Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Numerical Simulation of Non-inductive Startup and Flux Compression in the Pegasus Toroidal Experiment[1] J.B. O'BRYAN, C.R. SOVINEC, D.J. BATTAGLIA, T.M. BIRD, Univ. of Wisconsin — Nonlinear numerical computation is used to investigate DC helicity injection from washer-gun plasma sources in a spherical torus. The simulations model non-inductive startup in the Pegasus Toroidal Experiment (Univ. of Wisconsin), including relaxation of the current channels into a "tokamak-like" plasma and current amplification through flux compression. Our resistive MHD simulations with the NIMROD code (nimrodteam.org) use three-dimensional, anisotropic, temperature-dependent thermal conduction—corrected for regions of low-magnetization [Braginskii, Reviews of Plasma Physics, 1965]—and temperature-dependent resistivity. We investigate the effectiveness of the relaxation and flux compression, in terms of current drive, heating, and confinement. Preliminary results on current amplification are in rough agreement with the experiment and indicate significant plasma heating.

[1]Work supported by the U.S. Dept. of Energy.

John O'Bryan
Univ. of Wisconsin

Date submitted: 18 Jul 2009 Electronic form version 1.4