

Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Development of State-Space Model-Based Kalman Filter for $n \geq 1$ Resistive Wall Mode (RWM)¹ 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).

¹Supported by the US DOE under DE-FG02-ER83657, DE-FC02-04ER54698, DE-FG02-89ER53297, DE-AC02-76CH03073, and DE-FG02-92ER54141.

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Date submitted: 21 Jul 2007

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