

Abstract Submitted  
for the DPP07 Meeting of  
The American Physical Society

**Robust Control of Resistive Wall Mode in DIII-D Based on Eigenmode Approach**<sup>1</sup> J. DALESSIO, E. SCHUSTER, LeHigh University, D.A. HUMPHREYS, M.L. WALKER, General Atomics, Y. IN, J.S. KIM, FAR-TECH Inc. — Control of the resistive wall mode (RWM) is a major focus of the DIII-D experimental program. The FAR-TECH DIII-D/RWM model represents the plasma surface as a toroidal current sheet and represents the wall using an eigenmode approach [1]. The magnitude and phase of the RWM plasma deformation is determined from a set of 22 poloidal field probes and saddle loops, and 12 in-vessel coils are used to oppose the deformation. The resulting model is reformulated into a robust control framework, with a parameter that maps to the growth rate of the system modeled as an uncertain parameter. A robust controller that stabilizes the system for a range of practical growth rates is proposed, tested through simulations, and compared to other control techniques. Implications for experimental implementation and use are discussed. [1] Y. In, *et al.*, Phys. Plasma **13**, 062512 (2006).

<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, and DE-FG02-03ER83657.

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Date submitted: 21 Jul 2007

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