

Abstract Submitted
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NIMROD Modeling of CTH Current Rise Dynamics¹ JONATHAN HEBERT, JAMES HANSON, Auburn University — The 3D extended MHD code NIMROD [1] has been modified to model the Compact Toroidal Hybrid (CTH), a five-field period torsatron/tokamak hybrid device located at Auburn University. In many shots with inductively driven current in CTH, hesitations in the plasma current are observed as the plasma current is ramped. V3FIT reconstructions of the current rise demonstrate the edge rotational transform is near a low order rational, suggesting that island formation at or near the edge may be responsible for the current hesitations. The initial stages of the current drive were self-consistently modeled using NIMROD with experimentally relevant vacuum fields, loop voltages, initial temperatures and initial densities. Results show the formation of field-period-symmetry-preserving islands near the plasma edge as well as the coalescence of these islands into larger, symmetry-breaking island chains which modify the distribution of the current in the plasma. Modeling investigating the effect of CTH physical limiters will be presented.

[1] C.R. Sovinec et al Journal of Computational Physics, 195, 355 (2004).

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