

Abstract Submitted
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Suppression of density limit disruptions using vacuum rotational transform on the CTH experiment S.F. KNOWLTON, J.D. HANSON, G.J. HARTWELL, J.L. HERFINDAL, X. MA, D.A. MAURER, M.C. ARCHMILLER, M. PANDYA, Auburn University — Experiments on the Compact Toroidal Hybrid (CTH) demonstrate the suppression of disruptions in tokamak discharges in which a fraction of the net rotational transform is produced by torsatron coils. Torsatron plasmas with adjustable vacuum transform are generated in CTH by ECRH, followed by ramp-up of the plasma current and density. Neither density nor current-driven disruptions are observed when the vacuum rotational transform is above a threshold value of $\iota_{vac}(a) \sim 0.11$. At lower vacuum transform levels, density limit disruptions can occur in CTH when gas puffing produces line-averaged densities near the Greenwald limit. These density limit disruptions are preceded by growing $m/n=2/1$ MHD oscillations prior to the disruption, indicating internal tearing mode activity. Above the apparent threshold value of $\iota_{vac}(a) \sim 0.11$, the plasma current declines as the density is increased, indicating cooling of the plasma without an associated major disruption. Vertical displacement events are also reduced by the addition of vacuum transform. Disruptions in plasmas with varying levels of applied vacuum transform will be discussed in light of other diagnostic measurements and modeling. Supported by US. Department of Energy Grant No. DE-FG02-00ER54610

Stephen Knowlton
Auburn University

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