Geophysical Research Abstracts,
Vol. 11, EGU2009-4788, 2009
EGU General Assembly 2009


# Energy Cascades in MHD

A. Alexakis
Laboratoire de physique statistique, Ecole Normale Supérieure, Paris, France (aalexakis@gmail.com)

Most astrophysical and planetary systems e.g., solar convection and stellar winds, are in a turbulent state and coupled to magnetic fields. Understanding and quantifying the statistical properties of magneto-hydro-dynamic (MHD) turbulence is crucial to explain the involved physical processes. Although the phenomenological theory of hydro-dynamic (HD) turbulence has been verified up to small corrections, a similar statement cannot be made for MHD turbulence. Since the phenomenological description of Hydrodynamic turbulence by Kolmogorov in 1941 there have been many attempts to derive a similar description for turbulence in conducting fluids (i.e Magneto-Hydrodynamic turbulence). However such a description is going to be based inevitably on strong assumptions (typically borrowed from hydrodynamics) that do not however necessarily apply to the MHD case. In this talk I will discuss some of the properties and differences of the energy and helicity cascades in turbulent MHD and HD flows. The investigation is going to be based on the analysis of direct numerical simulations. The cascades in MHD turbulence appear to be a more non-local process (in scale space) than in Hydrodynamics. Some implications of these results to turbulent modeling will be discussed