

Abstract Submitted
for the APR12 Meeting of
The American Physical Society

Simulations of current-filament dynamics and relaxation in the Pegasus ST¹ J.B. O'BRYAN, C.R. SOVINEC, University of Wisconsin–Madison
— Nonlinear numerical computation is used to investigate the relaxation of non-axisymmetric current channels from washer-gun plasma sources into “tokamak-like” plasmas in the Pegasus Toroidal Experiment. Resistive MHD simulations with the NIMROD code utilize ohmic heating, temperature-dependent resistivity, and anisotropic, temperature-dependent thermal conduction corrected for regions of low magnetization [Braginskii 1965] to reproduce critical transport effects. A strong reversed current sheet suggests magnetic reconnection between adjacent passes of the current channel. Axisymmetric current rings are periodically released from the channel when adjacent passes come into contact. After large-scale magnetic field reversal, a hollow current profile is observed with significant poloidal flux amplification having accumulated over many reconnection cycles.

¹Work supported by the US Dept. of Energy through the Plasma Science and Innovation Center

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Date submitted: 05 Jan 2012

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