Abstract Submitted
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DIII-D Integrated Control Design Suite in Worldwide Use for High Confidence Plasma Control[1] A.S. WELANDER, R.D. DERANIAN, J.R. FERRON, D.A. HUMPHREYS, R.D. JOHNSON, R.J. LA HAYE, J.A. LEUER, B.G. PENAFLOR, M.L. WALKER, GA, D. GATES, J. MENARD, D. MUELLER, PPPL, R.R. KHAYRUTDINOV, TRINITI Lab — Making efficient use of experimental time in tokamaks means minimizing use of operations to develop control algorithms. High power devices such as ITER will require commissioning of controllers with minimal experimental development time. A systematic process in which controllers are designed based on experimentally validated models and verified against simulations can provide the necessary high level of confidence without experimental time. We describe development of a suite of tools implementing this approach, known as "integrated plasma control," along with examples of its application to DIII-D and other tokamaks worldwide. These examples include algorithms for neoclassical tearing mode suppression and efficient shape control. Use of these methods has resulted in high confidence controllers that were successful in first-time use and has motivated the use of the DIII-D suite of tools on NSTX, KSTAR, EAST, and ITER.

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