NSTX-U Weekly Report (March 18, 2016)

FY 2016 NSTX plasma operations
Operation Targets: Total - TBD
Completed: 4.81 run week and 482 plasma shots

Ahmed Diallo and Ben LeBlanc of PPPL visited Physical Science Laboratory during the week of Mach 13 in Madison to participate in the integration of the pulse-burst laser system and the custom power supplies. This is part of Diallo's Early Career Research Program Award. During this week, the alignment and testing of the oscillator were performed. Parameter scans (flash-lamps voltages and timings) were performed to evaluate the optimum settings for maximum output pulse energy at the oscillator. These tests were successfully performed for 30 Hz. An initial test was successfully done at 1 kHz (with only a subset of the pulses). So far, the results are encouraging with energy per pulse of about 0.6 J before the amplifier stage. These tests will be extended to 10 kHz at the output of the oscillator. Subsequently, the output beam from the oscillator will be fed to the amplifier and final characterization of the near- and far-field beams will be performed in preparation for its commissioning on NSTX-U. (A. Diallo)

J.-K. Park (PPPL) presented a talk "Self-consistent NTV with force balance and systematic NTV optimization in Tokamaks" in US-Japan MHD workshop, which was jointly held with ITPA MHD meeting in NIFS, Japan. The talk introduced a new formulation and method adopted in general perturbed equilibrium code (GPEC) and summarized the very recent applications to NSTX-U and KSTAR for NTV and coil optimization. GPEC can also be applied to stellarators and incoporate neoclassical transport codes in stellarators, as additionally discussed with LHD collaborators. In ITPA MHD, M. Lanctot (GA) and J.-K. Park reported and concluded WG9 activities "Requirements for n=2 error field control". As WG9 shows that error field tolerance for n=2 is likely comparable to n=1, with similar physics basis, a new joint experiment for n=2 error field is under consideration since it will be important to understand and quantify n=2 error field threshold for ITER. For another joint experiment, MDC-19 "error field control at low rotation", N. Logan and J.-K. Park have been actively involved in plasma response modeling for DIII-D, EAST, KSTAR, RFX-mod, as reported by M. Lanctot (GA). (J-K. Park)

Experimental Research Operations (S. Gerhardt, R. Kaita, R. Ellis)

Significant progress was made on the mechanical and electrical installations of the LLNL EUV spectrometer suite. The vacuum manifold for the UV spectrometers was installed and leak checked. The system is being pumped down in preparation for operations. Initial data is expected to be collected during the next operations period.

Significant progress was made on the mechanical and electrical installations of the Granule Injector. The Granule Injector chamber is installed and under vacuum, and mechanical/electrical installations continue. The injector itself was installed on the machine, and conduit and cable runs were completed.

The repair and recalibration of the Synthetic Aperture Microwave Imaging (SAMI) diagnostic (University of York) was completed.

Installation of the new the Argon Dump System (APS) needed for future lithium operations has

been completed and has been reviewed by the PPPL Activities Certification Committee (ACC). The APS was operated manually for the recent argon vent to remove the BN pieces.

A complete fit-up of the Massive Gas Injector (MGI) assembly at bay I mid plane was performed. Proper fit of all components was confirmed, and mounting holes for the valve stand were drilled in the platform. A trial fit of the lower MGI assembly was performed. All of the components will fit as planned, and a fixture for precise location of the assembly and its mounting studs is being developed. Both valves will be assembled to their insulators and spool pipes this week, and hi-potted and leak checked in preparation for final installation.

Engineering Operations (A. von Halle, P. Titus)

NSTX-U has completed a two-week maintenance period, and will resume plasma operations during the week of March 21st. During the last week of this maintenance period, repairs of the neutral beam (NB) 2A and 2C transmission lines were completed, and the NB2B autotransformer was replaced with a spare unit. All six of the NB ion sources are expected to resume conditioning and injection operations this coming week. Detailed inspections of the Motor Generator #1 rotor weld repairs made during the NSTX-U Upgrade Project were performed and found that all 21 locations are good after 73 start/stop cycles and 1893 hours of operation. Repairs and upgrades to the Gas Injections Systems have been completed, and all injectors have been calibrated. Upgrades to the lower TF water fittings have been completed, and all water systems are operational. Good progress was made on the fast voltage measuring system needed for CHI operations, and new cameras/fiberoptics. A vacuum vessel boronization was performed on Sunday, March 20th.

The NSTX-U Test Cell will be in restricted access this coming week during plasma operations. Access will be available in the evenings for approved work.