

NSTX Weekly Report (May 19, 2006)

FY2006 weeks of research operations

Planned: 11 weeks

Completed: 8.06 weeks

A paper was published on "Structure and Motion of Edge Turbulence in NSTX and Alcator C-Mod" [S.J. Zweben et al, Phys. Plasmas 13, 056114 (2006)]. This paper described the changes which were observed in the edge turbulence by the gas puff imaging diagnostic at the L-H mode transition in NSTX. Another manuscript "Energy confinement scaling in the low aspect ratio National Spherical Torus Experiment (NSTX)" by S. Kaye et al. was accepted for publication in Nuclear Fusion.

There will be an NSTX Physics Meeting on Monday, 5/22 at 1:30 pm in LSB318. The topics are: **XP Summaries:** XP614 – J. Menard. XP615 – S. Sabbagh, XP617 – J. Hosea, XP529/621 – R. Maingi. **Physics Presentation:** S. Kubota – Fluctuation measurements from the UCLA reflectometer. (S. Kaye)

Run Coordination (R. Raman, S. Sabbagh)

XP614: Comparison of error field correction techniques at high beta_N (May 16)– J. Menard: Good progress was made in developing a scenario in which a combination of error-field correction and feedback control considerably extended the discharge pulse length. The reference discharge, with no OHxTF correction in flat-top or sensor-based feedback, routinely disrupted around $t=0.6s$. This was used as the reference shot because it has historically exhibited edge rotation slow-down and eventual collapse. Adding feedback to this scenario at 500ms extends it by 50-100ms. Extending the OHxTF correction w/o feedback extends the reference shot by about 200ms. Extending the OHxTF correction with feedback on extends the reference shot by 400ms. Extending the OHxTF error correction with feedback, but turning off the OHxTF error correction at 800ms produces the longest pulse, suggesting late OHxTF correction may not be optimal.

XP615 Active Stabilization of the Resistive Wall Mode at Low Aspect Ratio (May 17)– S. Sabbagh: In this abbreviated run, which was delayed due to PF5 coil power supply repair, there was insufficient time to make progress.

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

NSTX plasma operations resumed this week after a one week maintenance period. Due to the annual PPPL Safety Forum, there was no plasma operation on Monday, May 15, 2006. Good progress was made on XP-614 "Comparison of error field correction techniques at high beta-N", successfully extending the pulse length through both pre-programmed and active feedback error field correction. Some run time was lost this week in addressing a power supply problem in the PF5 circuit, but progress was also made on XP-615 "Active Stabilization of the Resistive Wall

Mode at Low Aspect Ratio", XP-526 "Dependence of ELM severity and confinement on boundary shape", and XP-617 "HHFW Power Balance".

Plasma operations will continue this coming week, and the test cell will be locked-up until 5 PM each day. Access to the test cell will be available from 5PM to 9PM each evening.

Research Operations (M. Bell)

Boundary Physics Operations (H. Kugel)

- The analysis of the LITER-1B snout heater malfunction was completed. A LITER Team meeting was held to review the results, and to consider maintenance options for supporting the 2006 Experimental Campaign. The LITER-1C cartridge, well-tested off-line in the Lithium Test Facility was adopted as the candidate replacement cartridge, and the reassembly is in progress.
- Dr. J.P. Allain (ANL) presented the talk "Particle-beam Experiments on Lithium-based Surfaces at Argonne". Afterwards lithium related issues of interest to LTX and NSTX were discussed.

Plasma Diagnostic Operations (R. Kaita)

- The electrical installations for a new edge diagnostic "LADA" (Lyman-Alpha Diode Array) was completed. It consists of a ten-channel AXUV diode array that was originally used as tangential bolometer on CDX-U.
- Dial indicators were installed on the positioning mechanism for the high-k scattering turbulence diagnostic. This will make it easier to reorient the system for probing different spatial locations across the NSTX plasma.