NSTX Weekly Report (March 16, 2012)

NSTX is in the Upgrade Project outage in FY 2012

The paper "A real-time velocity diagnostic for NSTX" by M. Podestà and R. E. Bell (PPPL) has been published in Rev. Sci. Instrum. 83, 033503 (2012).   The paper describes the design criteria and implementation of a new charge-exchange recombination spectroscopy system for fast measurements of toroidal rotation on NSTX. The diagnostic can measure at up to four radial locations with maximum sampling rate of 5 kHz. The system is interfaced in real time with the NSTX plasma control system, in order to feed back on plasma velocity by means of actuators such as neutral beams and external coils. Examples from the initial tests of the system during neon glows are also discussed in the paper. (M. Podestà)

Stefan Gerhardt (PPPL) presented a talk titled 'Physics Based Disruption Detection in NSTX' at the BPO disruption mitigation workshop in San Diego, March 12-13..   This talk showed the thresholds for various signals beyond which disruptions become more likely.   It also showed how a disruption predictor based on simple combinations of these threshold tests can predict nearly all NSTX flat-top disruptions with at least 10 ms warning time.   Roger Raman (University of Washington) presented a talk titled 'Disruption Mitigation Plans on NSTX'.   This talk described the planned NSTX-U studies that would study the poloidal variation of Massive Gas Injection (MGI) experiments on NSTX-U. It mentioned work in progress, which plans to improve the MGI system for NSTX-U through DEGAS-2 modeling work being conducted by D. Stotler and T. Abrams.   The talk then described a new disruption mitigation system that could be tested on NSTX-U.   It has the advantages of rapid delivery of a large inventory of macro-particles at high velocity and with good reliability which is required for ITER. (S. Gerhardt, R. Raman)

Tom Osborne (GA) visited PPPL this week to continue work on the Python analysis tools used for edge profile and stability analysis. Work also continued on a collaboratove paper comparing Lithium ELM elimination with RMP ELM suppression. (R. Maingi, ORNL)

Vlad Soukhanovskii (LLNL) visited General Atomics (GA) from 5 to 9 March. While at GA, V. Soukhanovskii had detailed discussions with DIII-D scientists on a variety of Boundary Physics and Diagnostics topics for collaboration between DIII-D and NSTX-U, including radiative divertor control, H-mode density control with cryopumps, divertor Thomson scattering measurements, and near-infrared divertor spectroscopy.   He also discussed details of a snowflake divertor experiment that he had proposed in collaboration with Dmitri Ryutov (LLNL) and Egemen Kolemen (PPPL). At the DIII-D Science Meeting on Friday, 9 March, D. Ryutov gave a talk on the snowflake divertor theory developments, V. Soukhanovskii gave an overview of NSTX snowflake divertor experiments and plans for NSTX-U, and E. Kolemen summarized his work on the snowflake configuration control development at DIII-D. A design review for addressing the feasibility of DIII-D testing of snowflake divertor configurations will be scheduled in the near future. (V. Soukhanovskii)

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

NSTX Upgrade construction activities continued this week with the measuring arm in the vessel to complete metrology needed to install the new neutral beam armor brackets. Outside the

vessel, preparations to remove the first outer TF coil section (TF#7) have started, and the removals of TF turnbuckles and clevis pads are in progress. The welding of additional support on the vacuum vessel ribs has been completed on the lower dome, and two bays have been completed on the upper. New pads have been welded onto the base of the neutral beam-line that will eventually be moved into the NSTX test cell, and weld repairs to the liquid nitrogen manifold on that beam-line have been completed. Fabrication of the new liquid nitrogen supply and return cryogenic lines   is in progress.

Access to the NSTX test cell will be available only through previous arrangement with the Upgrade Work Control Center.