Abstract Submitted
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Magnetic field and velocity fluctuations with and without a reversal surface in the RFP D. MARTIN, D. CRAIG, Wheaton College (IL), D.J. DEN HARTOG, M.R. NORNBERG, J.A. REUSCH, University of Wisconsin - Madison, MST TEAM — Fluctuations in the standard Reversed Field Pinch (RFP) are dominated by poloidal mode numbers m=0 and m=1. The velocity and magnetic fluctuations generate an emf which redistributes current in the plasma. In experiments, the m=0 mode amplitude and the emf due to m=1 modes are both highly dependent on the existence of the reversal surface in the plasma. We investigate the role of the reversal surface on magnetic and velocity fluctuations using the DEBS resistive magnetohydrodynamic (MHD) code. As in the experiment, we find that m=0 modes are suppressed through the removal of the reversal surface but m=1 magnetic fluctuation amplitudes are not strongly affected. However, the suppression of m=0 fluctuations is much more sudden in the experiment than in the code. Using the outputs of the code, we calculate the line-integrated velocity fluctuation correlated with specific magnetic modes measured at the edge. This facilitates comparisons between experimental and computational measures of velocity fluctuations. As in experiment, decreased m=1 velocity fluctuations are observed in the code without a reversal surface present but the change in phase between v and b observed in experiment is not reproduced in the code. We speculate that the phase change observed in the experiment may be due to the contribution of advection of the mean flow profile by the magnetic fluctuations, an effect not present in the code.
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