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Stratified Turbulence, Heating, Cooling and Diffusion in Galaxy Clusters

Monday, 11 August 2014 16:00 (25 minutes)

I will discuss what can be inferred about the structure of stratified turbulence in galaxy clusters from basic assumptions such as a generalised principle of critical balance [3,4]. I will then discuss how the conclusions from this exercise lead to a useful prescription for deducing velocity spectra in the ICM from the density fluctuation spectra [2] (measurable by existing X-ray observatories). One of the most striking observational consequences one can draw from such observations is that turbulent heating and radiative cooling in the cores of the brightest galaxy clusters appear to match each other locally in radial location (upcoming paper by I. Zhuravleva et al. [1]). Finally, I will discuss the role of turbulent diffusion vs. turbulent heating in a stratified ICM.

References:
[1] I. Zhuravleva, E. M. Churazov, A. A. Schekochihin et al. 2014, submitted
[2] I. Zhuravleva et al. 2014, ApJ 788, L13 [arXiv:1404.5306]
[3] S. V. Nazarenko & A. A. Schekochihin 2011, JFM 677, 134 [arXiv:0904.3488]
[4] A. A. Schekochihin, I. Zhuravleva & E. M. Churazov 2014, in preparation

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