

## **NSTX Weekly Report (Jan. 15, 2009)**

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

**Planned: TBD run weeks**

**Completed: 0 run week and 0 plasma shot**

- The paper "High speed infrared camera diagnostic for heat flux measurement in NSTX," by J-W. Ahn (ORNL), R. Maingi (ORNL), D. Mastrovito, and A.L. Roquemore was accepted for publication in Rev. Sci. Instr. In this paper the diagnostic details of the fast infrared camera were presented, as well as the first analysis of the heat flux profiles from ELM types. (R. Maingi)
- The paper "ELM destabilization by externally applied non-axisymmetric magnetic perturbations in NSTX" by J. Canik (ORNL), R. Maingi (ORNL), T. Evans (GA) et. al., was accepted for publication by Nucl. Fusion. This paper expands on the recent PRL on this subject with 1) details of the magnetic perturbation characteristics; 2) more information on impact of the triggering pulses on confinement and impurity accumulation; and 3) data demonstrating the triggered ELM energy loss decreased with increasing ELM triggering frequency. (R. Maingi)
- The paper "Advances in global MHD mode stabilization research on NSTX" by S.A. Sabbagh, (Columbia University) J.W. Berkery (Columbia University), R.E. Bell, et al. was recently published in Nuclear Fusion. The paper describes high beta stability sustainment to resistive wall modes with  $n = 1$  active feedback and  $n = 3$  static error field correction (with comparison to single-mode RWM theory), comparison of "fast feedback" vs. "error field correction" at reduced plasma rotation, the observation and physics of RWM destabilization at relatively high levels of plasma rotation, the observation of  $n = 2$  non-resonant magnetic braking, and the increase of such braking at increased ion temperature, expected from NTV theory. The paper also reports the transient achievement of  $\beta_N = 7.4$  in NSTX. The paper can be found at the IOP website: <http://www.iop.org/EJ/abstract/0029-5515/50/2/025020>. (S. Sabbagh)

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

The NSTX outage continued this week with ongoing preparations to close and pump-down the NSTX vacuum vessel. Some rework and testing of the Beam Emission Spectroscopy (BES) diagnostic shutters is in progress, and cleaning, inspection and photography of the vessel's interior surfaces has been completed. The electrical insulation of the NSTX vacuum vessel segment has been verified, and machine area scrubs have started. The re-installation of the neutral beam to torus transition duct is scheduled for next week, and will be followed by vessel pump-down.

Access to the NSTX test cell will be available 1st and 2nd shifts this coming week, with periods of restricted access for MPTS diagnostic Laser alignments.