

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

Category Number and Subject: 10.0.0 Undergraduate and High School
Research

Theory Experiment

Evaluation of New Magnetic Perturbation Coils for DIII-D,*
M.P. Aldan, *RPI*, M.J. Schaffer, T.E. Evans, T.S. Taylor, *GA* –
Experiments show that non-axisymmetric magnetic fields deleteriously affect tokamak plasma confinement, e.g., reducing turbulence-stabilizing velocity shears by braking plasma rotation and causing plasma locked modes that may lead to disruption. Externally applied perturbations can also be useful, e.g., to control edge-localized modes, stabilize resistive wall modes, and make stochastic magnetic layers, among others. DIII-D has two sets of non-axisymmetric coils (C-coils and I-coils) that have been used extensively for these purposes, but their fields penetrate deeply into the plasma, which is not always desirable. Present work investigates possible new conceptual perturbation coils for DIII-D to make stochastic fields in a narrower layer close to the plasma edge with less core penetration, and to broaden the plasma strikepoint width at the divertor target to reduce peak thermal load. The new coils may be on the vacuum-vessel center-post, floor, and ceiling. Magnetic-field Fourier analysis and line-tracing codes are used to evaluate the perturbing fields. Results will be presented.

*Supported by US DOE National Undergraduate Fusion Fellowship & DE-FC02-04ER54698.