Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Validation and Continued Development of Methods for Spheromak Simulation[1] THOMAS BENEDETT, Univ of Washington — The HIT-SI experiment has demonstrated stable sustainment of spheromaks. Determining how the underlying physics extrapolate to larger, higher-temperature regimes is of prime importance in determining the viability of the inductively-driven spheromak. It is thus prudent to develop and validate a computational model that can be used to study current results and study the effect of possible design choices on plasma behavior. A zero-beta Hall-MHD model has shown good agreement with experimental data at 14.5 kHz injector operation. Experimental observations at higher frequency, where the best performance is achieved, indicate pressure effects are important and likely required to attain quantitative agreement with simulations. Efforts to extend the existing validation to high frequency (36-68 kHz) using an extended MHD model implemented in the PSI-TET arbitrary-geometry 3D MHD code will be presented. An implementation of anisotropic viscosity, a feature observed to improve agreement between NIMROD simulations and experiment, will also be presented, along with investigations of flux conserver features and their impact on density control for future SIHI experiments.

[1]Work supported by DoE

Thomas Benedett
Univ of Washington

Date submitted: 11 Jul 2016 Electronic form version 1.4