

NSTX Weekly Report (May 6, 2005)

FY2005 Planned Operations: 17 weeks

Completed: 2.48 weeks producing 239 plasmas

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

- There will be an NSTX Physics meeting today, Monday, May 9 at 1:30 pm in LSB252. Fred Levinton will discuss ideas for an APS Invited presentation. (S. Kaye)

Run Coordination (J. Menard, S. Sabbagh)

The second full week of operations was completed successfully with five experimental proposals and one experimental machine proposal were conducted.

XP515 - "Recycling Measurements Following Repeated Lithium Pellet Injection": Ohmic helium discharges limited on the inner wall were developed for this experiment. Brief NB pulses were also added to increase the electron temperature and allow a longer flat-top for future injection of multiple pellets. In these limited discharges, the oxygen/carbon and hydrogen/deuterium ratios were elevated compared to recent divertor discharges.

XP507 - "Early divertor and H-mode development for long pulse": In initial development work for this experiment, we achieved 0.8MA discharges with a current flat-top out to about 0.8s.

XP506 - "Physics of Ohmically Heated H-mode Plasmas": Ohmic H-modes were readily obtained although their duration was limited. Good data was obtained from several diagnostics, including the reflectometers and the gas-puff-imaging diagnostic.

XP523 - "Characterization of the Edge/SOL and turbulence in the NSTX boundary": Both L- and H- mode plasmas were investigated. Good data was obtained with the reciprocating probe and other diagnostics. The plasma quality was excellent and, with one neutral beam source, the L-mode performance equaled that in 2004 in both L- and H-mode plasmas; the central electron temperature reached 1.6keV. At higher NB power, the total and the electron stored energy did not reach previous levels, however, suggesting a continuing conditioning of the first wall.

XMP-37 "RWM/EFC coil capabilities": After commissioning the SPA system into the RWM coils earlier in the week, tests of the RWM/EFC coil excitation with pulses and sine wave trains were performed to measure the response of the internal RWM sensors and other magnetic diagnostics. As part of this calibration, the SPA channels 1 & 3 operated separately satisfactorily but the SPA channel 2 interacted with the real-time data acquisition and the control system, although this channel had operated in concert with the others in earlier system tests. The problem with this channel is being investigated.

XP508 - "Long pulse double null development at high elongation and

triangularity": The experiment was conducted with the goal of producing long pulse DND target plasmas. Stored energy reached 250kJ. Attention was placed on extending pulse length and reducing plasma excursions and MHD while increasing I_p to 0.9 MA, with initial success to be continued on Monday, May 9th.

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

NSTX Operations continued this past week with two extended run days. The new Switching Power Amplifier (SPA) power supply has been connected to the Resistive Wall Mode (RWM) error field coils and current was delivered to the three sets of coils in the local current feedback mode, and via the Plasma Control System (PCS). Work is continuing on the commissioning of the PCS control of the SPA in preparation for upcoming RWM experiments. The last of the flux loops has been connected in to the real-time data acquisition system, and the calibration of the magnetic diagnostics is nearing completion. Commissioning of rtEFIT continued in parallel with an ongoing experiment on Double-Null Plasmas using the new PF1A coil. The rebuilt neutral beam ion source in the "B" position was commissioned to operate at 80keV, and was used to support experiments this week.

Plasma operations will resume on Monday morning after a vacuum vessel boronization over the weekend, and there will be no access to the NSTX test cell during the 1st shift. The run day will be extended to 7PM on Tuesday and Wednesday this week. The test cell will be in controlled access each evening from the end of run day until 10PM. A machine area scrub will be performed from 10-11PM each evening in preparation for the following day's run. (A. von Halle)

Research Operations (M. Bell)

Physics Operations (D. Mueller)

The second full week of routine operations was completed successfully. The RWM coils were tested and calibration of their effect on the magnetics sensors was done. The upgrade of rt-EFIT to use the increased number of magnetics sensors, vessel current measurements and new Greens table was run, work remains to complete the integration of this improvement with isoflux control. In XPs: the fast probe was used to study the edge of L-mode and H-mode plasmas at low power. Setup work was done to develop targets for early H-mode and long pulse DND plasmas. Ohmic H-Mode plasmas were produced.

Boundary Physics Operations (H. Kugel)

- XP-523, "Characterization of the Edge/SOL and Turbulence in the NSTX Boundary" was performed. (J. Boedo, UCSD)

- Spectroscopic equipment from Neil Brooks (GA) for the FY 2005 LLNL-GA-PPPL collaboration on NSTX divertor spectroscopy was received. The included spectrometer was connected successfully off-line and test spectra obtained. (V. Soukhanovskii, LLNL)