

## NSTX Weekly Report (May 21, 2010)

### **FY 2010 NSTX plasma operations**

**Planned: Total - 15 run weeks (Base - 14 run weeks, ARRA - 1 run week)**

**Completed: Base - 0.99 run week and 157 plasma shots**

**Completed: ARRA -1.01run week and 171 plasma shots**

NSTX had very good participation at the High Temperature Plasma Diagnostics Conference. There was one NSTX invited talk by Ron Bell on "Measurement of Poloidal Velocity on the National Spherical Torus Experiment." There were 20 poster presentations on a variety of NSTX diagnostic topics by the NSTX researchers and students: "Concept of a Charged Fusion Product Diagnostic for NSTX" by W. Boeglin (Florida International University), "Reconfiguration of the FIRETIP System for NSTX-U" by C. Domier (UC Davis), "Results from the FIRETIP Electronics Upgrade on NSTX" by W. C. Tsai (UC Davis), "Design of Real-Time Density Feedback Control System of NSTX Plasma Based on FIRETIP" by J. W. Juhn (Seoul National University), "Study of RF Driven Plasma Waves using FIRETIP on NSTX" by J. Kim (Pohang Institute of Science and Technology), "A Tangentially-Viewing Fast-Ion D-Alpha Diagnostic for NSTX" by A. Bortolon (UC Irvine), "High-Throughput Accurate-Wavelength Lens-Based Visible Spectrometer" by R. Bell, "High Accuracy Calibration for a Scanning Visible Spectrometer" by F. Scotti, "The NSTX Beam Emission Spectroscopy Diagnostic System: Capabilities and Research Plan" by D. Smith (University of Wisconsin at Madison), "Spectroscopic Diagnostics for Liquid Lithium Divertor Studies on the National Spherical Torus Experiment" by V. Soukhanovskii (LLNL), "A Ka-Band Direct-Conversion Correlation Reflectometer for NSTX" by S. Kubota (UCLA), "Biasing, Acquisition, and Interpretation of a Dense Langmuir Probe Array in NSTX" by M. Jaworski, "High-Density Langmuir Probe Array for NSTX Scrape-Off Layer Measurements under Lithiated Divertor Conditions" by J. Kallman, "First Real-Time Detection of Surface Dust in a Tokamak" by C. Skinner, "Tungsten Transport in the NSTX Plasma" by J. Clementson (LLNL), "SXR Continuum Radiation Transmitted Through Metallic Filters: An Analytical Approach to Electron Temperature Measurements" L. Delgado-Aparicio, "A Two-Color Adaptor for High Speed Infrared Imaging of the NSTX Divertor" by A. McLean (ORNL), "Simulations and Inversion Techniques for 2D Soft X-Ray Imaging Systems" by D. Battaglia (ORNL), "Prototype High Resolution Multi-Energy Soft X-Ray Array for NSTX" by K. Tritz (Johns Hopkins University), "Transmission Grating Based EUV Imaging Spectrometer for Impurity and Electron Temperature Measurements" D. Kumar (Johns Hopkins University), "Modeling the Polarization Properties of Propagating Electromagnetic Waves in NSTX" by J. Zhang (UCLA), "GPU-Acceleration of 2-D FDTD Full-Wave Reflectometry Codes" by B. Rose (Purdue University). (B. Stratton, R. Kaita)

Jon Menard and Rajesh Maingi (ORNL) participated in the ARIES Town Meeting on "Edge Plasma Physics and Plasma Material Interactions in the Fusion Power Plant Regime" 20-21 May 2010 at UC San Diego. Rajesh Maingi gave a presentation on "Heat flux measurements and modeling from C-Mod, DIII-D, and NSTX for the FY10 Joint Research Milestone, and implications for power producing devices" and presented comments during the session on "Experimental benchmarking of models for power plants." Jon Menard chaired the session on "Innovative Ideas" which discussed divertor geometries and progress on developing new tungsten alloys. Jon also participated in the panel on "New device contributions to edge physics benchmarking" and presented comments on the need for new PMI capabilities in the

fusion program. All presentations from the town meeting are downloadable from: <http://cer.ucsd.edu/ATMPMI2010/program.shtml> (J. Menard)

### **Engineering Operations (A. von Halle, C. Neumever)**

The extended NSTX maintenance period to address an OH coil lead water leak is concluding this week with the reassembly of the OH and TF coil connections and upper hub assembly. The second lithium evaporator (LITER) probe has been installed at Bay K. Pre-operational testing is in progress to support lithium evaporation into the vessel using both probes early next week. Also this week, testing of the new Beam Emission Spectroscopy (BES) diagnostic was completed. NSTX operations will resume next week following a full set of Coil System HiPots, an operational test of the TF joint monitoring system, and coil system integrating system testing.

Access to the NSTX test cell will be restricted next week during coil system power testing and plasma operations. Access will be available each evening after 5PM.

### **Research Operations (M. Bell)**

#### **Boundary Physics Operations (H. Kugel)**

- Liquid Lithium Divertor (LLD)

- A prototype gas heating system was tested on the 4th LLD plate up to an average plate temperature of 173°C.
- 3 LLD plates were electrically heated to 220°C to obtain Residual Gas Analyzer (RGA) spectra to characterize LLD conditions following recent argon vents.

- Lithium Evaporators (LITERs)

- The Bay-K LITER shutter assembly was replaced using a brief argon vent.
- LITER unit K2 was reinstalled, a preliminary bakeout of the probe was performed in preparation for opening the Torus Interface Valve (TIV), the TIV was opened, and the probe was inserted and aligned.