum.

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

NSTX entered a scheduled maintenance week after a week of experiments using all three neutral beam ion sources, the LITER 1d lithium evaporator, the supersonic gas injector, and the power amplifier driven error field coils. During the maintenance week, the lithium pellet injector was re-installed and is being prepared for an upcoming experiment requiring lithium powder injection. Also this week, maintenance was performed on the neutral beam power systems that should help increase the operating level and approve the reliability of the new ion source in the "B" position, and detailed physical

inspections of the MG set rotor were completed. Time was taken to test and repair electronics for the Rogowski and Mirnov coils, and new storage disks were installed on the Linux data server. A vacuum vessel boronization will be performed before resuming operations with a Coaxial Helicity Injection experiment on Monday.

The NSTX test cell will be in restricted access during plasma operations this coming week, with test cell access scheduled to be available from 5 to 10PM each evening.

Research Operations (M. Bell)

Boundary Physics Operations (H. Kugel)

The LPI was reinstalled on NSTX and is presently pumping down during bakeout in preparation for a Li powder XMP and XP. (D. Mansfield)

Diagnostic Operations (R. Kaita)

- M. Lawrence of the Lawrence Livermore National Laboratory (LLNL) was at PPPL during the past NSTX maintenance week to work on the grating for the LLNL XEUS X-ray spectrometer.
- X. Nguyen of UCLA was at PPPL during the past NSTX maintenance week to complete the installation of waveguide for the 65 GHz reflectometer.
- J. Boedo, L. Chousal, and R. Hernandez of UCSD was at PPPL during the past NSTX maintenance week to refurbish the fast reciprocating probe and add a new electromagnetic probe head.
- A. Tolea of the Johns Hopkins University was at PPPL during the past NSTX maintenance week to install the cables for the JHU transmission grating spectrometer.
- Improvements to the high-k scattering microwave turbulence diagnostic during the past NSTX maintenance week included increasing the detector bandwidth from 0.6 MHz to 3.75 MHz, and eliminating the exit window standing wave problem with optical attenuators.