Tokamak Experiments

J. Pamela of JET presented their plan to support the ITER design in the PFC area. They plan to address issues of material erosion, T inventory, wall lifetime, wall damage due to transient events, detritiation, control and mitigation of ELMs and disruption mitigation. JET will shut down in 2008 and will install 4404 Be tiles (5 ton) and a bulk W castellated divertor surface. A C/W divertor is also considered. With neutral beam power increase to 34 MW they expect to reach an $n\tau T$ of $40x10^{19}$ m^3 KeV s around 2009-2010.

R. Majeski reported on the CDX-U Li coating experiment. At an e-beam power of 40 MW/m^2, they found it difficult to evaporate the Li even when the pool temperature reached 400° C. Most of the heat seemed to have been transfer to the large Li-surface via convection. With evaporation, they were able to achieve uniform chamber coating of 1000 Å, but it was not a low recycling surface.

B. Lipshutz reported on the effect of removing boron from C-MOD. They cleaned all the B-coated tiles with ultrasonic method, but were not able to remove all the boron. They also removed the BN limiter and used disruptive cleaning to remove H on the wall. But the wall pumping did not seem to be affected by the removal of B. With subsequent boronization, they improved their plasma performance, and got much higher stored energy. They have now applied W-brushes to their divertor and planned on extending the surface coverage to 10%.

C. Lanier of LLNL reported on recent DIII-D edge studies including particle control, radial transport and ELMs characterization. He reported results on the elimination of ELMs with ergodic coils with low collisonality plasma and the study of C transport and co-deposition using the injection of $^{13}CH_4$. Under forward and revere toroidal field, with $^{13}CH_4$ injected uniformed from the top baffle, the carbon emission distribution was found to be similar.

C. Skinner of PPPL stressed the significant difficult and the ITER program risk of having large amount of carbon dust. The worst situation could be a generation of 100 g/day with 50 μm co-deposition. This will lead to high tritium inventory and safety related issues. He also showed that the dust can be detected with electrostatic grids at 30-50 V, with 25 μm spatial separations. He indicated that we have R&D opportunities to look into the possibility of demonstrating the needed removal of 90% of the injected tritium, or deuterium from present DD machines.

D. Rudakov of UCSD reported on the natural occurrence and introduced carbon dust in DIII-D. He reported that P. West had found large excursion events with the influx of carbon, mostly in the SOL. Rudakov then showed the results from different introduction of dust from the DiMES surface. He found that the dust can be traveling toroidally toward the inboard at up to ~100 m/s, and about 4×10^{-4}g of dust, amount to 1-2 % of the original amount could get into the core.