

NSTX Weekly Report (Aug. 4, 2006)

FY 2006 NSTX plasma operations completed on June 23, 2006.

Joule Milestone: 11 weeks

Achieved: 12.66 weeks

- The paper "Observation of instability-induced current redistribution in a spherical-torus plasma" by J.E. Menard, et al. was accepted for publication by Physical Review Letters. This paper studies the effect of low-n MHD instabilities on neutral beam fast ion diffusion and non-inductive current drive. Anomalous fast ion diffusivity limited to the core of the plasma where large MHD-induced displacements are measured by the soft X-ray arrays can explain apparent neutron rate decreases and core current redistribution. The calculated current drive components, including Ohmic, were constrained by the current profile inferred from MSE constrained reconstructions. Similar MHD-induced NBICD diffusion mechanisms could play an important role for some steady-state operational scenarios proposed for ITER.
- The paper "Active Stabilization of the Resistive-Wall Mode in High-Beta, Low-Rotation Plasmas" by S.A. Sabbagh (Columbia University), et al., has appeared in Physical Review Letters (Volume 97, 045004 (2006)). The paper "Three wave interactions between fast ion modes in the National Spherical Torus Experiment" by N. Crocker (UCLA) et al., has appeared in Physical Review Letters (Volume 97, 045002 (2006)).
- R. Kaita gave a seminar on NSTX research and fusion in general in the Department of Physics and Astronomy at Calvin College in Grand Rapids, MI.
- There will be an NSTX Physics meeting on Monday, 8/7 at 1:30 pm in LSB318. During this meeting, and the meeting on Monday, 8/14, those giving IAEA presentations will present draft outlines of their presentations for group feedback and to identify areas that need further work, possibly with others help. The schedule for the discussions is: **Monday 8/7 (titles not exact)** S. Kaye – Confinement and transport, R. Raman – Transient CHI, S. Medley – Fast ion loss/redistribution. **Monday 8/14 (titles not exact)** J. Menard – Overview, A. Sontag – Active RWM stabilization, D. Gates – Steady-state operation, V. Soukhanovskii – Divertor regimes. (S. Kaye)

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

The NSTX outage continued this past week with in-vessel work in support of the installation of the new Poloidal CHERS diagnostic. Passive stabilizer plates and machine tiles have been removed from the vessel and brought to the shop to be modified for the PCHERS views. Also this week, the vacuum prep lab is refurbishing diagnostic valves, and additional power outlets have been installed in the test cell. Efforts are underway to reduce the electrical noise on the diagnostic grounding system, and to test signal processing electronics for the magnetic diagnostics system.

The test cell will remain in free (card reader) access through the coming week.

Research Operations (M. Bell)

Diagnostic Operations (R. Kaita)

- The post-run calibration has ended. Completed activities include a check of the detection system for the multipoint Thomson scattering system, field-of-view measurements for the gas puff imaging fast camera, and the optical alignment for the high-k scattering turbulence diagnostic.