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**Simulation of current-filament dynamics and relaxation in the Pegasus ST**[1] 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 ST. Resistive MHD simulations with the NIMROD code utilize ohmic heating, temperature-dependent resistivity, and anisotropic, temperature-dependent thermal conduction to reproduce critical transport effects. With sufficient injected current, adjacent passes of the current channel merge periodically, releasing axisymmetric current rings from the driven channel. The current rings provide a new phenomenological understanding for filament relaxation in Pegasus [O'Bryan, Sovinec, Bird. *Phys. Plas.* submitted]. After large-scale poloidal-field reversal, a hollow current profile and significant poloidal flux amplification accumulate over many reconnection cycles. When the current injection ceases, closed flux surfaces form quickly. Better electron thermal confinement with a two-temperature model produces a slower rate of decay for plasma current and internal energy than the single-temperature MHD model.

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