

Abstract Submitted  
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**NIMROD Simulations of Low-q Disruptions in the Compact Toroidal Hybrid Device (CTH)**<sup>1</sup> E.C. HOWELL, M.D. PANDYA, J.D. HANSON, D.A. MAUER, D.A. ENNIS, G.J. HARTWELL, Auburn University — Non-linear MHD simulations of low-q disruptions in the CTH are presented. CTH is a current carrying stellarator that is used to study the effects of 3D shaping. The application of 3D shaping stabilizes low-q disruptions in CTH [M. D. Pandya et al., POP 22, 2015]. The amount of 3D shaping is controlled by adjusting the external rotational transform, and it is characterized by the ratio of the external rotational transform to the total transform:  $f = \iota_{vac}/\iota$ . Disruptions are routinely observed during operation with weak shaping ( $f < 0.05$ ). The frequency of disruptions decreases with increasing amounts of 3D shaping, and the disruptions are completely suppressed for  $f > 0.1$ . Nonlinear simulations are performed using the NIMROD code [C.R. Sovinec et al., JCP 195, 2004] to better understand how the shaping suppresses the disruptions. Comparisons of runs with weak ( $f = 0.04$ ) and strong ( $f = 0.10$ ) shaping are shown.

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Eric Howell  
Auburn University

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