Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Impact of Current Profile on Transport and Stability in High Noninductive Fraction DIII-D Discharges[1] 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-PSFC, 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 $q_{min} \sim 1.5$, $q_{95} \sim 6.8$. 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 $\rho \sim 0.3 - 0.55$ 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 $f_{NI} = 1$.

[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.

Tim Luce
General Atomics

Date submitted: 16 Jul 2010 Electronic form version 1.4