

Abstract Submitted
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ITER Vertical Stability and Shape Control Studies¹ L.L. LODESTRO, R.H. BULMER, W.H. MEYER, L.D. PEARLSTEIN, LLNL, D.A. HUMPHREYS, M.L. WALKER, GA — A tokamak plasma's vertical stability and shape control system is a critical component of experimental operation. The recent ITER Design Review and subsequent STAC tasks have produced significant modifications to the original ITER vertical stability control system, which used only the outboard coils, PF2-5 ("VS1" circuit). The addition of a new in-vessel coil set ("VS3") for vertical control is predicted to augment the control robustness sufficiently to match performance typical of operating devices for similar levels of noise and disturbance amplitude (scaled to minor radius). In this paper we present results of our recent studies of this new system. Linear control-level models are used to analyze controllability and to design controllers, using the GA TokSys toolbox. These controllers are then implemented in more detailed simulations to evaluate their performance under nonlinear conditions. We present Corsica simulations of ITER Baseline 2008 design using these controllers, including controlled and uncontrolled vertical stability events, and flattop and rampdown phases, providing an assessment of the ITER Baseline coil system.

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