Abstract Submitted
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Three-Dimensional Hybrid-Kinetic Simulations of Alfvnic Turbulence in the Solar Wind[1] LEV ARZAMASSKIY, MATTHEW KUNZ, Princeton University, BEN CHANDRAN, University of New Hampshire, ELIOT QUATAERT, University of California, Berkeley — It is well established that the solar wind is turbulent, exhibiting a power spectrum extending over several decades in scale and with most of the energy at large scales is in form of Alfvénic fluctuations. The solar wind is also weakly collisional, with a wide variety of non-Maxwellian features observed in the particle distribution functions. In this talk, we present the first hybrid-kinetic three-dimensional simulations of driven Alfvénic turbulence in the solar wind. We confirm power-law indices obtained in previous analytical and numerical (e.g., gyrokinetic) studies, and carefully explore the location of and physics occurring at the ion Larmor scale. In the low-beta regime, we find evidence of stochastic heating, which arises when ions interact with strong fluctuations at wavelengths comparable to the ion Larmor scale. Finally, we discuss the interpretation of spacecraft measurements of the turbulence by testing the Taylor hypothesis with synthetic spacecraft measurements of our simulation data.

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