

NSTX-U Weekly Report (Dec. 7, 2012)

NSTX-U is in the Upgrade Project outage in FY 2013

Doug Darrow (PPPL) attended the 22nd International Toki Conference on "Cross-Validation of Experiment and Modeling for Fusion and Astrophysical Plasmas," held in Toki City, Japan, November 19-22, 2012. He gave a talk entitled "Comparison of measurement and modeling of stochastic loss of neutral beam ions during TAE avalanches in NSTX." The talk described both the measurement of the pitch angle distribution of lost neutral beam ions during a TAE avalanche and the results of modeling that loss with the ORBIT code, including the measured TAE mode structures. Fair agreement was found between the model and measurement. Also described briefly was the methodology for assessing whether the modes had generated stochasticity within a chosen segment of the particle orbit phase space. The talk was received with interest. While in Toki, Dr. Darrow also held discussions with Drs. M. Isobe and K. Ogawa regarding possible neutron, fusion product, and fast ion measurements for Large Helical Device plasmas in a prospective deuterium campaign. Finally, Dr. Darrow discussed with Prof. Satoshi Yamamoto and co-workers at the University of Kyoto details of methods to measure neutral beam ion loss from Heliotron-J plasmas. (D. Darrow)

Joon-Wook Ahn (ORNL) visited KSTAR to run experiment on small ELMs. Several small ELM regimes have been identified previously on other machines but they typically occur in narrow operating window, e.g. strict DN configuration and high density (Greenwald fraction higher than 0.7) for type-II ELMs. However, small ELMs at KSTAR occurred in significantly wider operating window; various magnetic configurations (DN, USN, LSN, and limited) and much lower density (Greenwald fraction less than 0.4). Three shape parameters are at the moment under investigation; inner separatrix shape, squareness, and drsep. Straight (or even concave) inner separatrix and higher squareness are thought to be beneficial for accessing small ELM regime and experimental data showed a consistent behavior at KSTAR. This has a potential of the access to the small ELM regime with good confinement and wide operating window. (J-W Ahn)

On December 5, Jon Menard (PPPL) visited the MIT Plasma Science and Fusion Center (PSFC) and presented a seminar entitled "Progress and Plans for NSTX Upgrade". J. Menard also participated in discussions with PSFC leaders regarding possible opportunities for collaboration between the PSFC and NSTX/PPPL groups (J. Menard).

On Dec. 3, Masayuki Ono (PPPL) visited the Gamma-10 group at Tsukuba University. M. Ono and Prof. Imai discussed a joint cooperative agreement between PPPL and the GAMMA-10 group. He also talked about the 28 GHz MW-class gyrotron development. He then visited National Institute for Fusion Science, Gifu, Japan on Dec. 4 and 5 and participated in the long-pulse RF experiment being conducted on Large Helical Device (LHD) and he discussed the collaboration plan for the liquid lithium divertor R&D with Prof. Hirooka. (M. Ono)

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

NSTX Upgrade construction activities continued with the completion of the final cuts of the vessel at Bays J-K in preparation for the installation of the new port for the 2nd neutral beam (NB2). Weld prep for the new Bay J-K cap flange is in progress, and the cap itself is complete

and ready to install. All of the upper umbrella legs have now been installed, and the bake-out piping is being replaced on the upper dome. Lower umbrella legs are now being welded in place. Electrical contractors have begun installing power cabling in the field coil power conversion building for the NSTX-U TF magnet configuration. Brazing of water lines on the ion dump, calorimeter and 90" flange for NB2 has been completed. Hydrostatic testing of these components is next.

Preparations of non-upgrade equipment for plasma operations in the NSTX-U configuration also continued with the ongoing fabrication of the new field coil power conversion system firing generators.

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