

Abstract Submitted
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Improved Vertical Stability Model for NSTX-U M.G. NIGH, UW-Platteville, D.J. BATTAGLIA, M.D. BOYER, PPPL — Establishing stable plasma discharges at large plasma elongation ($\kappa \geq 2.5$) with real-time vertical position control is critical for the mission of the National Spherical Torus Experiment Upgrade (NSTX-U) to realize large normalized β ($\beta_N > 4$) concurrently with large non-inductive current fraction. A database of NSTX-U discharges is utilized to establish the maximum controllable open-loop vertical instability growth rate realized during operations in 2016. A closed-loop simulation of the real-time vertical position control on NSTX-U was developed to investigate the potential for improvements of the vertical control strategy and to quantify the impact of the poloidal field coil power supplies on the vertical position control near the controller limits. Specifically, the impact of switching transients on the actuators and measurements will be investigated in order to potentially motivate improvements to the power supplies or magnetic measurements.

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