Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

A Weakened Cascade Model for Solar Wind Turbulence GREGORY HOWES, JASON TENBARGE, University of Iowa, STEVEN COWLEY, EURATOM/CCFE Association, Culham, WILLIAM DORLAND, University of Maryland, ELIOT QUATAERT, UC Berkeley, ALEXANDER SCHEKOCHIHIN, University of Oxford — A refined cascade model for kinetic turbulence in weakly collisional astrophysical plasmas is presented that includes both the transition between weak and strong turbulence and the effect of nonlocal interactions on the nonlinear transfer of energy. The model describes the transition between weak and strong MHD turbulence and the complementary transition from strong kinetic Alfven wave (KAW) turbulence to weak dissipating KAW turbulence, a new regime of weak turbulence in which the effect of shearing by large scale motions and continued kinetic dissipation play an important role. The inclusion of the effect of nonlocal motions on the nonlinear energy cascade rate in the dissipation range, specifically the shearing by large-scale motions, is proposed to explain the nearly power-law energy spectra observed in the dissipation range of both kinetic numerical simulations and solar wind observations.

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Date submitted: 16 Jul 2010 Electronic form version 1.4