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**Effects of Boundary Conditions on Helicity-Conserving Systems**[1]

THOMAS BENEDETT, CHRISTOPHER HANSEN, THOMAS JARBOE, University of Washington — The presence of non-axisymmetric features on plasma volumes of Steady Inductive Helicity Injection (SIHI) devices, such as the helicity injectors on HIT-SI and HIT-SI3, is consequential to both the time-dependent performance and the equilibria of the devices, as shown through the use of the 3D MHD code PSI-Tet, which is capable of simulating plasmas in such volumes through the application of FEM mechanics on unstructured tetrahedral grids. The behavior of SIHI devices with different injector geometry, explored through Hall MHD PSI-Tet simulations, will be presented, as will the behavior of (composite) Taylor state equilibria in such volumes, as the presence and nature of nonaxisymmetries appears to qualitatively affect the shape of the minimum-energy-with-conserved-helicity equilibria, through the generation of magnetic islands that appear all the way to the spheromak's magnetic axis according to patterns identified herein.

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