Abstract Submitted
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Kalman Filters to Reduce Noise Effects during External Kink Control[1] M.E. MAUEL, J. FARRINGTON, J. BIALEK, O. KATSURO-HOPKINS, A. KLEIN, D.A. MAURER, G.A. NAVRATIL, T.S. PEDERSEN, Columbia University — Magnetic feedback control of the resistive wall mode in tokamaks use derivative (and proportional) gain in order to optimize stabilization[2,3] and to adjust the phase response during control of rotating kinks.[4] Derivative gain amplifies noise and can lead to large and undesirable fluctuations in the feedback control current. In this poster, a recipe is presented for the implementation of a Kalman filter that tracks kink mode dynamics as recently described.[5] Numerical simulations demonstrate the use of the control algorithm for various configurations of magnetic field sensors and control coils used in the HBT-EP device. By properly tracking both the wall and plasma modes, feedback control is maintained up to the ideal wall limit in rotating discharges in the presence of measurement noise.

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[4]A.Klein, *et al.*, Phys. Plasmas, **12**, 040703 (2005).
[5]M. E. Mauel, *et al.*, Nuc. Fusion, **45**, 285 (2005).

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