NSTX Weekly Report (July 2, 2009)

FY 2009 NSTX plasma operations
Planned: Base - 11 run weeks, ARRA - 5 run weeks (pending funding approval)
Completed: Base -10.48 run weeks with 1,611 plasma shots, ARRA - 0 run weeks

The paper "Edge-localized-mode (ELM) suppression through density-profile modification with lithium-wall coatings in the National Spherical Torus Experiment" by R. Maingi (ORNL), et al., has been accepted for publication in Physical Review Letters. The paper reports an ELM-free regime recently obtained in the National Spherical Torus Experiment, following lithium (li) evaporation onto the plasma facing components. Edge stability calculations indicate that the pre-li discharges were unstable to low-n peeling/ballooning modes, while broader pressure profiles stabilized the post-li discharges. Normalized energy confinement increased by 50% post-li, with no sign of ELMs up to the global stability limit.

Run Coordination (R. Raman , University of Washington, Deputy: E. Fredrickson)

No experimental plasma operations during this period.

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

The NSTX maintenance period concluded this week with some limited plasma operations in helium to verify system readiness to support experiments on Monday. All three neutral beam ion sources have been re-conditioned to 90keV operation after the calorimeter bellows replacements, and the vacuum conditioning of the upgraded HHFW antennas is making good progress. The recharged LITER probes are ready to support operations, as well as the first of the two lithium powder droppers. Also this past week, coil protection systems to allow the SPA's to be used to drive the Coaxial Helicity Injection absorber coils were implemented and tested, and power testing of the machine's error field coils was completed.

The NSTX Test cell will be in restricted access this coming week during plasma operations, with extended run days (to 7PM) planned for Tuesday and Thursday. Test cell access will be available each evening at the end of the run day.

Research Operations (M. Bell)

Boundary Physics Operations (H. Kugel)

• Liquid Lithium Divertor (LLD)
- A teleconference was held with SNL, PPPL, and the coating vendor to discuss LLD progress and planning.
- The first 3 of the 6 plates have been grit blasted in preparation for coating. The molybdenum coating of all 6 plates is scheduled for completion by 7/06. Delivery is scheduled for later in the week. (M. Viola)

• Lithium Powder Dropper
- Dropper_Bay-I were completed is open to the vessel and ready for operation.
- Dropper_Bay-C was installed and pumpdown is in progress (D.K. Mansfield)

• ORNL Fast Infrared Camera
- The downward viewing, Fast Camera at Bay-H-top obtained first data, and the results are being presented at the EPS Meeting this week. (J-W. Ahn, R. Maingi, ORNL)

Diagnostic Operations (R. Kaita)

• C. Domier from the University of California at Davis (UCD) visited PPPL during the past week. His primary goal was to install electronics that were developed at UCD to improve the time resolution of the Far-Infrared Tangential Interferometer and Polarimeter (FIReTIP) diagnostic for density and fluctuation measurements on NSTX.

• P. Beiersdorfer and J. Lepson from the Lawrence Livermore National Laboratory (LLNL) visited PPPL during the past week. Among the subjects they discussed with others on the NSTX team was the interpretation of the spectra from the LLNL Long-Wavelength Extreme Ultraviolet Spectrometer (LoWEUS). This was of particular interest for an experiment to determine the source of metallic impurities when lithium was evaporated onto plasma-facing components.