Abstract Submitted
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The PEGASUS Toroidal Experiment Program[1] R.J. FONCK, M.W. BONGARD, E.T. HINSON, B.A. KUJAK-FORD, B.T. LEWICKI, A.J. REDD, D.J. SCHLOSSBERG, F. VOLPE, G.R. WINZ, University of Wisconsin-Madison — The PEGASUS program is developing non-solenoidal startup and growth techniques for tokamaks, and exploring plasma stability at near-unity aspect ratio. Helicity injection from localized current sources in the plasma periphery produced $I_p \geq 0.1$ MA, consistent with a simple theory invoking helicity balance and Taylor relaxation constraints. Future efforts will concentrate on accessing $I_p = 0.3$ MA to test theory to the point where parallel conduction losses dominate the helicity loss rate. Plasma growth following startup will be pursued via Higher Harmonic Fast Wave heating (0.8 MW available) and/or Electron Bernstein Wave heating and current drive (0.5-1.0 MW EBW proposed). Proposed upgrades in support of these programs include a new centerstack for increased TF, divertors for separatrix-limited operation, and long-pulse capabilities. Plasma stability is dominated by peeling-like modes at large $\langle j_{edge}/B \rangle$ and large-scale low-$m/n = 1$ core activity. The new capabilities will provide core and edge $j(r)$ manipulation to stably access the unique high I_N, high-β_t regime at $A \approx 1$.

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