

## Session 3: Tokamak Experiments Summary

### 1. Erosion/redeposition experiments on DIII-D and EAST

**Bill Wampler** reported on the three DiMES Mo erosion experiments and focused on the result from Aug. 2011 with net erosion on the Mo coating and deposition outside of the coating and derived that the net/gross is 0.55. He also showed the on going erosion experiment with EAST. Tiles have been prepared and 12 20x30 cm tiles were pre-measured by IBA at Sandia. Blanket test by using the MAPES facility is underway.

### 2. Discharge fueling with lithium wall operation of LTX

**Dick Majeski** showed the comparison of fueling efficiency with different gas injection systems and with associated diagnostics around the torus. He compared puffers with piezoelectric valve, supersonic gas injector, and molecular cluster injector. The highest efficiency is from the directed cluster jets of up to 30-35%. LTX research is continuing.

### 3. Lithium research on NSTX - progress and plans

**Charles Skinner** reviewed the program and showed that the lower liquid lithium divertor (LLD) provided a stable Li plasma facing surface with no Mo or Li influx. The plasma performance improved with increasing lithium dose. He reviewed also laboratory experiments and the collaboration with EAST, which obtained H-mode with the use of a PPPL Li injector. Future plans include atomistic simulations, lab experiments, and Magnum-PSI, LTX and EAST collaborations, leading to Li-PFC implementation in NSTX-U

### 4. PFC Activities in Alcator C-Mod

**Graham Wright** showed the operation with melted W tiles that had caused the increase of disruptivity and was surprised by the toroidal and upward migration of W. He also made projection for ITER operation. He then showed initial positive results from field aligned ICRF antenna operation with lower impurity contamination. He also showed that dual gas jet with radiation symmetry would improve disruption mitigation

## **5. DIII-D Boundary and Pedestal Experimental Plan for 2012**

**Clement Wong** showed VGs prepared by **Tony Leonard** of GA covering areas important to PFC, such as ELMs control by considering QH-mode, pellet pacing and I-mode. On pedestal physics they are trying to understand the pedestal evolution and looking into peak heat flux profile mismatches, different divertor configurations for heat flux reduction and PFC materials studies.

## **6. High-Z erosion and other recent DiMES and MiMES experiments**

**Dmitry Rudakov** provided further details on the Mo erosion and re-deposition experiments showing the improvement of the spectroscopic measurement of gross erosion, and briefly reported on the dust studies on the capture with aerogel. He also reported the study on arcing on the surface of DIII-D and the installation of advanced duct geometries module for mirror protection.

## **7. Development of Si-W transient tolerant PFM**

**Clement Wong** reviewed the history of the study, leading to the successful exposure of Si-W button to 6 VDEs, which showed that the concept won't work due to the formation of low melting point Si-W eutectic. Results do provide guidance on the maximum operating temperatures for the use of Si-W and B-W material systems.

## **8. Survey of Metal Contamination in DIII-D Plasma Facing Tiles with Beta Backscattering and X-Ray Fluorescence (XRF)**

**Dean Buchenauer** showed VGs prepared by **Chris Chrobak** of GA, indicating that  $\beta$ -backscattering has sensitivity limit  $\sim 30 \mu\text{m}$  for high-Z film, XRF has depth sensitivity of  $\sim 0.8\text{-}5 \text{ mm}$  with range from Al-U. They are complimentary tools for in-vessel surface impurities analysis. Details of the metallic impurities

distribution inside the DIII-D vessel were shown. Sources of impurities Cu, Ni are not fully understood.