Abstract Submitted
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Turbulent Dissipation and Anomalous Viscosity in MST Reversed Field Pinch Plasma.[1] ABDULGADER ALMAGRI, University of Wisconsin-Madison, JAMES TITUS, FAMU, PAUL TERRY, JOHN SARFF, University of Wisconsin-Madison, EPHREM MEZONLIN, FAMU — During the sawtooth cycle in MST RFP plasmas, tearing mode magnetic fluctuations with $m = 1$, $n =$ 5-10 are linearly unstable and grow to 2-3% of the mean magnetic field. Through nonlinear coupling this growth culminates in a strong reconnection event and broad spectrum extending to the ion gyroradius scale. An insertable magnetic probe is used to measure the equilibrium magnetic field and the poloidal and toroidal components of magnetic fluctuations. Using two-point correlation techniques the fluctuation power spectrum $S(k_{per})$ is measured in the plasma edge for r/a from 0.75 to 0.96. The magnetic fluctuation spectrum evolves over a sawtooth cycle. Away from the reconnection event, dissipation is limited and the spectrum is nearly a pure power law. At the reconnection event, the spectrum has an exponential component that causes deviations from a power law above a dissipative wavenumber k_d. For $r/a =$ 0.81 $k_d = 0.8$ cm^{-1} implying dissipation that is too large to be classical, but is consistent with anomalous viscosity. The corresponding anomalous viscosity is 36 m^2/s consistent with a previous measurement of anomalous viscosity from plasma flow damping. The power spectrum, radial profiles of k_d, and the connection to observed ion heating during reconnection will be presented.

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