DPP10-2010-001592

Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Sorting Category: 5.6.4 (E)

Progress in Nonsolenoidal Plasma Startup Using Point-Source Helicity Injection in the Pegasus ST[1] 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.

[1]Work supported by US DOE Grant DE-FG02-96ER54375.

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[X] Prefer Oral Session
[ ] Prefer Poster Session

Special instructions: To be placed in NSTX oral session.

Date submitted: 16 Jul 2010 Electronic form version 1.4