

**Abstract Submitted for the Forty-Sixth Annual Meeting
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Category Number and Subject: 5.6.2 DIII-D Tokamak

Theory Experiment

Fully Noninductive, High Bootstrap Fraction, Stationary Discharges in DIII-D,* P.A. Politzer, *GA* – We have been studying the behavior of fully noninductive, stationary plasmas with high bootstrap fraction operating without the usual inductive transformer control of the plasma current. Our goal is to determine the self-consistent equilibrium of such plasmas, as well as the stability limits and responses to transient perturbations. These discharges have reached $\beta_N \approx \beta_p \geq 3.0$, with $f_{bs} > 75\%$. These conditions have been maintained for >2.2 s, with $I_p \approx 0.65$ MA and $\beta \approx 1.5\%$. The self-consistent plasma has a broad current profile, with low internal inductance ($\ell_1 I \leq 0.6$) and a weakly inverted q profile. There is intermittent ITB formation in all channels (n_e , T_e , T_i , and V_ϕ). Improved confinement and higher β associated with the ITBs leads to current overdrive (≥ 50 kA/s). Steepening of the pressure profile leads to collapse of the ITB, with the plasma losing a fraction of its current and energy. In spite of the current and pressure fluctuations, the plasma maintains its average parameters, a positive result providing evidence of dynamical stability.

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