

Abstract Submitted
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NIMROD Simulation of multipulsed edge-current drive in SSPX¹

L.L. LODESTRO, B.I. COHEN, E.B. HOOPER, H.S. MCLEAN, R.D. WOOD, LLNL — Flux amplification (A)—the ratio of poloidal magnetic flux enclosed by a spheromak's toroidal core to an applied edge flux—is a critical parameter for an economic spheromak-based fusion reactor. In [1], measurements of A in SSPX and NIMROD simulations [2] were found to be in good agreement over a range of discharge parameters while $A < 3$. Experiments to study A performed subsequently with the modular capacitor bank gave some indication that $|dI_{\text{gun}}/dt|$ played a role and that increasing it might build magnetic field more efficiently, but were limited by gun discharge circuit inductance. In [3], multipulsed gun injection was investigated numerically and the results compared to SSPX. Here we report the continuation of those simulations to longer times. We find trends on timescales much longer than could be studied in SSPX, negligible effect on A of multipulsed injection at frequencies smaller than the fundamental SSPX reconnection frequency, and small increases in A for large frequencies.

[1] B. Hudson et al., Phys. Plasmas **15**, 056112 (2008).

[2] E.B. Hooper et al., Nucl. Fusion **47**, 1064 (2007).

[3] L.L. LoDestro et al., 50th DPP, TP6-93 (2008).

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