

NSTX Weekly Report (May 27, 2011)

FY 2011 NSTX plasma operations started on October 4, 2010

FY 2011 NSTX Outage started on October 25, 2010

Planned Run Weeks: TBD

Run Weeks Completed: 4.21 run weeks and 839 plasma shots

A paper "*Accelerating the numerical simulation of magnetic field lines in tokamaks using the GPU*" by R.C. Kalling (General Atomics) et al. was published in *Fusion Engineering and Design* 86, 399 (2011). This paper describes the graphics processing unit (GPU) calculations of field lines in NSTX. The GPU technique enabled a marked increase in computational performance and capabilities over the past decade. The GPU's origin, to accelerate the rendering of complex graphical imagery on computer displays, resulted in their ability to solve computationally intensive highly data-parallel algorithms, such as calculation of magnetic field line topology discussed in this paper. It is now in the process of incorporating the high-resolution footprint modeling into the GPU version. This will allow modeling the divertor footprints in NSTX. (R. La Haye, General Atomics)

A paper entitled "*Evaluation of an electrostatic dust removal system with potential application in next-step fusion devices,*" by F. Q. L. Friesen (Grinnell College), et al., has been published in *Review of Scientific Instruments* 82, 053502 (2011). Plasma-wall interactions in next-step fusion devices will produce large quantities of dust with potential radiological, chemical, and explosion hazards. Safe operation will require a means for removing it to ensure compliance with safety limits. The paper shows that a moving electrostatic potential wave can effectively move carbon and tungsten dust without the need for a maintenance intervention. The work was supported by a National Undergraduate Fellowship and mentored by C.H. Skinner. (C. H. Skinner, PPPL)

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

Preparations for upcoming NSTX operations continued with vacuum vessel leak-checking and the ongoing calibrations of the expanded Multi-Pulse Thomson Scattering (MPTS) diagnostic system. Round the clock operation of the neutral beam helium refrigerator started this week, and is making good progress cleaning up the helium process gas. Good progress was also made on the "scrubs" of machine areas.

Access to the NSTX test cell will be limited this coming week during the scheduled Rayleigh/Raman scattering calibration of the MPTS diagnostic.

Research Operations (M. Bell)

Boundary Physics Operations (H. Kugel)

- Materials Analysis Particle Probe (MAPP)
 - The 38-inch bellows motion drive was received from the vendor and has passed a leak test.