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Dissipation Range of Anisotropic Magnetic Fluctuations in MST plasmas[1] JAMES B. TITUS, Florida A&M University, ABDULGADER F. ALMAGRI, PAUL W. TERRY, JOHN S. SARFF, University of Wisconsin - Madison, EPHREM D. MEZONLIN, Florida A&M University — Previous measurements of broadband magnetic fluctuations in the Madison Symmetric Torus (MST) revealed a turbulent cascade that is anisotropic with respect to the large-scale (equilibrium) magnetic field and characterized by a power spectrum with exponential falloff at scales larger than expected for classical processes. The cascade is supported by tearing instabilities at the global scale that undergo strong nonlinear coupling. The non-classical dissipation feature may be indicative of the powerful non-collisional ion heating observed in MST plasmas. We report new measurements with increased spatial resolution, by decreasing the distance between coils (4 mm) and increasing the number of coils (7) in each direction. Initial analysis shows similar anisotropic behavior for larger values of $k$but with a modest difference in the spectral characteristics. In particular, the exponential falloff appears to weaken at shorter wavelengths, suggesting strong dissipation occurs over an intermediate range of scales somewhat larger than the ion gyroradius. Also, the power spectrum is much steeper at small scales during pulsed poloidal current drive and non-reversed plasmas, where tearing instability and/or non-linear coupling is reduced.

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