

## NSTX Weekly Report (June 11, 2010)

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

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

**Completed: Base - 2.7 run week and 505 plasma shots**

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

A progress summary of General Atomics NSTX research participation for a period Dec. 2009 to June 1, 2010 was prepared and submitted. The General Atomics group participation in NSTX research continued to be actively carried out in the areas of plasma control, H-mode edge pedestal, and RMP coil design for edge localized mode (ELM) control. The effects of rotation and error fields on stability were also further continued with the emphasis on the physics of neoclassical tearing modes. Radio frequency heating (wave-particle and edge interactions, and fast wave antenna loading) is still to be initiated. (R. La Haye, General Atomics)

The 4TH ITER International Summer School was held on May 31 through June 4 at the University of Texas at Austin. The focus of the Summer School was "Magnetohydrodynamics and Plasma Control in Magnetic Fusion Devices." Two young researchers from NSTX attended. E. Koleman, a postdoctoral research fellow, has been working on strike point control. J. Juhn, a graduate student visiting NSTX from Seoul National University, has been investigating the use of interferometer measurements for density feedback control. (R. Kaita)

### **Run Coordination (E. Fredrickson, S. Sabbagh - Columbia University)**

Thursday June 3, John Canik ran two XPs, XP1027 "Resonant Magnetic Perturbations (RMPs) below the Edge Localized Mode (ELM) triggering threshold for impurity screening" to look at the effects of sub-ELM RMPs on impurity confinement and XP1064 "Long-Pulse Enhanced Pedestal H-modes (EPH)" to develop a mechanism for triggering the Enhanced Pedestal H-mode. The shot lists were completed, although Friday morning was spent on further investigations of the EPH mode. Thursday evening the HHFW system was vacuum conditioned to voltages of about 20kV. Friday morning attempts to routinely trigger the EPH mode and avoid the ensuing beta limit disruptions continued. On Friday afternoon good progress was made towards the Joule Milestone of measuring divertor heat flux profiles in the first day of Rajesh Maingi's 3 day XP1043, "Measurement of Heat flux profiles for the FY2010 Joint Milestone".

The week of June 7 was dedicated to HHFW experiments, beginning with an extended campaign of XMP-26 "HHFW Plasma Conditioning" to condition the antenna's. By Tuesday 2.2 MW was coupled for 250 ms into an OH helium plasma without RF trips using -90 degree ( $k_{\phi}=-8 \text{ m}^{-1}$ ) antenna phasing. Progress was made and 2.1 MW was coupled into a deuterium NBI H-mode with -90 degree phasing ( $k_{\phi}=-8 \text{ m}^{-1}$ ) and Joel Hosea's XP1017 "RF Heating at Divertor/SOL regions" to study heating of the divertor plates by HHFW was started on Wednesday.

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

NSTX plasma operations continued this past week utilizing both HHFW and neutral beam heating, as well as dual probe lithium evaporation. The lithium (LITER) probe in the Bay F

position was replaced with a freshly filled unit over the past weekend and, after some delays in completing alignments, was placed back in service. The neutral beam ion source in the "A" position failed with an external water leak, and will be replaced with a spare this coming weekend. Operations were suspended on Thursday June 10 to address an elevated leakage current (2 Mega-Ohms) measured between the OH coil and the inner vacuum vessel. Operations resumed on Friday June 11 after the elevated leakage current issue was cleared. Also this week, a peer review of the new tangential FIDA diagnostic was held.

Access to the NSTX test cell will be restricted next week during plasma operations which will be extended to 7PM on Tuesday and Thursday. Access will be available each evening.

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

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

- Liquid Lithium Divertor (LLD)
  - The final review of XP 1059, "LLD Characterization, Part II" was completed pending resolution of CHITS.
  
- Lithium Evaporators (LITERs)
  - LITER unit F1 was baked, installed, and aligned. Units F1 and K2 were used to experimental operations.
  - LITER units F2 was craned to the High Bay for reloading.
  
- Lithium Technology R&D
  - Quartz Deposition Monitor heads and associated parts were received.
  - A double chamber Argon Glove Box was received.