NSTX-U Weekly Report (March 20, 2015)

NSTX-U is in the Upgrade Project outage in FY 2014

W.X. Wang (PPPL) attended the 7th IAEA topical meeting on the theory of plasma instabilities (March 4 -6, Frascati, Italy), and presented an invited talk on "Distinct turbulence sources and confinement feature in spherical tokamak plasma regime". Two important turbulence sources newly found in ST regime through gyrokinetic simulations of NSTX experiments are drift wave Kelvin-Helmholtz (K-H) instability and collisional trapped electron mode (collisional-TEM). The topic discussed in the talk includes: how K-H mode and collisional-TEM are identified; what are their linear and nonlinear features; what roles they play in driving plasma transport for NSTX/U, namely, whether they drive experimentally relevant transport, and how they possibly contribute to transport scaling observed in STs. An interesting prediction of existence for a minimum plasma transport in advanced ST collisionality regime, and future experimental identification of K-H and collisional-TEM are also discussed. (S. Kaye, PPPL)

Ryo Yasuhara from LHD in Japan visited PPPL from March 18 through March 20 2015. During his visit, he met with Ben LeBlanc and Ahmed Diallo of PPPL to discuss potential collaboration projects on the NSTX-U Thomson scattering system. Yasahura is planning an extended visit at PPPL to collaborate with NSTX-U in the Thomson scattering group. Yasahura and Diallo started developing the specifications for a prototype edge polychrometer for the Thomson system. (A. Diallo)

R. Kaita (PPPL) gave a colloquium lecture on fusion energy to science and engineering faculty and STEM (Science, Technology, Engineering, and Mathematics) students at Union University in Jackson, TN on March 19, 2015. It included a discussion of the role of the spherical torus concept and NSTX in particular in the development of magnetic confinement fusion. He also taught a class on the nuclear physics of nuclear fusion. (R. Kaita)

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

NSTX Upgrade activities continued with the completion of TF installations in both the upper and lower umbrellas, and the ongoing installation of TF lead supports. The upper and lower umbrella lids have been fit-up, and will be installed by early next week.

The Digital Coil Protection System (DCPS) and the Power Supply Real Time Control (PSRTC) are complete and supporting Field Coil Power Conversion (FCPC) System dummy load testing. The crossover of data connections to integrate the integrated FCC and Junction Area DCPS's have been made, and combined, parallel DCPS pre-operational testing has been successfully performed.

Preparations for plasma operations in the NSTX-U configuration also continued with dummy load testing of the FCPC power supplies utilizing PSRTC, DCPS, and the new rectifier firing generators. During a break in dummy load testing to complete integrated FCC/JA DCPS commissioning, the FCPC group successfully addressed issues identified during the first round of dummy load testing, and recommissioned the TF fiberoptic based DC current feedback system. Rectifier dummy load testing has resumed using the integrated redundant DCPS's. Welding and vacuum leak checking of the coaxial lines for the deuterated

trimethylboron (dTMB) system has been completed up the the NSTX-U vacuum vessel. NSTX-U Coil water systems will be run this coming week to perform flow switch calibrations, and to polish the de-ionized water.

Access to the NSTX test cell will be available only through Work Permits approved by the D-Site Shift Supervisors.