Abstract Submitted
for the APR12 Meeting of
The American Physical Society

Interpretation of DIII-D Edge Pedestal Experiments JOHN-PATRICK FLOYD II, MIN-HEE SAYER, WESTON STACEY, Georgia Institute of Technology — The presence of a large pinch velocity in the edge pedestal of high confinement (H-mode) tokamak plasma discharges is important in edge transport, and must be included in theoretical modeling of experiments. The pinch-diffusion relation [1] describing edge transport has been derived from first principles and includes a momentum-balance satisfying pinch term. This pinch-diffusion relation is used to analyze and study edge pedestal transport in two scenarios important to ongoing plasma physics research: i) the L-H mode transition, and ii) the evolution of edge pedestal structure and dynamics between ELM disruptions. In the study of the L-H mode transition, the pinch-diffusion relation is used to compute electron densities at several points near the L-H transition. These results are examined to learn more about factors affecting transport near the transition. This should result in improved insight into edge pedestal transport factors that play a role in triggering the L-H transition. The study of inter-ELM edge transport and edge pedestal structure evolution is done by taking composite data during an H-mode shot, and using the cylindrical, time-dependent pinch-diffusion relation to model transport across the inter-ELM period. We will further analyze the evolution of pedestal transport between ELMs, and by observing properties immediately after an ELM, we can gain insight of the change in edge pedestal parameters before and after ELMs.

[1] Stacey, W. M. 2004, Phys. Plasmas, 11, 5487.

John-Patrick Floyd II
Georgia Institute of Technology

Date submitted: 06 Jan 2012 Electronic form version 1.4