

2007 Fall Meeting  
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[Kolmogorov Versus Iroshnikov-Kraichnan Spectra: Consequences for Ion Heating in the Solar Wind](#)

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**AB**Whether the phenomenology governing MHD turbulence is Kolmogorov or Iroshnikov-Kraichnan (IK) remains an open question, theoretically as well as observationally. The ion heating profile observed in the solar wind provides a strong, if indirect, observational constraint on the relevant phenomenology. Recent studies of a solar wind heating model based on Kolmogorov spectral scaling have produced reasonably good agreement with observations, provided the effect of turbulence generation due to pickup ions is included in the model. Without including the pick-up ion contributions, the Kolmogorov scaling predicts a proton temperature profile that decays too rapidly. In the present study, we incorporate in this heating model the energy cascade rate based on IK scaling, and show that the model yields higher proton temperatures, within the range of observations, with or without the inclusion of pickup ions. Furthermore, the turbulence correlation lengths governed by IK scaling seem to follow better the trend of observations. In addition to a self-consistent treatment of pickup ions, we also include in our study the effects of finite cross-helicity. This work is supported by DOE, NSF and NASA.

DE: 2134 Interplanetary magnetic fields

DE: 2149 MHD waves and turbulence (2752, 6050, 7836)

DE: 2152 Pickup ions

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SC: SPA-Solar and Heliospheric Physics [SH]  
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