

NSTX Weekly Report (Sept. 16, 2005)

For FY2005 Joule milestone: 17 weeks
Completed: 17.97 weeks producing 2221 plasmas
FY 2005 Run completed on September 13, 2005

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

- Akio Ishida (Professor, Niigata University, Japan) started a 4-week visit to NSTX to collaborate with Martin Peng (ORNL) to assess the 2-fluid effects in the NSTX plasma. (M. Peng)
- There will be an NSTX Physics Meeting on Monday, 9/19 at 1:30 pm in LSB318. 2 VUgraph XP Update: XP531 Transient CHI (Raman). Featured Speaker: Anne White - "Analysis of bicoherence in NSTX GPI (30 min). APS Invited Talk Status (not the correct titles): Gates – Shaping and Performance Maingi – ELM regimes (S. Kaye)

Run Coordination (J. Menard)

The eighteenth week of operation was completed successfully with one experimental proposal and two experimental machine proposals.

XP-531 Transient CHI Startup - Significant progress was made with current persistence studies. Unambiguous, clear evidence for the generation a persisting closed flux current discharge was demonstrated, as more than 60kA of plasma current persisted after the injector current was reduced to zero. The current decay phase was diagnosed using the Thomson scattering diagnostic to obtain electron temperature and density profiles at the same time the fast camera images showed the presence of a closed flux plasma. These results were produced using only 17kJ of capacitor bank energy, which points to the potential for considerably increasing the closed flux current magnitude as these discharges are further optimized and with the use of more bank energy.

XMP-3 Magnetics calibrations - Single coil vacuum field shots were taken to check the variation/drift of equilibrium magnetic sensor calibrations over the course of the run. All 3 SPAs for the RWM coils were also successfully tested to 3kA in both polarities for the first time. Vacuum $n=3$ and travelling $n=1$ field data at several frequencies was also acquired in support of RWM spectroscopy experiment XP501. Finally, the I_p Rogowski redundant return winding voltages were integrated and digitized for the first time and appear to be suitable for diamagnetic flux measurements.

XMP-43 Moveable glow probe - Tests to characterize MGP performance at lower pressures were completed at normal power to pressures as low as 1.5 mT. The

MGP cycle speed was increased to be in sync with NSTX 10 minute duty cycles. The MGP was used to support CHI experiments.

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

NSTX operations concluded this past week with XP-531 "Transient CHI", obtaining signs of current persistence on magnetic diagnostics, camera images and Thomson scattering profiles. The rest of the week was devoted to post-run diagnostic calibrations such as magnetic calibration shots using the field coils including RWM, a neon glow for CHERS and ERD, and a backfilling of the vessel in nitrogen and then argon for Raman/Rayleigh scattering calibrations of the MPTS system. The neutral beam cryopanel has been warmed, the helium gas returned to the tank farm, and the helium refrigerator turbines have been shut down for the outage. The NSTX vacuum vessel will be vented to atmosphere early this coming week, and the neutral beam duct will be removed to allow access to the vessel by late in the week.

Access to the NSTX test cell will be available via the card readers throughout this coming week. (A. von Halle)

Research Operations (M. Bell)

Diagnostic Operations (R. Kaita)

- Calibrations of the CHERS ion temperature and ERD edge rotation diagnostics were performed with neon glow discharges in NSTX.
- Raman and Rayleigh scattering calibrations of the multipoint Thomson scattering electron temperature diagnostic were performed with nitrogen in the NSTX vacuum vessel.

Boundary Physics Operations (H. Kugel)

- Tests to characterize Moveable Glow Probe (MGP) performance at lower pressures were completed at normal power to pressures as low as 1.5 mT. The MGP cycle speed was increased to be in sync with NSTX 10 minute duty cycles. The MGP was used to support CHI experiments.
- The SNL Hydrogen Sensor (R. Bastasz, SNL) was used to measure neutral deuterium flux during CHI experiments. (C.H. Skinner)