

Development of steady-state advanced tokamak research in the DIII-D tokamak

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Total pages: 47 (35 text, 7 figures, 5 tables)

(Received

Abstract. Research into the feasibility of steady-state operation of high fusion gain tokamak plasmas is one of the central elements of the DIII-D program. Realization of such discharges has progressed to the point of demonstrating well-aligned noninductive current profiles for a resistive time at 90% of the total current with plasma pressure and confinement consistent with fusion gain >5 in an ITER-sized tokamak. Full current drive discharges with poorer alignment have been obtained for shorter duration. The design methodology and the path to integrating the various elements necessary for full noninductive operation on DIII-D are discussed in detail.

PACs Nos. 52.55.Fa, 52.55.Wq, 28.52.Av