Abstract Submitted
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**Density limit disruption suppression in a current-carrying stellarator**[1] XINXING MA, D.A. ENNIS, J.D. HANSON, G.J. HARTWELL, S.F. KNOWLTON, D.A. MAURER, Auburn University — Density limit disruptions are frequently observed in current-driven discharges in the Compact Toroidal Hybrid (CTH). These disruptions are triggered by elevated densities achieved with edge fueling. The phenomenology of hybrid discharge terminations is similar to tokamak disruptions: progressive narrowing of the plasma current profile until the discharge is unstable to growing $m = 2, n = 1$ tearing modes, at which point there follows the negative loop voltage spike and positive current spike and subsequent rapid decay of the plasma current. As a result of the ability to adjust the vacuum rotational transform in CTH, i.e. the level of imposed 3D field strength, we have found the density limit at a given current linearly increases with the addition of vacuum transform. Consequently, plasmas with densities up to two times the Greenwald limit[1] are attained at the maximum vacuum transform of 0.22. The results are similar in both hydrogen and deuterium plasma, although operation with deuterium extends achievable plasma currents and densities to higher values. 3D equilibrium reconstructions show these discharges disrupt at more peaked current profiles and lower plasma currents as the amount of 3D fields is increased.

[1]M. Greenwald et al., Nucl. Fusion **28**, (1988)

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Xinxing Ma
Auburn University

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