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Theory Experiment

Overview of Recent DIII-D Experimental Results,* M.E. Fenstermacher for the DIII-D Team, *LLNL* — DIII-D experiments added to the ITER physics basis and to physics understanding for extrapolation to future devices. Experiments with a mock-up of the ITER Test Blanket Modules showed mainly a reduction in toroidal rotation but only a small decrease in confinement. Baking the DIII-D vessel in 2 Torr O₂ at 350°C showed removal of carbon co-deposits in agreement with predictions and high performance hybrid operation was then recovered within 15 plasma discharges. Improved control of post-disruption runaway electrons suggested new approaches to mitigation in ITER. ELM pacing was demonstrated with both LFS pellets and oscillating RMP fields. New diagnostics proved Alfvén eigenmodes cause fast ion losses. Locked NTMs were stabilized by aligning the island O-point to the ECCD absorption zone. Advances in physics understanding included: 1) fully noninductive AT scenarios, 2) plasma response and turbulence changes due to resonant and non-resonant 3D fields vs β , 3) validation of core turbulence and thermal transport models, 4) new intrinsic rotation physics and 5) SOL/secondary divertor heat flux studies.

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