

Abstract Submitted  
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**Progress in Nonsolenoidal Plasma Startup Using Point-Source Helicity Injection in the Pegasus ST**<sup>1</sup> R.J. FONCK, J.L. BARR, M.W. BONGARD, M.G. BURKE, E.T. HINSON, A.J. REDD, D.J. SCHLOSSBERG, K.E. THOME, University of Wisconsin-Madison — Compact, high-current plasma guns are employed as DC helicity injectors on the PEGASUS ST. This startup technique has produced  $I_p \sim 0.17$  MA to date, consistent with helicity balance and Taylor relaxation constraints. Once a tokamak-like plasma is formed, passive electrodes can act as helicity injectors for further growth. This may provide additional control of the edge current density, the Taylor relaxation limit, and provide a higher helicity input rate. Ion heating to  $T_i \sim 0.5$  keV is observed in the strongly-reconnecting, helicity-driven phase. Efficient handoff from helicity to inductive drive requires the buildup of core current density. Following helicity formation, OH-driven plasmas are MHD-quiescent and sustained above 0.20 MA, apparently due to increased core magnetic shear. Outstanding issues for prediction to larger fusion experiments include: structure of the edge current density; impedance of the injected current channel; impurity behavior; and the behavior of the confinement and helicity dissipation rate as  $I_p$  and  $T_e$  increase.

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