Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Simulations of Kinetic Alfvén Wave Turbulence Over a Range of Outer Length Scales[1] KURT SMITH, PAUL TERRY, University of Wisconsin-Madison, CMSO — We compare a three-field model for kinetic Alfvén Wave turbulence with a two-field model that is the small-scale limit of the three-field system. The three-field system couples electron density fluctuations with the bulk flow and magnetic fields, and the two-field simplification, studied in previous work, couples electron density and magnetic fields only. The two-field system has been shown in simulations to yield non-Gaussian electron-density perturbations under a range of dissipation parameters (diffusivity and resistivity). The non-Gaussian statistics have enhanced tails, consistent with Lévy-tailed distributions inferred from pulsar scintillation measurements. Landau damping is expected to be significant in the small-scale regime, which motivates our study of the larger-scale three-field system to determine whether non-Gaussian statistics can result in a regime not expected to be as strongly damped. We present simulations of the three-field system with a variety of outer length scales relative to the ion-sound gyroradius, and compare the results to the small-scale limit.

[1]Work supported by the NSF

Kurt Smith
University of Wisconsin-Madison

Date submitted: 17 Jul 2009 Electronic form version 1.4