Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Nimrod Simulations of Decaying and Driven HIT-SI Plasmas CIHAN AKCAY, CHARLSON C. KIM, GRIFF O'NEILL, TOM R. JARBOE, BRIAN A. NELSON, University of Washington, VALERIE A. IZZO, General Atomics — The Steady Inductive Helicity Injected Torus (HIT-SI) is a spheromak that uses two semi-toroidal injectors to provide steady inductive helicity injection (SIHI), which produces and sustains a spheromak with significant toroidal current by generating poloidal flux using relaxation current drive. NIMROD's resistive MHD model was employed in conjunction with flux injector boundary conditions to simulate HIT-SI operation. This computational model was employed to explore the effects of SIHI and Lundquist number (S) on sustained HIT-SI plasmas. Preliminary computational results showed very little plasma current formation at the Lundquist numbers comparable to that of the experiment (∼5-10), a result that is in poor agreement with the experiment. To check these results, work has been undertaken to upgrade the existing computational model and to transfer it over to the newer version of NIMROD. Of particular interest are the improved resistive MHD and resistive MHD with the Hall term. The results of these simulations are to be compared with the experimental data. We will present our efforts and progress in this direction.

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Date submitted: 20 Jul 2007 Electronic form version 1.4