Abstract Submitted
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Improved feedback control of wall-stabilized kink modes with different plasma-wall couplings and mode rotation[1] Q. PENG, J.P. LEVESQUE, C.C. STOAFER, D.J. RHODES, P.E. HUGHES, P.J. BYRNE, M.E. MAUEL, G.A. NAVRATIL, Columbia University — The HBT-EP tokamak can excite strong, saturated kink modes whose growth rates and rotation frequencies evolve on a millisecond timescale. To control such modes, HBT-EP uses a GPU-based feedback system in a low latency architecture [1]. When feedback is applied, the mode amplitude and rotation frequency can change quickly. We describe an improved algorithm that captures the rapid phase changes in the mode while also removing transient amplitude jumps. Additionally, the control coil driving signal is implemented using a current-controller instead of a voltage-controller. The feedback performance is improved and has been tested under more unstable regimes, including different wall configurations and plasmas slowed by a bias probe. Feedback suppression is observed in all cases and the feedback parameters' dependency on different experimental conditions is studied.

[1] N. Rath, *et al.*, Fusion Eng. Des., **87**, 1895 (2012).

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