NSTX-U Weekly Report (December 23, 2015)

FY 2016 NSTX plasma operations
Operation Targets: Total - TBD
Completed: 0.51 run week and 51 plasma shots

Run Coordination (J. Menard, S. Gerhardt)

NSTX-U plasma operations continued with four experimental machine proposals (XMPs) were successfully carried out. Net results of these efforts were dramatic improvements in the plasma performance. Inner wall limited L-mode discharges were achieved at B_T=0.65 T with an Ip flat-top of 700 kA for ~200 ms [discharge # 202440], and in a separate discharge, an Ip flat-top of 600 kA for ~320 ms [discharge # 202430]. These development activities will be continued following the vessel boronization presently planned for January 4th. (S. Gerhardt, PPPL)

XMP-106 [Magnetic Callibrations] was run on Monday, Dec. 21 to obtain magnetics calibrations shots for the latest magnetic sensor configuration. All available NSTX-U coil systems were pulsed independently at full current over the course of four shots. A fifth shot was taken with combined ohmic and toroidal field coil currents in order to assess the interaction between the two coil systems. (C. Myers, PPPL)

This was followed by further execution of XMP-101 [Breakdown Scenario Development,]. The shots focused on improving the null condition and the poloidal field ramp following breakdown. The XMP concluded with a start up scenario achieving a plasma current of 150 kA by 20 ms using less than 4 loop volts. (Battaglia, PPPL)

XMP-126 [I_p and R Control,] was run at the very end of December 21st, and on the morning of December 22nd. Plasma current feedback was successfully turned on, allowing the plasma current to be ramped and held constant at a fixed value. Major radius control was also implemented, and a first optimization of the associated control gains was made. (D. Mueller, PPPL)

XMP-105 [Vertical Position Control Checkout] was started at the end of Dec. 22nd. The plasma vertical position was successfully controlled using a reduced set of position sensors. (M.D. Boyer, PPPL)

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

NSTX-U Plasma operations continued this past week per experimental machine proposals (XMP's) to optimize plasma performance and close plasma control system (PCS) feedback loops. Significant progress was made this week in extending the plasma current flat-top, and achieving levels approaching 800kA. Also successfully achieved PCS feedback control of the vessel pressure pre-fill, plasma current, and radial/vertical plasma position. The Multipulse Thompson Scattering (MPTS) laser-beam delivery optics were successfully tested during plasma operations. Preparations are being made for the first vacuum vessel boronization using the new deuterated trimethylboron (dTMB) injection system on Monday January 4, 2016.

Neutral Beam Maintenance activities are planned in the NSTX-U Test Cell over the holiday break.