Abstract Submitted
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Stability of Current-Driven Discharges in the Compact Toroidal Hybrid Experiment[1] S.F. KNOWLTON, G.J. HARTWELL, J.D. HANSON, J. PETERSON, J. SHIELDS, B.A. STEVENSON, Auburn University — Experiments on stability and disruption avoidance in current-driven stellarator plasmas are in progress on the Compact Toroidal Hybrid (CTH) torsatron (R = 0.75 m, a $\sim$ 0.2 m, B $\leq$ 0.7 T, n_e $\leq 10^{19}$ m^{-3}). The edge vacuum rotational transform variable in the range $0.1 < \iota/2\pi < 0.5$. Ohmic plasma currents of $I_p \leq 40$ kA are induced in target plasmas generated by 12 kW ECRH at the fundamental resonance of 18 GHz. The duration of the ohmic phase of the discharge is up to 100msec. During the plasma current rise, hesitations in the rate of current increase and associated MHD instabilities correlated with low-order rational values of the net edge rotational transform are observed. At edge rotational transform values of 1/3 or 1/2, the current usually undergoes repetitive relaxations in which the current rise is arrested, and the value of the total current drops by about 3%. Major disruptions associated with these instabilities have not yet been found to occur. Efforts to operate with an edge transform above a value of $\frac{1}{2}$ with substantial plasma current are ongoing.

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Gregory Hartwell
Auburn University

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