Abstract Submitted for the Forty-Eighth Annual Meeting
Division of Plasma Physics
October 30th-November 3, 2006, Philadelphia, Pennsylvania

Category Number and Subject:

[ ] Theory [X] Experiment

Anomalous Effects on the Current Evolution in DIII-D,* T.A. Casper, R.J. Jayakumar, L.D. Pearlstein, M.A. Makowski, C.T. Holcomb, *LLNL*, T.C. Luce, C.C. Petty, *GA*, E.J. Doyle, *UCLA* – We explore configurations where the current profile formation and evolution exhibit features consistent with non-neoclassical resistive effects or self-organizing mechanisms. In these discharges, evolution of the current density that determines q achieves a stationary configuration where the inductively driven flux diffusion is balanced by external, non-inductively-driven current and/or by anomalous flux or current diffusion processes. This stationary evolution of q has been observed in both hybrid and quiescent, high-confinement (QH) modes of operation. By contrasting measurements with the neoclassical evolution we infer the location and amount of anomalous current diffusion required to maintain these discharges. A hyper-resistive model is applied to provide at least a heuristic understanding of the current evolution observed in QDB modes. We present a combination of experimental data analysis and simulation results using the CORSICA code to demonstrate the anomaly in current profiles and their evolution.

*Work supported by U.S. DOE under W-7405-ENG-48, DE-FG02-04ER54698, and DE-FG03-01ER54615.