

Abstract Submitted  
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**Simulations of Sawtooth Oscillations In CTH<sup>1</sup>** NICHOLAS ROBERDS, LUCA GUAZZOTTO, JAMES HANSON, DAVID MAURER, Auburn University — Sawteeth are driven relaxation oscillations seen in tokamaks. Experimentally, they can be reproduced reliably. They affect the confinement of the plasma core, and in some circumstances can trigger disruptions. Sawtoothing has been observed in the Compact Toroidal Hybrid (CTH), a tokamak-stellarator hybrid having a non-axisymmetric equilibrium field. We present novel numerical simulations of sawtooth oscillations in this tokamak-stellarator hybrid. Results are contrasted and compared with simulations of a small ohmic tokamak that resembles CTH without the helical stellarator field. We have used NIMROD [1] to conduct these extended-MHD simulations in toroidal geometry. Sawtooth simulations are obtained by starting with a stable ideal MHD equilibrium from VMEC [2], and driving the central safety factor below unity with an applied loop voltage. The challenges of sawtooth simulations with 3D equilibrium fields are discussed.

[1] C.R. Sovinec, A.H. Glasser, T.A. Gianakon, D.C. Barnes et al, J. Comput. Phys., 355 (2004).

[2] S. P. Hirshman and J. C. Whitson, Phys. Fluids 3553 (1983).

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