Abstract Submitted
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Overview of CTH research[1] M.C. ARCHMILLER, M.R. CIANCIOSA, D.A. ENNIS, M.M. GOFORTH, J.D. HANSON, G.J. HARTWELL, J.D. HEBERT, J.L. HERFINDAL, S.F. KNOWLTON, X. MA, D.A. MAURER, M.D. PANDYA, N.A. ROBERDS, P.J. TRAVERSO, Auburn University — Goals of the Compact Toroidal Hybrid (CTH) experiment are to: (1) investigate the dependence of plasma disruptive behavior on the level of applied 3D magnetic shaping; (2) test and advance the V3FIT reconstruction code; and (3) study the implementation of an island divertor. Progress towards these goals and other developments are summarized. The disruptive density limit exceeds the Greenwald limit as the vacuum transform is increased, but a threshold for avoidance is not observed. Low-q disruptions, with 1.1 $<q(a)<$2.0, cease to occur if the vacuum transform is raised above ~ 0.07. Application of vacuum transform can reduce and eliminate the vertical drift of elongated discharges that would otherwise be vertically unstable. While reconstructions using external magnetics give accurate estimates of the enclosed toroidal flux and quantities near the plasma boundary, internal diagnostics (such as Thomson scattering and 2D two-color SXR cameras) are being developed to extend the range of accuracy into the plasma core. NIMROD is used to model the current ramp phase and predicts the formation of symmetry-breaking magnetic islands. An island divertor design has begun with connection length studies to model energy deposition on divertor plates located in an edge 1/3 island.

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