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How Do Alfven Wave Collisions Dominate the Properties of Plasma Turbulence? G.G. HOWES, J.M. TENBARGE, K.D. NIELSON, University of Iowa, D.J. DRAKE, Valdosta State University, J.W.R. SCHROEDER, F. SKIFF, C.A. KLETZING, University of Iowa, T.A. CARTER, UCLA — Turbulence plays a key role in the evolution of space and astrophysical plasmas, mediating the transfer of energy from large-scale turbulent motions to small scales where the turbulent energy is ultimately converted to plasma heat. The cascade of energy from large to small scales is mediated by the nonlinear interaction between counterpropagating Alfven waves, or Alfven wave "collisions," the fundamental building block of astrophysical plasma turbulence. These nonlinear interactions are inherently three-dimensional, and the mathematical properties of the nonlinearity govern the nature of the turbulent cascade, dictating the phase relationships between fluctuations at different scales that give rise to structure in the turbulence. Here, we present a synthesis of recent results that illuminates the nature of turbulence in weakly collisional plasmas, such as the solar wind and solar corona. We explore how the nonlinearity controls the development of structure in plasma turbulence.

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