

# Feedback control of the proximity to marginal RWM stability using active MHD spectroscopy

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**Abstract.** DIII-D experiments yield the first proof-of-principle results in feedback control of the proximity to the resistive wall mode (RWM) stability boundary using an active MHD spectroscopic stability measurement and neutral beam injection heating. In contrast to calculations of the stability of reconstructed equilibria, the spectroscopic measurement is independent of the assumed RWM stability model. The real-time implementation enables the control system to react to unforeseen changes in plasma parameters and hence stability limits. In the experimentally accessed regime, near but below the ideal MHD no-wall limit for the  $n = 1$  external kink instability, the control dynamics are described by a linear model that depends on the plasma stored energy. This model is used to aid in optimizing feedback gain settings.

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