Abstract Submitted
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Overview of HIT-SI3 experiment: Simulations, Diagnostics, and Summary of Current Results[1] JAMES PENNA, THOMAS JARBOE, BRIAN NELSON, AARON HOSSACK, DEREK SUTHERLAND, KYLE MORGAN, CHRIS HANSEN, THOMAS BENEDETT, CHRIS EVERSON, University of Washington, BRIAN VICTOR, Lawrence Livermore National Laboratory — The Helicity Injected Torus - Steady Inductive 3(HIT-SI3)experiment forms and maintains spheromaks via Steady Inductive Helicity Injection (SIHI). Three injector units allow for continuous injection of helicity into a copper flux conserver in order to sustain a spheromak. Firing of the injectors with a phase difference allows finite rotation of the plasma to provide a stabilizing effect. Simulations in the MHD code NIMROD and the fluid-model code PSI-TET provide validation and a basis for interpretation of the observed experimental data. Thompson Scattering (TS) and Far Infrared (FIR) Interferometer systems allow temperature and line-averaged density measurements to be taken. An Ion Doppler Spectroscopy (IDS) system allows measurement of the plasma rotation and velocity. HIT-SI3 data has been used for validation of IDCD predictions, in particular the projected impedance of helicity injectors according to the theory. The experimental impedances have been calculated here for the first time for different HIT-SI3 regimes. Such experimental evidence will contribute to the design of future experiments employing IDCD as a current-drive mechanism.

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