Abstract Submitted for the Forty-Ninth Annual Meeting
Division of Plasma Physics
November 12–16, 2007, Orlando, Florida

Category Number and Subject: 5.6.2. DIII-D Tokamak

[ ] Theory [X] Experiment

Flow Shear and Tearing Stability in DIII-D,* R.J. La Haye, *General Atomics,* D.P. Brennan, *U. Tulsa*, R.J. Buttery, *UKAEA-Culham*, S. Kruger, *Tech-X Corp.*, D. Chandra, D. Raju, A. Sen, *Inst. For Plasma Research*, for the DIII-D Team – The reorientation of one neutral beam in DIII-D from co to counter injection has allowed tests of the effects of rotation on tearing stability. It is found that reduced plasma rotation and flow shear has a destabilizing effect. Existing modes get bigger. Otherwise stable modes are destabilized, i.e. the stable beta limit is lowered. Experimental examples in the saw-teething H-mode, the hybrid scenario, and the advanced tokamak will be presented. A significant level of stabilizing flow shear is of the order of the inverse of the product of the local magnetic shear length L_s and the Alfvén time τ_A; removing this flow shear by going from all co to near balanced injection decreases the tearing stability. Preliminary experimental analysis suggests that the relative sign of the flow shear and the magnetic shear also plays a role. The literature on the theory of tearing and flow will be reviewed. New studies of the effects of flow shear on tearing both analytically and with codes are in development.

*Supported by the US DOE under DE-FC02-04ER54698.