STATIONARY, HIGH BOOTSTRAP FRACTION PLASMAS IN DIII–D WITHOUT INDUCTIVE CURRENT CONTROL

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ABSTRACT. We have initiated an experimental program to address some of the questions associated with operation of a tokamak with high bootstrap current fraction under high performance conditions, without assistance from a transformer. In these discharges stationary (or slowly improving) conditions are maintained for up to 3.7 s at $\beta_N \approx \beta_p$ approaching 3.3. The achievable current and pressure are limited by a relaxation oscillation, involving growth and collapse of an ITB at $\rho \geq 0.6$. The pressure gradually increases and the current profile broadens throughout the discharge. Eventually the plasma reaches a more stable, high confinement ($H_{89P} \sim 3$) state. Characteristically these plasmas have 65%–85% bootstrap current, 15%–30% NBCD, and 0%–10% ECCD.

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