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Electrostatic kinetic turbulent cascade of entropy in magnetized plasmas[1] T. TATSUNO, W. DORLAND, U Maryland, A.A. SCHEKOCHIHIN, Imperial, S.C. COWLEY, UCLA — Upon the outstanding agreement of Goldreich & Sridhar theory on astrophysical MHD turbulence with the assumption of anisotropy and critical balance [1], one may construct a gyrokinetic turbulent theory to explore the microscale behavior below the ion gyroscale [2]. In the global regime, it is shown that the fluctuations corresponding to Alfvén dynamics cascade independently from other fluctuations and that they don't exchange energy with one another as far as reduced MHD ordering holds. Applying the similar ordering to kinetic regime, we are led to gyrokinetic equations, which again support the cascades of kinetic Alfvén and compressive fluctuations without energy exchange. Thus we may conjecture that each fluctuation component exchanges energy at the ion gyroscale due to the strong coupling and start to cascade without energy exchange again below. Performing electrostatic decaying turbulence simulations with Boltzmann electrons using the gyrokinetic code `AstroGK`, we here show the first computational results of the one component, entropy cascade in the absence of kinetic Alfvén fluctuations, below the ion gyroscale. The preliminary calculation shows that the turbulent spectra agree very well with the predicted theory. [1] P. Goldreich & S. Sridhar, Astrophys. J. **438**, 763 (1995). [2] A. A. Schekochihin *et al.*, submitted to Astrophys. J.

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