

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

Category Number and Subject:

Theory Experiment

Real-Time Control of Plasma Rotation and Stored Energy in DIII-D,* P. Gohil, J.R. Ferron, D.A. Humphreys, D. Kaplan, B.G. Penaflo, J.T. Scoville, *General Atomics* – Real time control of plasma profiles throughout the plasma discharge is an important requirement for high-performance steady-state operation. To further this goal on DIII-D, significant efforts have been made to implement feedback control of plasma rotation and ion temperature using real time measurements obtained from the charge exchange recombination spectroscopy system. Plasma rotation is controlled by simultaneous neutral beam injection (NBI) in the same direction as the plasma current (co-NBI) and counter to the plasma current (counter-NBI), a capability made available for 2006. Feedback control of plasma rotation and ion temperature allows for studies of plasma transport and plasma instabilities. For example, feedback control of the plasma rotation at low or zero plasma rotation allows studies of the stabilizing effect of external feedback coils on RWMs. Details on measurement, analysis and control algorithms for plasma rotation will be presented as well as details on experiments to simultaneously feedback control the plasma rotation and stored energy.

*Work supported by U.S. DOE under DE-FC02-04ER54698.