NSTX-U Weekly Report (October 18, 2013)

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

Steve Sabbagh (Columbia University) made two remote presentations to the ITPA MHD Stability group meeting (Oct 8th – 11th, 2013), held in Hefei, China. The talk "ITPA MDC-2 Joint Research: benchmarking RWM stability physics between codes, and experiments" summarized the completion of a significant kinetic RWM stability code benchmarking effort (e.g. MARS-K, MISK), and the talk "MDC-21 (proposal) Global mode stabilization physics and control for disruption prediction and avoidance" summarized approaches and goals for this new joint research effort which will be proposed to the ITPA coordinating committee at the end of the year. (S.A. Sabbagh)

Charles Skinner (PPPL) has completed a two-week collaboration visit on surface dust detection on Large Helical Device (LHD) at National Institute for Fusion Science (NIFS), Toki, Japan with Dr. Ashikawa of NIFS as the host. An electrostatic dust detector, originally developed for NSTX, was installed at LHD lower port 3.5 and first exposed to plasmas on 10/16/13. Tests confirmed the detector was working normally and preliminary results showed the first dust signals from LHD. The dust levels on LHD so far appear to be low - of order ~ng/cm2/discharge and dust signals are detected only on some discharges. Further experiments are in progress. He also presented a talk entitled *"Lithium / plasma interactions and dust detection in magnetic fusion devices."* (C. Skinner)

Vlad Soukhanovskii (LLNL) visited General Atomics Oct. 7 - Oct. 11, 2013 to participate in the DIII-D National Fusion Science Campaign experiments, as the leader of the snowflake divertor experiment, a part of the Heat Flux Mitigation Campaign. The experiment was developed and executed by a National Team comprised of researchers from LLNL, PPPL, General Atomics, UCSD, SNL, and MIT. Magnetic feedback control and scenario development of snowflake configurations, key to the success of these experiments, were developed by PPPL, General Atomics and LLNL researchers led by Egemen Kolemen (PPPL). On Tuesday, Oct. 8, an experiment aimed at combining the snowflake divertor solution with the advanced tokamak discharge scenario was carried out. Stable high performance ($\beta N = 3$, $H98y2 = 1.4$) Snowflake divertor plasmas were developed in a near-double null (DN) configuration, which had two poloidal field nulls in one divertor and one null in the other. Advanced tokamak discharges with the snowflake divertor maintained high confinement and βN under radiating divertor conditions with neon seeding, and produced further reductions in both ELM and between-ELM divertor heat fluxes, particularly at the inner divertor target (centerpost). On Friday, Oct. 11, an experiment aimed at the exact snowflake configurations studies and testing the theory of the fast convective plasma redistribution in the snowflake region was executed. The latter part took advantage of the divertor Thomson scattering system, a unique DIII-D diagnostic capability. Pedestal characteristics, power balance in the inner and outer divertor between and during ELMs, as well as divertor radiation distribution and detachment were studied at several upstream densities using deuterium and neon seeding. While at General Atomics, Vlad Soukhanovskii discussed with DIII-D researchers possibilities for prototyping of radiative divertor control diagnostics at DIII-D, and divertor Thomson scattering system design and operation, both potentially significant research efforts for NSTX Upgrade. (V. Souhkanovskii)

Joon-Wook Ahn (ORNL) visited GA, Oct 14 – 18, 2013, to conduct experiment in the DIII-D

National Campaign, “Effect of 3-D fields on detached/radiative divertor plasma”. The experiment was carried out in a standard LSN type-I ELMy H-mode. Divertor detachment was reliably obtained by gas puffing, to which n=3 fields were applied to investigate their impacts. It turned out that odd parity was more effective in causing response from the plasma. Ip was also varied to check the impact of q95 on the plasma response. Conditions for detachment and re-attachment are being analyzed. (J-W. Ahn)

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

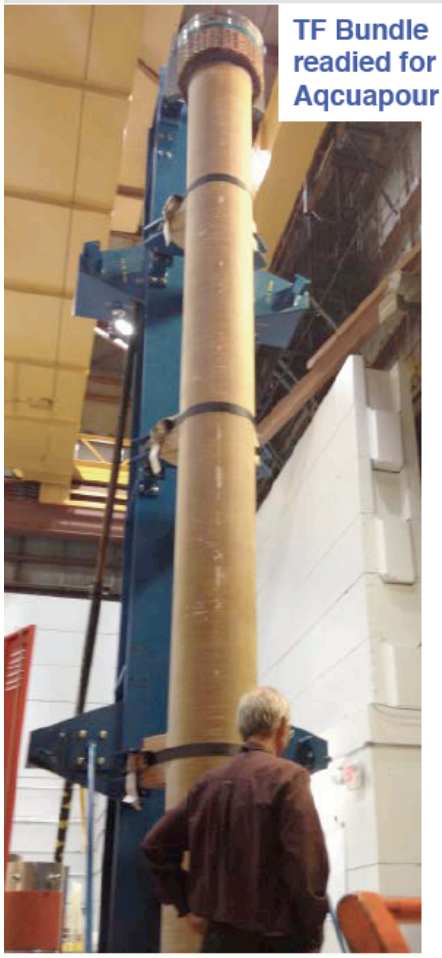
NSTX Upgrade construction activities continued with the lift of the TF bundle into the vertical position for the application of the Aquapour base for OH winding. Interface pieces are being installed on the TF bundle, and the Aquapour is expected to be applied this coming week. The OH winder assembly has been aligned and leveled, and is now being anchored to the coil winding facility floor. (See the attached pictures.) In the NSTX-U test cell, a contractor has finished the installation of the NB2 ion dump and ion source cooling water piping, and hydrostatic testing has been successfully completed.

Preparations of non-upgrade equipment for plasma operations in the NSTX-U configuration also continued with the ongoing commissioning of the 34 new firing generators for the Field Coil Power System (FCPC) rectifiers. More than half of the new firing generators have now been installed in rectifiers, and all rectifiers are expected to be complete with new firing generators and fiberoptic control/communication links by the end of November.

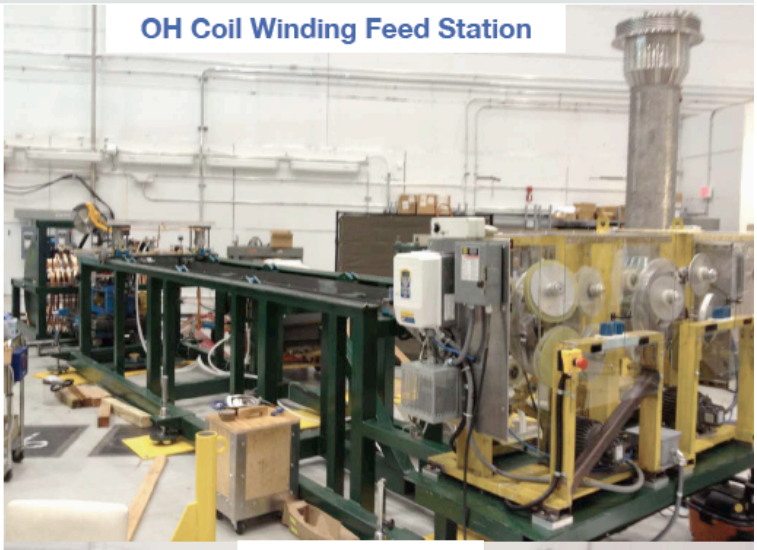
Access to the NSTX test cell will be available only through previous arrangement with the Upgrade Work Control Center.

OH Winding is the Next Step!

TF Bundle readied for Aqcuapour



OH Coil Winding Feed Station



Turning Station