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Magnetic Fluctuation Spectrum in the RFP P.W. TERRY, V. TANGRI, J.S. SARFF, A.F. ALMAGRI, Y. REN, G. FIKSEL, S.C. PRAGER, University of Wisconsin-Madison — Cascading magnetic turbulence is observed in MST. However, the spectrum is better fit by exponential decay than a power law, suggesting dissipation is important. To probe the processes at play we extend the dissipation range energy transfer arguments of Corrsin[1] to MHD turbulence, and consider multiple dissipation mechanisms, including energy absorption by impurity ions from cyclotron resonance damping. The latter is believed to be important from anomalous ion heating observations. When cyclotron damping dominates at lower wavenumber than viscous or resistive dissipation, and the densities of multiple charge state impurities produce a cyclotron damping rate that is roughly constant in wavenumber, exponential decay in the dissipation range gives way to an inertial range power law at higher wavenumber. We fit the theoretical spectrum to MST data, obtaining values for the cyclotron damping rate and the turbulent dissipation rate. These are compared to independent theoretical calculations. Implications for solar wind and interstellar turbulence are discussed.

[1]S. Corrsin, Phys. Fluids 7, 1156 (1964).

Paul Terry
University of Wisconsin-Madison

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