Abstract Submitted
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Turbulent cascade of magnetic and kinetic energy in RFP plasmas[1] A.F. ALMAGRI, D.J. THUECKS, J.S. SARFF, P.W. TERRY, University of Wisconsin-Madison; Center for Magnetic Self-Organization in Laboratory and Astrophysical Plasmas — The dominant magnetic fluctuations in the reversed field pinch arise from large-scale tearing instabilities, but a broadband spectrum is also observed. Recent measurements in MST suggest that short wavelength fluctuations (spatially resolved to the ion gyro-radius scale, $\sim$1cm in our experiment) in both magnetic and electric fields arise via a nonlinear cascade driven by the tearing modes, but the mechanism responsible for energy transfer across scales remains poorly understood. Magnetic fluctuations dominate the power spectrum in the plasma edge at low frequencies ($f \leq 80$ kHz) but electric field fluctuations become dominant at high frequencies. This observation, paired with measurements of the coherence between fluctuations in magnetic and electric fields, may indicate different mechanisms are responsible for transferring energy across scales in the two spectra. Coherences between electric and magnetic fluctuations peak near the frequency where the fluctuation powers are found to be in equipartition. In addition to measuring coherences in frequency-wavenumber space, we will also examine radial coherence lengths and radial phases of electrostatic fluctuations to assist in identifying the mechanisms at work.

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