

Analysis of stable resistive wall modes in a rotating plasma

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Measurements of the resistive wall mode (RWM) response to external resonant field pulses yield complete knowledge of the mode characteristics in the parameter range explored. An ideal magnetohydrodynamics (MHD) model [A.M. Garofalo, *et al.*, Phys. Plasmas **9**, 4573 (2002)] has been generalized to include the effects of plasma rotation and dissipation, and the new model is found to explain quantitatively the experimental observations. Rotation of the RWM with respect to the wall is often described as an essential feature of the mechanism by which plasma rotation stabilizes the RWM. This interpretation of the rotational stabilization of the RWM appears inconsistent with the measurements from recent DIII-D [J.L. Luxon and L.G. Davis, Fusion Technol. **8**, 441 (1985)] experiments. It is found that the theoretically predicted mode rotation with respect to the wall is not needed for stabilization and is only a consequence of torque balance in absence of magnetic-field nonaxisymmetries.