

NSTX Weekly Report (April 9, 2004)

FY 2004 weeks of operation planned: - 18 weeks, Completed: - 7.3 weeks

Department, Project, Program (M. Ono, M. Peng, M. Williams, E. Synakowski)

- Deyong Liu, a PhD student from the University of California, Irvine, arrive at NSTX on April 7, 2004 to start work on a dissertation project. Doug Darrow is his host at PPPL, and William Heidbrink (Prof. UC Irvine) is his dissertation advisor. Deyong's thesis work will include measuring and modeling the influence of MHD activity and HHFW on energetic ions in NSTX. Deyong's visit to PPPL is anticipated to continue for about 2 years. (D. Darrow)
- No NSTX Physics meeting on Monday, April 12.

Run Coordination (S. Kaye, J. Menard)

On Monday, experiment (XP-432) on long pulse single null plasmas using PF1b to control triangularity was conducted. $I_p = 800\text{kA}$ long-pulse lower-single-null (LSN) discharges with higher triangularity were developed by using the PF1B coil during normal plasma operations for the first time. This allowed the lower triangularity to be increased to 0.6-0.7. The plasma elongation was also increased to 2.2 for durations exceeding 600ms. The higher elongation delayed and reduced deleterious MHD present at lower elongation, and allowed the plasma current to be maintained until nearly $t=900\text{ms}$. This discharge pulse length had only previously been achieved at higher $TF=5\text{kG}$ and higher beam voltage. (J. Menard)

Operations resumed after fixing water leaks and computer problems, with double null H-mode plasmas produced in preparation for next week's experiments.

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

- NSTX plasma operations continued this past week with investigations on long pulse single null plasmas using PF1b for the first time to control triangularity (XP-432). The run was interrupted mid-week by a water leak at a fitting on the OH bus, which required dismantling of adjacent buswork and cooling systems to access and repair. The run resumed on Friday with the start of experiments on long-pulse double null plasmas (XP-402). Time was spent this week conditioning the neutral beam ion sources, and all three sources are now operating at 90keV.

Access to the NSTX test cell will be restricted during plasma operations this week. Test cell access will be available from 5:00PM to 10:00PM each evening, except for Tuesday, April 13th, when plasma operations will be extended to 9:00PM. The next maintenance week is scheduled for May 3rd-7th. (A. von Halle)

Research Operations (M. Bell)

Boundary Physics Operations (H. Kugel)

- Today (Friday, 4/9/04), a novel real-time surface particle detector obtained its first results from NSTX. Clear signals of particles landing on the detector at Bay C bottom were detected at a time about 10-20 ms after reconnection events in the current rampdown. This is the first time-resolved detection of surface particles in tokamaks. Recent modeling by S. Krasheninnikov has shown dust particles can be accelerated in the electric and magnetic fields and be an important mechanism of core plasma contamination by impurities. For next-step devices such as ITER, the in-vessel dust inventory will be strictly regulated for safety reasons, however diagnostics to measure dust are lacking. This detector is the first to provide time resolved information and will be used to identify the tokamak events leading to dust generation. (C. H. Skinner)
- Results from SNL accelerator-based measurements of sample coupons were received from W.R.Wampler. (C.H. Skinner)
- The UCSD Team performed maintenance on the Fast Probe, and then used the Probe to perform test measurements of edge plasma. (J.Boedo, UCSD)
- Scoping studies of a supersonic gas injector nozzle were initiated on a test stand using a scanning pressure transducer in preparation for plume characterization measurements. (V.Soukhanovskii, LLNL)

Diagnostic Operation (R. Kaita)

- W. A. Peebles from UCLA visited PPPL during the past week. He and S. Kubota reinstalled the 1 mm interferometer on the mid-plane of NSTX. This instrument will be one of the diagnostics used in the experimental proposal to measure core

turbulence that Peebles presented for review this week.

- The Johns Hopkins University "optical" X-ray array, so named because of the fiber optic coupling between the scintillator X-ray convertor and the detectors, was installed during the past week. Testing with plasmas is in progress.