

Abstract Submitted
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Sorting Category: 5.1.1.2 (Experimental)

Implementation of a Multivariable Shape Controller on DIII-D¹ J.A. LEUER, J.R. FERRON, D.A. HUMPHREYS, A.W. HYATT, B.G. PENAFLORE, M.L. WALKER, General Atomics, R.R. KHAYRUTDINOV, V.E. LUKASH, TRINITY Laboratory — A model based, multivariable shape controller has been designed and implemented in the DIII-D plasma control system (PCS). Here we describe the modeling approach, controller design, simulation, and the first successful experimental test of the controller on DIII-D. Comprehensive models of all major electromagnetic components have been developed, including a physics based, linearized plasma response model. A rigorous model-based design methodology is used to develop a multiple-input-multiple-output (MIMO) control algorithm which is expected to improve static and dynamic shape and position response and provide a framework for development of advanced shape and current profile controllers. The models are incorporated in a simulator which allows validation of the control algorithm within the PCS while running in closed loop with the simulator. In the first test on DIII-D the controller provided stable operation and good steady state shape control throughout the primary part of the plasma discharge.

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Prefer Oral Session
 Prefer Poster Session

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Special instructions: DIII-D Poster Session 2, immediately following DL Rudakov

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