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**Modeling and Simulation of Resistive Wall Mode Control In DIII-D**<sup>1</sup> M.L. WALKER, D.A. HUMPHREYS, T.H. JENSEN, J.A. LEUER, A. NEREM, E.J. STRAIT, General Atomics, A.M. GAROFALO, Columbia U. — Detailed dynamic response models have been developed for all relevant subsystems comprising the DIII-D resistive wall mode (RWM) closed loop control system. These include the switching power amplifiers (SPA), digital plasma control system (PCS), acquisition and control circuitry, and a fully toroidal model of plasma/vessel dynamics based on specification of the marginal wall position from stability codes such as GATO and DCON. These models have been validated with experimental data, including open-loop excitation of the SPA, PCS, and vacuum vessel dynamic responses, and measurement of the growth rate and mode structure of the unstable plasma. These models are incorporated into a closed-loop control simulation to investigate the control limitations which are due to realistic power supply responses. Consequences of and approaches to the intrinsically multi-variable RWM control problem are also investigated.

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Prefer Oral Session  
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