Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Compressive fluctuations in astrophysical gyrokinetic plasmas
ANJOR KANEKAR, WILLIAM DORLAND, University of Maryland, College Park, ALEXANDER SCHEKOCHIHIN, Oxford University, NOAH MANDELL, University of Maryland, College Park — In the gyrokinetic description of plasma, at length scales larger than ion larmor radius, compressive fluctuations are passively advected by Alfvenic turbulence [A. A. Schekochihin et al. ApJS 182 310]. Linearly, these fluctuations are Landau damped, with a damping rate proportional to their wavenumber along the guide field. However, the nonlinear behavior of these fluctuations is still poorly understood. Particularly, whether compressive fluctuations undergo a parallel cascade is still an open question. We have developed a new code using CUDA for a graphics processor, which solves reduced equations rigorously derived from gyrokinetics for these scales. We present theory and numerical results from the new code exploring the question of parallel cascade for compressive fluctuations.

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Date submitted: 13 Jul 2012 Electronic form version 1.4