NSTX Weekly Report (Dec. 3, 2004)

FY2005 Planned Operations: 14 weeks
Completed: 0 weeks producing 0 plasmas

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

• Elizabeth (Jill) Foley successfully defended her PhD. thesis to the Department of Astrophysical sciences of Princeton University. It was very well received by the thesis defense committee. The title of the dissertation is " Development of the Motional Stark Effect With Laser-Induced Fluorescence Diagnostic". The extensive experimental and computational work lays the foundation for further development of the MSE-LIF diagnostic concept, that is planned to be implemented on NSTX. The results of this investigation highlight the importance of magnetic and electric field effects on the atomic radiative transition rates for the hydrogen atom. This may have important implications for the collisional radiative models of hydrogen and the diagnosis of neutral beam interactions with the plasma. (F. Levinton, Nova Photonics)

• NSTX team members participated in the Alcator C-Mod Ideas Forum on December 2 and 3. Ed Synakowski attended the meeting and made a presentation regarding collaboration opportunities between the NSTX and C-Mod programs. Presentations from NSTX team members on C-Mod research activities and/or experimental proposals were also given by Ted Biewer, Chuck Kessel, Rajesh Maingi, David Mikkelsen, Martha Redi, Ed Synakowski, Randy Wilson, and Stewart Zweben. (E. Synakowski)

Reseach Operations (M. Bell)

Boundary Physics Operations (H. Kugel)

• The preparation of 3 divertor ports for a moveable GDC anode probe and possible lithium evaporator testing was completed.

• New electronics upgrades were installed on the UCSD Fast Reciprocating Probe. (R. Hernandez, UCSD)

Diagnostic Operations (R. Kaita)

• The first of the new plasma current Rogowski coils has been wound by the vendor sent to PPPL.

• Spatial calibrations for CHERS ion temperature diagnostic and the ERD plasma rotation diagnostic have been completed.

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

The NSTX outage continued this past week with the verification that all neutral beam impinged surfaces are properly shielded while still providing the necessary sight lines for the new high-K scattering diagnostic. The bay G, H, I, and K port covers have now been re-installed on the vessel, and a light-tight cover installed in place of the center stack casing to allow high-K scattering, CHERS/ERD, and MPTS diagnostic calibrations this week. The fabrication of the new PF1A lower coil is in progress and will be ready for the installation of the center stack casing late this coming week. Two more TF flag and box assemblies were fabricated in the final configuration for the production run, and are now being tested. The third and final cable needed to power the new RWM error field coils has been run from the power conversion building to the test cell high bay area, and the insulators between the inner and outer vacuum vessel sections have been successfully tested to be able to support 2kV CHI operations. Rollie Hernandez of UCSD visited PPPL this week to upgrade the instrumentation and controls for the fast probe. There are no NSTX test cell access restrictions expected this week. (A. von Halle)

Status Report of the RWM Coil Switching Power Amplifier Installation Work (C. Neumeyer):

• The SPA installation task is ongoing. The third and final FCPC-to-test cell DC output power cable run is being pulled. The cabling within the test cell for four of the six RWM coils remains to be installed, but completion is expected before the holidays. The objective is to complete all work within the test cell by end of January. The power resistor in the DC link circuit between the Transrex "P13" supply and the SPA input has been installed within the FCPC first floor reactor enclosure. Preparations of the P13 circuit will be completed by mid December. This week, PPPL personnel visited the manufacturer of the SPA DC output disconnect switches (Filnor Inc., located in Ohio). It is expected that the switches will be shipped before the holidays and installed in January. An order has been placed for the SPA/RWM Kirk Keys. Issues related to the shortcomings in segregation between control and power sections within the SPA are being addressed by providing electrical isolation on all incoming and outgoing connections to the SPA room. Procurement of an upgraded fiber optic IGBT gate driver to enhance the isolation within the SPA cabinet is being considered.

• A wide variety of tasks are underway for the RWM/SPA control system. The SPA Interface Module (SPAIM) has been designed, built and tested. Three CAMAC 337 modules have been modified to interface with the SPAIM. A second PC Link Interface Module (PCLIM) has been built and tested. The system consisting of the a Systran serial FPDP transmitter module, a Systran serial FPDP Receiver module, a PCLIM, a 336 module, three 337 modules and the SPAIM have been tested using the new "pclinkTest" program. The CAMAC crate rack installation and and wiring to the SPA remains to be completed. The Stand-Alone Digitizer (SAD) has been designed. Layout is completed and stuffing is taking place. Two boards are expected to be completed by next

week for debug and test. A VME crate to house the SAD, Systran, Clock Receiver Module, and Fault Processing Module has been obtained. New power supplies have been ordered. Rear Panel work and additional wiring for the VME crate remains to be done. The Clock Receiving Module has been built and tested. For RWM coil protection the Analog Coil Protection (ACP) chassis is being wired. The Input Signal Conditioner (ISC) boards have been designed and stuffed and await test. Front panels need to be built. The actual ACP Calculator boards are being fabricated. They should arrive at PPPL early next week for stuffing and test. Front panels need to be built. The ACP Status Board layout is almost complete. Boards should be here in about 2 weeks for stuffing and test. Front panels need to be built. The ACP Fault Self Test board is still being designed and should be released for layout in two weeks. The interface between the Fault Signal and the Transrex P13 Opto-Driver is being wired this week. Should be available mid next week for test. An interconnecting cable needs to be installed between the FCPC Junction Area and P13. Finally, the PC board to bring out the status signals from the SPA Sub-units has been designed, built but not yet tested.

• The PSRTC/PCS Sky software is being modified for the RWM/SPA upgrade. The "pclinkTest" program has already been modified and is in use to test the pc link and SPA reference (control) voltage. The data acquisition program has been modified to read SPA monitor points from new (but not yet installed) SAD digitizer. Work is in progress to modify the PSRTC algorithms for the three new RMW/SPA control loops.

• Preparations for SPA commissioning tasks have started but the effort will not pick up until January once the installation is completed. Tasks related to electrical isolation are being addressed. A second addendum of drawings has been obtained from the SPA vendor (IE power) are being reviewed .