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Model-based RWM Identification, ELM-Filtering, and RWM Control on the DIII-D Tokamak[1] Y. IN, J.S. KIM, FARTECH, Inc., M.S. CHU, J.R. FERRON, D.A. HUMPHREYS, G.L. JACKSON, R.J. LA HAYE, R.D. JOHNSON, J.T. SCOVILLE, E.J. STRAIT, A.D. TURNBULL, M.L. WALKER, GA, A.M. GAROFALO, H. REIMERDES, Columbia U., M.S. CHANCE, M. OKABAYASHI, PPPL — Resistive-wall-mode (RWM) modeling helps not only to identify the RWM mode, but also to optimize model-based control. Based on modeled sensor signals, a static matched filter is constructed to identify the RWM mode. Using a "picture frame" wall model, a dynamic Kalman filter has been developed to discriminate edge localized modes (ELMs) from RWMs. From this ELM-filtered RWM mode identification, an enhanced RWM feedback controller has been implemented for DIII-D plasmas. Recent experiments showed the effectiveness of the Kalman filter scheme; the feedback coils were rarely excited during ELMs, while responding to RWMs. To investigate proper RWM responses, an optimized Kalman filter parameter set has been found and evaluated. Meanwhile, using a thin wall treatment, an eigenmode approach has been adopted to represent the vessel more accurately.

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