Category Number and Subject: 5.6.2 DIII-D Tokamak

[ ] Theory   [x] Experiment

Resistive Wall Mode Feedback Control in a Simple Analytic Model,★ E.J. Strait, G.L. Jackson, R.J. La Haye, J.T. Scoville, *GA,* A.M. Garofalo, G.A. Navratil, H. Reimerdes, *Columbia U.*, M. Okabayashi, *PPPL* – A simple slab model [1] can yield valuable insights into the dynamics of resistive wall mode feedback control, even without fully realistic geometry, since it allows easy comparison of sensor configurations, feedback algorithms, and amplifier characteristics. For example, the model shows that the appropriate choice of sensors allows stabilization of modes with growth rates exceeding a single-pole upper cutoff frequency in the open-loop transfer function, such as might be caused by coil inductance. With experimental values of key parameters, the predicted strength of the least stable mode that can be controlled by feedback is in good agreement with DIII-D results. The model predicts that performance of the DIII-D system could be improved by increasing the bandwidth of the amplifiers and control system.

[1]   A.M. Garofalo, et al., Phys. Plasmas **9**, 4573 (2002).