Abstract Submitted for the 52nd Annual Meeting
Division of Plasma Physics
November 8–12, 2010, Chicago, Illinois

Category Number and Subject: 5.6.2. DIII-D Tokamak

[ ] Theory [X] Experiment

Impact of Current Profile on Transport and Stability in High Noninductive Fraction DIII-D Discharges,* F. Turco, *ORAU*; T.C. Luce, J.R. Ferron, P.A. Politzer, M.A. Van Zeeland, S.P. Smith, A.M. Garofalo, A.D. Turnbull, *GA*; C.T. Holcomb, *LLNL*; A.E. White, *MIT*; M. Okabayashi, *PPPL*; Y. In, *Far-Tech*; H. Reimerdes, *Columbia U.*; D.P. Brennan, R. Takahashi, *U. Tulsa* — Experiments addressing the issue of J_{BS} and J_{EC} alignment and the optimum q profile for stable noninductive operation show the J_{NI} and J profiles are best aligned at q_{min}~1.5, q_{95}~6.8. The kinetic profiles vary systematically with q_{min} and q_{95}. Transport analysis shows that electrons dominate losses at low q_{min}, while at high q_{min} ions dominate. Drift wave stability analysis with the TGLF model shows trends in the linear growth rates that contradict these observations. Systematic scans of EC deposition indicate that a broad ECCD profile at ρ~0.3-0.55 yields a J profile that is more stable to the tearing modes that limit the duration of the discharges. Optimal alignment of J_{EC} for tearing stability coincides with the region where additional NI current is needed for f_{NI}=1.

*Work supported by US DOE under DE-AC05-06OR23100, DE-FC02-04ER54698, DE-AC52-07NA27344, DE-FC02-99ER54512, DE-AC02-09CH11466, & DE-FG02-06ER84442.

: