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**Nonlinear Simulation of DIII-D Plasma and Poloidal Systems Using DINA and Simulink<sup>1</sup>** M.L. WALKER, J.A. LEUER, R.D. DERANIAN, D.A. HUMPHREYS, General Atomics, R.R. KHAYRUTDINOV, Trinita Laboratory — Hardware-in-the-loop simulation capability was developed previously for poloidal shape control testing using Matlab Simulink [1]. This has been upgraded by replacing a linearized plasma model with the DINA nonlinear plasma evolution code [2]. In addition to its use for shape control studies, this new capability will allow study of current profile control using the DINA model of electron cyclotron current drive (ECCD) and current profile information soon to be available from the Plasma Control System (PCS) real time EFIT [3] calculation. We describe the incorporation of DINA into the Simulink DIII-D tokamak systems model and results of validating this combined model against DIII-D data.

[1] J.A. Leuer, *et al.*, 18th IEEE/NPSS SOFE (1999), p. 531.

[2] R.R. Khayrutdinov, V.E. Lukash, *J. Comput. Phys.* **109**, 193 (1993).

[3] J.R. Ferron, *et al.*, *Nucl. Fusion* **38**, 1055 (1988).

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- Prefer Oral Session  
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