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**Dynamics of m=0 Modes in the RFP** D. CRAIG, A.M. FUTCH, R. HESSE, Wheaton College, Wheaton, IL USA, C.M. JACOBSON, University of Wisconsin - Madison, WI USA — In the reversed field pinch (RFP), poloidal mode number m=0 fluctuations are driven by nonlinear coupling in standard sawtoothing plasmas but are unstable in improved confinement plasmas. We explore how the rise and fall time of these m=0 fluctuations depends on the type of event and the resistivity and viscosity. Visco-resistive MHD simulations using the DEBS code reveal that the resistivity, the viscosity, and the radial profiles of these all play a role. Analysis of standard sawteeth in MST experiments shows that the rate of rise observed in experiment is consistent with the code results but that the rate of decay is faster in experiment and more weakly dependent on S. The rise of the m=0 modes at the sawtooth crash is well described by nonlinear, visco-resistive MHD and primarily determined by the initial conditions heading into the crash rather than the dissipation during the crash. In contrast, the duration and decay of the elevated m=0 mode amplitude during a crash event is more dependent on the amount and profile of dissipation. The rise and fall time for unstable m=0 modes during improved confinement discharges in MST is faster than for stable m=0 modes in standard plasmas. Events of this type have yet to be observed in MHD computation and the dependence on resistivity and viscosity in these cases is therefore less fully explored.
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