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Overview of Recent DIII-D Experimental Results[1] M.E. FENSTERMACHER, Lawrence Livermore National Laboratory, DIII-D TEAM — Recent DIII-D experiments have added to the ITER physics basis and to physics understanding for extrapolation to future devices. Physics mechanisms contributing to resonant magnetic perturbation ELM suppression and QH-mode were identified. The QH-mode operating space was extended to ITER-relevant parameters and predicted Super-H mode performance was observed at high shaping. Upgraded divertor Thomson data was combined with edge modeling to identify the core density limit at divertor detachment. Pedestal studies were done to determine the role of ν^*, Z_{eff} and kinetic ballooning mode instabilities in controlling pedestal structure. Injection of massive high-Z gas dissipates magnetic and kinetic energy of runaway electron beams. 3D magnetics data validate several linear MHD codes, including ability to predict neoclassical tearing viscosity torque. Feedback control of applied 3D fields facilitates access to increased β_N values above the no-wall limit. The effect of test blanket module (TBM) fields on fast ion losses and momentum transport, and partial correction of TBM fields at high β was achieved. Density gradient driven trapped electron modes and core n_e peaking were controlled by electron cyclotron heating suggesting a possible burn control technique.

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Max Fenstermacher
Lawrence Livermore National Laboratory

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