

Toakamak Session (Aug. 12, 2011)

H. Kugel [NSTX liquid lithium divertor \(LLD\) results](#): recalled the development of the LLD, it operated successfully demonstrated with strike point on lithium-filled surface. Its effect on plasma performance did not clearly differ from evaporative lithium coatings. Issues of lithium vacuum chemistry need investigation for both analysis of the static liquid lithium results, and the design of flowing liquid lithium system for NSTX-U.

R. Maingi [The continuous improvement of H-mode discharge performance with progressively increasing lithium evaporation in NSTX](#), in the areas of disappearing ELMs, reduced Te and Pe profile peaking factor, increase global and electron τ_e . Improvements possibly caused by Li intercalating into bulk graphite, highly asymmetric Li evaporation, Li pumping complex, and E-fields and increase on ion impact energy, thus increase implantation depth.

R. Majeski (PPPL) [Summary of LTX results](#), Began operation with Li wall in Oct.2010, with increased Ip and plasma duration. Observed rapid passivation of 300 C Li films, with possible impurity surface segregation. Unexpected shell motion partly fixed. New Li getter pumps enhanced pumping. LTX is under vacuum and will restart soon.

G. Wright (MIT) [PFC activities in Alcator C-Mod & PSI Science Center W nano-filament grown in the C-Mod divertor](#). Reported in 3 areas: 1. I-mode provides L-mode-like particle transport with H-mode-like energy confinement. 2. Heat flux $I_q \sim 1/I_p$, 3. Tungsten fuzz has been grown in the C-Mod lower divertor.

C. Wong [Status of DIII-D boundary experiments including Si-W surface material development](#), noted boundary plasma as a challenge when extended from ITER to DEMO, also confirmed $\lambda_q \propto 1/I_p$, additional divertor physics understanding will be needed. On Si-W material development, showed improvement in Si filling in W-slots. But W-damage seemed to be occurring during the filling process. Buttons were exposed to piggyback near disruption.

D. Rudakov [Overview of recent and upcoming DiMES and MiMES experiments in DIII-D](#) Showed recent Mo button exposure under L-mode discharge, gross erosion could be measured by Mo light. Also reported on dust studies, mirror studies showed deterioration of mirrors from O-bake, and advanced duct geometry for mirror protection.

W. Wampler [Measurements of erosion and deposition in DIII-D and EAST tokamaks](#) Reported on the new Sandia Ion Beam Laboratory, concern on the SS erosion and reposition in ITER. ^{13}C injection experiment showed high deposition at 2nd OSP, O-bake experiment showed 50% removal of D. He also described the DiMES Mo erosion experiment and the EAST erosion experiment with 1 μm carbon film removed by 37100 s exposure.

D. Rudakov [Role of arcing in PFC erosion and dust production in DIII-D DiMES](#) showed that arcing is a relatively small contributor to overall carbon erosion in DIII-D, but it could be a notable contributor to dust production. Dust release by plasma-wall contact is observed, but the role of arcing is yet to be quantified. Tungsten is affected by arcing more than carbon, vanadium and Be.

D. Donovan [Experimental Studies of the Sheath Power Transmission Factor in the DIII-D Tokamak](#). He showed the probe in DIII-D to measure T_e , V_f , and n_p . Three probes can be used to determine the reliability of measurements on the standard domed probes. Direct measurement of the plasma potential can be done.

Tokamak: Needs and Gaps

- **Improve coupling between the boundary physics and PMI:**
Worry about heat flux width $l_q \sim 1/l_p$,
Needs to quantify impacts from radiative divertor for FNSF and DEMO
- **Enhance SOL Modeling support:** To move closer to predictive capability
- **In addition to the divertor PFC design, needs increase attention to chamber PFC:** Heat flux distribution to FW including convective and radial transports, and corresponding FW-PFC design, including heat removal and impacts to power conversion & TBR

Question: Should we begin to identify the PFC issues for FNSF ?
e.g. one for solid wall and one for liquid surface wall