Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Model validation and numerical investigation of inductive helicity injection drivers for spheromak formation and sustainment[1] CHRISTOPHER HANSEN, AARON HOSSACK, University of Washington — Numerical investigation of inductive helicity injection drivers, as developed on the HIT-SI family of experiments at the University of Washington, is underway with a focus on developing validated models of relevant driver physics to support exploration and optimization of possible injector configurations for sustainment of spheromak plasmas. Two extended MHD codes are being used: NIMROD [1], where the injectors are approximated through boundary conditions on an axisymmetric domain, and PSI-Tet [2], where the full multiply-connected plasma volume is simulated. Simulations will be benchmarked against experimental data from the HIT-SI (two injectors), HIT-SI3 (three injectors), and the future HIT-SIU (four mouth injector manifold) devices. Validated physical models will then be used to explore possible injector configurations to determine the effect of toroidal/poloidal mode content, frequency, phasing, and other parameters on resulting sustained spheromak equilibria.
[1] K. Morgan et al. Phys. of Plasmas 24, 122510 (2017)
[2] C. Hansen et al. Phys. of Plasmas 22, 042505 (2015)

[1]Work supported by CTFusion, Inc. with support from the U.S. Department of Energy, ARPA-E award number DE-AR0001098

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Date submitted: 03 Jul 2019 Electronic form version 1.4