Resistive wall mode stabilization studies at DIII-D

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Abstract. The effort to understand the physics of the resistive wall mode (RWM) and develop methods to control this magnetohydrodynamic mode to allow achievement of higher pressure in advanced tokamak (AT) plasmas has been an example of successful multi-institutional collaboration at the DIII-D National Fusion Facility in San Diego. DIII-D research in this area has produced several advances and breakthroughs following a coordinated research plan involving a sequence of measurements, development of new analysis tools, and the installation of new diagnostic and feedback stabilization hardware: suppression of the RWM by active magnetic feedback has been demonstrated using the DIII-D six-element error field correction coil (C-coil), rotational stabilization of the RWM has been demonstrated and sustained for all values of the plasma pressure from the no-wall to the ideal-wall stability limits, improved RWM feedback stabilization has been shown using a new set of 12 internal control coils (I-coil), newly developed models of feedback have shown good agreement with the measurements. By so doing, the DIII-D

work on RWM stabilization has become a cornerstone of the long-term AT program and is having impact on the world fusion program. Presently both ITER and FIRE are including plans for RWM stabilization in their programs.

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