

NSTX Weekly Report (January 7, 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

The paper, "A midsize tokamak as a fast track to burning plasmas" by E. Mazzucato, has been accepted for publication in the first issue of AIP Advances (March 2011). The paper describes the conceptual design of a midsize tokamak ($a=1$ m, $A=3.4$, $B=6$ T) with the potential capability of reaching large values of energy gain ($Q \gg 10$). This is achieved by operating in a low recycling regime that existing experiments indicate can lead to improved plasma confinement. (E. Mazzucato, PPPL)

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

The NSTX outage continued this past week with the removal of the High Harmonic Fast Wave (HHFW) antenna Faraday cages for cleaning. The cleaning of the HHFW antenna straps themselves is being performed in the vessel and nearing completion. The Romer measuring arm was once again moved into the vessel to support in-vessel MSE-LIF installations, and to establish drilling points for the new T-FIDA diagnostic. A procedure to remove the Liquid Lithium Divertor (LLD) plates from the vessel is under review, and is expected to be performed next week.

Access to the NSTX test cell will be available this coming week, but in-vessel access will be limited during LLD plate removals.

Boundary Physics Operations (H. Kugel)

- Liquid Lithium Divertor (LLD)
 - The graphite tiles surrounding the LLD were removed to allow inspection of the plate supports. This revealed damage to the LLD end-supports, the heating cooling tubes and to the surrounding tiles, apparently due to forces that occur during plasma current disruptions. The plates will be removed for additional inspection, testing and assessment.
 - A procedure for removal of the LLD plates is under review
- Molybdenum Inner Divertor Tiles
 - A teleconference was held to discuss items in progress for the Final Design Review to be held next week.
- Lithium R&D
 - About 10 grams of molten lithium was moved in vacuum through 110 cm of tubing (0.95 cm ID) using a bellows filled lithium source in the horizontal position. This is now in addition to a previous test moving molten lithium through this same tubing with the bellows filled lithium source in the vertical position.
 - A high temperature liquid metal valve was also tested and found to successfully contain molten lithium.
 - Applying pressure on the bellows filled lithium source with the valve closed and then

opening the valve, the ability to inject a stream of lithium about 7.6 cm from the nozzle was demonstrated.

- Materials Analysis Particle Probe (MAPP)
 - An engineering layout of the installation configuration was completed pending vendor confirmation of component dimensions.