

Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Solenoid-free Startup of DIII-D¹ J.A. LEUER, N. EIDIETIS, D.A. HUMPHREYS, A.W. HYATT, G.L. JACKSON, J. LOHR, P.A. POLITZER, R. PRATER, P.T. TAYLOR, M.L. WALKER, GA, G. CUNNINGHAM, Culham, D. GATES, D. MUELLER, PPPL, Y.-K. OH, S.-W. YOON, S.-H. HAHN, NFRI, J.H. YU, UCSD — Inductive plasma current startup to 170 kA was achieved in the DIII-D tokamak without the use of inboard poloidal field coils (solenoidless startup). This was achieved with strong preionization/heating using electron cyclotron (EC) power. For outside breakdown and moderated field null quality, flux conversion efficiency to plasma current using only diverter and vertical field coils is similar to DIII-D's ohmic startup. At higher flux states null quality degrades and flux/current efficiency is reduced, possibly from a reduced in EC/breakdown region coupling. EC current drive was minimal for the plasma regime studied. Preliminary solenoidless handoff experiments to neutral beam current drive were also explored. This research is expected to reduce central solenoid requirements for next generation devices and provide a basis for solenoidless startup of toroidal devices with integration of appropriate current drive techniques.

¹Supported in part by US DOE under DE-FC02-04ER54698, DE-AC02-09CH11366, and DE-FG02-07ER54917.

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Date submitted: 24 Jul 2009

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