Abstract Submitted
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Outward Poynting flux due to electromagnetic fluctuations in an RFP[1] D.J. THUECKS, K.J. MCCOLLAM, D.R. STONE, University of Wisconsin-Madison; Center for Magnetic Self-Organization in Laboratory and Astrophysical Plasmas — In a reversed-field pinch (RFP) driven by a toroidal electric field, tearing modes not only generate the net EMF that sustains the equilibrium profile but are also expected to produce an outward flow of electromagnetic energy, or Poynting flux, to be dissipated at the plasma edge. In MST experiments, insertable edge probes measure both electrostatic $\tilde{E}$ and magnetic $\tilde{B}$ fluctuations, which are used to reconstruct the flux-surface average Poynting flux $< \tilde{E} \times \tilde{B} >$ as it varies with minor radius, time, and equilibrium parameters. Our initial results indicate that this outward flux is a significant fraction of the total input power on time average and increases to large values during the brief periods surrounding discrete magnetic relaxation events, or sawtooth crashes. The flux decreases with radius outside of the reversal surface, suggesting that the electromagnetic energy is deposited there and dissipated into the plasma. These results are qualitatively similar to expectation from a simple model of an incompressible fluid plasma with a solid, resistive boundary.

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