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Overview of the 2002 DIII-D Experimental Program¹

S.L. ALLEN, LLNL, DIII-D TEAM, General Atomics — The DIII-D program is focused on developing the scientific basis for an Advanced (optimized) Tokamak. In the 2002 campaign, AT discharges with $\beta_N H > 10$ for several τ_E have been obtained with 85% non-inductive current. Resistive wall mode stabilization has been demonstrated with rotation, error field reduction, and real-time feedback with external coils. Stabilization of $m/n=3/2$ neoclassical tearing modes (NTMs) with feedback-localized ECCD and a “search and suppress” algorithm has enabled 50% increases in β_T . Increased ECH power in this campaign has made possible the stabilization of the 2/1 NTM for the first time on DIII-D. We continue to increase both the performance ($\beta_N H > 7$ for 10 τ_E) and the understanding of the quasi-stationary quiescent double barrier mode which has both ion and electron internal transport barriers and no ELMs. Edge pedestal scalings are being developed and we developed a simplified model of the ELM as a combination of edge current-(peeling) and pressure-(ballooning) driven instabilities. “Bursty” edge transport is responsible for half of the radial transport in L-mode; a similar mechanism with reduced amplitude is seen in H-mode.

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