

## NSTX-U Weekly Report (May 20, 2016)

### **FY 2016 NSTX plasma operations**

**Operation Targets: Total – 18 run weeks**

**Completed: 8.95 run weeks and 940 plasma shots**

U.S. Department of Energy Secretary Ernest Moniz dedicated the NSTX-U facility on Friday, May 20, 2016. Secretary Moniz, U.S. Sen. Cory Booker (D-NJ), and U.S. Rep. Bonnie Watson Coleman (D-12) toured the NSTX-U facility and visited the NSTX-U control room to learn about the NSTX-U performance and research goals for the coming decade. Secretary Moniz unveiled a plaque dedicated to the workers who have made NSTX-U a reality and will keep it operational. Additional information about the dedication ceremony can be found at the following URLs:

<http://www.pppl.gov/news/2016/05/energy-secretary-moniz-launches-nation%E2%80%99s-newest-fusion-experiment-pppl>

and

[http://www.nj.com/mercer/index.ssf/2016/05/us\\_secretary\\_of\\_energy\\_dedicates\\_94\\_million\\_upg\\_rad.html](http://www.nj.com/mercer/index.ssf/2016/05/us_secretary_of_energy_dedicates_94_million_upg_rad.html)

(J. Menard, PPPL)

Dr. Mark Henderson, from the ITER Organization, visited PPPL on May 17-18 to work with Francesca Poli (PPPL) on EC power management in ITER. Henderson was accompanied by Mila Aung-Thwin and Van Roiko from EyeSteelFilm, who are working on the preparation of a documentary on fusion. During the visit, Henderson gave a Colloquium on the design and performance of the EC system and has been given a tour of NSTX-U, guided by M. Podesta' (PPPL). (F. Poli)

During the NSTX-U celebration event, Francesca Poli (PPPL) was interviewed by Jeanette Beebe, journalist for WHYY. The interview has been aired on WHYY (90.9 FM) on Monday morning, May 23, as part of the newscast (Morning Edition), and re-played a few times in the morning. The web story has been posted on [Newsworks.org](http://Newsworks.org). (F. Poli)

### **Run Coordination (J. Menard, S. Gerhardt)**

On May 20, 2016, five shots were taken towards XMP-154, aiming to demonstrate feedback control of the inner gap between the plasma and the center stack. Since the currently active shaping coils have all already been associated with feedback control of other shaping parameters (x-point locations, outer gap, squareness), PCS code changes were added to enable modification of the inner gap by adjusting the target for the other shaping parameters in real-time based on the error in the measured inner gap. The shots taken successfully demonstrate real-time modification of the target points and, as a result, tracking of the operator programmed inner gap request. Additional shots will be taken to fine-tune feedback gains and to use the new capability to actively control the time of diverting and actively limit the plasma later in a shot. (D. Boyer, PPPL)

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

NSTX-U plasma operations resumed late this past week after time was taken to investigate a

resistive electrical leakage path between the inner and outer vacuum vessel segments. Plasma Control System (PCS) updates to add real-time neutral beam power and voltage calibrated inputs and MGI triggering functions were completed and tested. All six neutral beam ion sources continued conditioning operations as test cell access allowed. The IRV Bolometer has been mounted on the NSTX-U vacuum vessel and is under vacuum awaiting electrical installations and commissioning tests. Working on an aggressive schedule to commission the lithium evaporator (LITER) probes. The probes will be lifted into place on NSTX-U on Saturday to be baked and then prepared for pre-operational testing. Off line testing of the LITER position controller is making good progress.

On May 20, the plasma operation was stopped after some unexpected motion was observed at the top in the Bay G-H area, which is where the water cooled flex buss cross the top of the machine to feed various coils. Upon closer inspection, the PF-1A flags (located outside the umbrella) that connect the flex bus to the rigid bus were bent; one up and one down due to the flex bus movement. Other than the flag, the rigid bus that traverses the umbrella and connects to the PF 1A coil has not been further affected. Thorough inspections including similar configurations in other locations on the machine are being performed. If no additional impacts are discovered, then a relatively straightforward solution of additional bracing for the flex bus will be implemented after all proper procedural requirements are met.

The NSTX-U Test cell will be in restricted access this coming week during plasma operations. Limited access is expected to be available for approved work on second shift.