

Abstract Submitted  
for the DPP08 Meeting of  
The American Physical Society

**Comparison of RWM Stabilization Strategies in DIII-D**<sup>1</sup> S. YANG, E. SCHUSTER, Lehigh University, D.A. HUMPHREYS, M.L. WALKER, General Atomics, Y. IN, J.S. KIM, FAR-TECH, Inc. — One of the major non-axisymmetric instabilities under study in the DIII-D tokamak is the resistive wall mode (RWM), a form of plasma kink instability whose growth rate is moderated by the influence of a resistive wall. The FAR-TECH/General Atomics RWM dynamic model represents the plasma surface as a toroidal current sheet and represents the wall using an eigenmode approach. This dynamic model is used for the design of model-based controllers that have the potential of outperforming present proportional-derivative (PD) controllers. We report on validation of this dynamic model, a required step before implementation of any model-based controller in the DIII-D plasma control system. In addition, simulation results are presented comparing the performance of advanced controllers synthesized using the validated dynamic model and present non-model-based PD controllers.

<sup>1</sup>Supported by the Pennsylvania Infrastructure Technology Alliance (PITA), the NSF CAREER award program (ECCS-0645086), and the US DOE under DE-FG02-92ER54141, DE-FC02-04ER54698, DE-FG02-03ER83657, and DE-FG03-99ER82791.

S. Yang  
Lehigh University

Date submitted: 18 Jul 2008

Electronic form version 1.4