

Abstract Submitted
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Plasma performance improvements from optimized error field correction in NSTX¹ J.E. MENARD, S.P. GERHARDT, D.A. GATES, S.A. SABBAGH, NSTX RESEARCH TEAM — The active suppression of n=1 resonant field amplification (RFA) of intrinsic error fields was previously shown to lead to pulse length extension at high beta in NSTX. The correction of intrinsic n=3 error fields was also found to maintain/increase plasma rotation near the plasma boundary resulting in further pulse length extension for operation above the no-wall limit. More recently, the optimal n=3 error field correction (EFC) was determined as a function of plasma current indicating that n=3 intrinsic EF is most likely related to the PF or TF coil system rather than the OH coil as is the case for the n=1 intrinsic EF. Importantly, n=2 error fields were also investigated and measured to be small, indicating odd-n (n=1 and 3) EFs are most prominent in NSTX. Finally, the time response of the n=1 RFA suppression has been optimized by optimizing the low-pass filtering and proportional gain to more robustly control n=1 RFA and unstable n=1 RWMs. Overall, the combined n=3 EFC and n=1 RFA and RWM control has been instrumental in reliably increasing the duration of operation above the no-wall limit. This improved control was used in achieving record pulse-lengths on NSTX and is being applied to a wide range of operating scenarios in NSTX.

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