

Abstract Submitted
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Nonsolenoidal startup of Pegasus plasmas using DC helicity injection and poloidal field induction¹ B.J. SQUIRES², N.W. EIDIETIS, G.D. GARSTKA, A.C. SONTAG, G.R. WINZ, University of Wisconsin-Madison — The central solenoid of a spherical torus (ST) offers limited Ohmic flux, which exacerbates the limitations of this heating and current drive technique. The design of a scalable non-solenoidal (NS) startup technique is desired to expand the operating space of the ST and to provide a path to NS operation for STs and tokamaks. Pegasus employs a two-part NS startup technique of DC helicity injection and poloidal field induction. DC helicity injection is used to create a target plasma at the outboard midplane by injecting current along helical field lines. The current filaments relax to a tokamak-like magnetic topology with I_p determined by magnetic helicity conservation. A prototype system capable of injecting up to 2 kA has been used to create target plasmas with toroidal current up to 20 kA. Poloidal field induction has been used to ramp the target to 30 kA and provide a target suitable for coupling to other CD techniques.

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