

NSTX Weekly Report (March 9, 2012)

NSTX is in the Upgrade Project outage in FY 2012

A Theory and Computation Brainstorming session was held on March 2 and 4 to present ideas that will form part of the basis for the FY2014-2018 Five Year plan for NSTX-U. Members of the NSTX-U experimental research team described their needed capabilities from existing or new theory and simulation to support analysis of NSTX data and development of NSTX-U research goals. Also, ideas and presentations from the NSTX-U and PPPL theory and simulation communities described what new experiments and/or measurements are needed to better support the development or interpretation of theory and simulation. Over 40 presentations were made. The ideas presented will be categorized, and smaller groups consisting of both theorists and experimentalists will be formed to prioritize the ideas in specific areas and develop a phased approach towards achieving their goals. (S. Kaye, PPPL)

The paper "Measurements of core lithium concentration in a Li-conditioned tokamak with carbon walls" by M. Podestà (PPPL) et al. has been published online in Nuclear Fusion [Nucl. Fusion 52 (2012) 033008]. The paper summarizes core lithium concentration measurements performed on NSTX throughout the 2010 experimental campaign. A broad range of experimental conditions has been investigated, including scans of plasma current and toroidal field. It is shown that lithium does not accumulate in significant amounts inside the plasma, resulting in an upper bound for the measured lithium concentration that is well below 0.1% of the electron density. Carbon, which constitutes the primary material of the NSTX inner wall, remains the dominant plasma impurity even after large amounts of lithium, of the order of hundreds of milligrams, are evaporated into the vacuum vessel. The paper can be found online at <http://stacks.iop.org/0029-5515/52/033008>. (M. Podestà)

Several presentations were made by NSTX researchers at the 2012 Joint Meeting of the US-Japan MHD Workshop and ITPA MHD Stability / Energetic Particle Topical Group, held at NIFS in Toki, Japan, 3-9 March. These included: "3D equilibrium reconstruction" by S. Lazerson (PPPL), "The relation of kinetic energy principle and neoclassical toroidal viscosity in tokamaks" by J.-K. Park (PPPL), "ITPA MDC-2 Joint research: benchmarking RWM stability physics (update)" by S. Sabbagh (Columbia University) and "Update of NSTX disruption studies" by J.-K. Park. (S. Sabbagh)

R. Maingi (ORNL) visited KSTAR and presented two seminars: one on divertor heat flux scaling and projections to NSTX-U; and the second on small ELM physics, and the effect of lithium on edge stability and transport. Future collaborative experiments were also discussed. (R. Maingi)

Dr. Saskia Mordijk of the College of William and Mary visited PPPL on March 8 and 9, 2012. She gave a seminar entitled Experimental Changes in Particle Transport from Resonant Magnetic Perturbations (RMPs) in DIII-D, and she had additional discussions with approximately 10 NSTX physicists regarding possible collaboration on particle transport analysis in NSTX. (S. Kaye)

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

NSTX Upgrade construction activities continued this week with the installation of in-vessel

graphite tiles in place of the Liquid lithium Divertor (LLD), and the removal of the passive plates for modifications needed to withstand increased forces expected in the upgrade configuration. With the passive plates out we will also be able to inspect and maintain in-vessel magnetic flux loops. The procedure for installing needed hardware for the new neutral beam armor has been approved, and that work is scheduled to start next week. Good progress continues to be made on the ongoing welding of additional support for the upper and lower vacuum vessel support ribs. Contractors have completed HVAC ductwork modifications in the TFTR Test Cell needed for the eventual moving of the second neutral beam-line into the NSTX test cell. Also this week, a detailed engineering status review of the NSTX-U Project was held.

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