

Abstract Submitted
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Non-inductive production of tokamak-like ST plasmas with washer gun sources on the Pegasus Toroidal Experiment¹ N.W. EIDIETIS, R.J. FONCK, G.D. GARSTKA, E.A. UNTERBERG, G.R. WINZ, University of Wisconsin - Madison — Washer gun plasma sources in the lower divertor region of the Pegasus ST can act as DC helicity injection sources for purely non-inductive startup or as pre-ionization sources for ohmic induction at very low toroidal field. In both applications, use of these edge current sources results in considerably altered current profiles and suppression of the strong internal tearing modes that in the past constrained ohmic plasmas to $I_P \leq I_{TF}$ and relatively low I_N . At low applied vertical field, the gun-driven I_ϕ is large enough to cause a poloidal flux reversal, and the plasma relaxes into a tokamak-like configuration. Discharges of $I_\phi > 50$ kA are produced by ~ 4 kA of injected current, with $> 80\%$ of I_ϕ persisting after the guns shut off. These discharges exhibit features indicative of tokamak plasmas, including strong vacuum field deformation, increased current decay times (> 0.7 ms), and core heating. They also have very high field utilization factor, $I_P / I_{TF} \leq 2.3$, $I_N > 12$, and very low 2/1 mode activity.

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