

Abstract Submitted
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Effects of ELM and Sawtooth Crashes on RWM Control Performance¹ A. BATTEY, J.M. HANSON, F. TURCO, G.A. NAVRATIL, Columbia U. — The impact of ELM crashes on DIII-D RWM feedback performance was evaluated in order to improve control robustness. The advanced RWM control algorithm recently implemented for DIII-D incorporates a Kalman filter observer that assumes white, Gaussian measurement noise. Contrary to this assumption some sources of plasma-generated noise such as ELM and sawtooth crashes are better described as discrete, delta function-like events. These events can propagate through the feedback algorithm, leading to large transient and possibly deleterious control commands. However, RWM control has previously been observed to suppress the transient plasma response following ELM crashes. Thus, maintaining some level of RWM feedback response during the ELM transient may be optimal. We will present simulations from an improved control algorithm, which aims to differentiate between quick ELM-like events and unstable RWMs. This approach can potentially improve feedback robustness and reduce the amount of power needed to maintain feedback control, improving the viability of a feedback controlled fusion device.

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