

**Abstract Submitted for the 50th Annual Meeting
Division of Plasma Physics
November 17–21, 2007, Dallas, Texas**

Category Number and Subject:

Theory Experiment

Determination of Edge Current in the DIII-D Tokamak,* B. Hudson, *Oak Ridge Institute for Science Education*, C.C. Petty, K.H. Burrell, L.L. Lao, P.B. Snyder, D.M. Thomas, *General Atomics*, S.L. Allen, C.T. Holcomb, M.A. Makowski, *Lawrence Livermore National Laboratory* – A statistical study of the measurement requirements necessary to infer the current profile in the pedestal of the DIII-D tokamak via motional Stark effect (MSE) and lithium beam diagnostics has been performed. Error in the edge magnetic probes and flux loops, Thomson scattering, and MSE and lithium beam polarimetry was systematically varied to determine the uncertainty in inference of the current profile via magnetic reconstructions using EFIT. It will be shown that edge MSE or lithium beam data accurate to 0.1 deg. is sufficient to resolve the peak edge current density to within 20%. This accuracy in the current profile is needed for validation of the peeling-ballooning stability model. Future work using a Hall probe to directly measure the magnetic field components in the plasma edge and SOL to further constrain edge current reconstruction will be presented.

*Work supported by US DOE under DE-AC05-06OR23100, DE-FC02-04ER54698, and DE-AC52-07NA27344.