

Abstract Submitted  
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**Development of State-Space Model-Based Kalman Filter for  $n \geq 1$  Resistive Wall Mode (RWM)**<sup>1</sup> Y. IN, J.S. KIM, J. KIM, FAR-TECH Inc., D.A. HUMPHREYS, G.L. JACKSON, R.D. JOHNSON, R.J. LA HAYE, E.J. STRAIT, M.L. WALKER, General Atomics, A.M. GAROFALO, H. REIMERDES, Columbia U., M. OKABAYASHI, PPPL, E. SCHUSTER, Lehigh U. — While significant progress has been made for  $n = 1$  RWM identification and control, it is now predicted that  $n > 1$  RWMs could appear even after the  $n = 1$  RWM is suppressed. Algorithm development, as well as diagnostic capability enhancement, is being done in order to identify the  $n = 2$  or  $3$  RWMs in the presence of a stabilized  $n = 1$  RWM for DIII-D. Specifically, taking advantage of the successful development of the Kalman filter to discriminate ELM noise from an  $n = 1$  RWM [1], a more advanced Kalman filter is being developed to detect both  $n = 1$  and  $n > 1$  RWMs. Noise characterization and modeling is deemed critical to determine the optimized Kalman gain. This multi-mode state-space model will also serve as a basis to design a model-based RWM feedback controller. [1] Y. In *et al.*, Phys. Plasmas **13**, 062512 (2006).

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