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Multiply Resonant Resistive Stability in DIII-D Plasmas[1] D.P. BRENNAN, A.D. TURNBULL, M.S. CHU, L.L. LAO, General Atomics, L.E. SUGIYAMA, Massachusetts Institute of Technology — MHD stability of resistive modes in the presence of multiple resonant surfaces, including central sawtooth oscillations, is examined using reconstructions of experimental equilibria in DIII-D. Coupling to other rational surfaces, especially the 1/1, is important even at low beta. The outer ideal MHD and inner tearing layer solutions are important in determining mode stability. The PEST3 code is used to determine matrix solutions for the ideal MHD n=1 mode that has singular jumps at each rational surface. This outer region matrix of solutions is matched asymptotically to the resistive MHD inner layer solutions, where the equilibrium configuration differs significantly in high and low beta plasmas. The most important effects in the dispersion relation are the resistive interchange parameter D_R and the coupling to the 1/1 surface. Two-fluid diamagnetic effects were examined in the uncoupled case, and modify the growth rates significantly. Electron and ion diamagnetic effects are important at large diamagnetic frequencies.

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