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Kinetic Simulations of Astrophysical Collisionless Turbulence VADIM ROYTERSHTEYN, YURI OMELCHENKO, Space Science Institute, HOMA KARIMABADI, CureMetrix, Inc — In many astrophysical systems collisionless plasma turbulence is thought to play a significant role in mitigating energy transport across scales. For example, local energy input from dissipation of turbulence is often invoked to explain the energy balance of the solar corona and the solar wind. At the same time, understanding of the dissipation mechanisms in collisionless plasma turbulence remains incomplete to say the least. We discuss our recent results from kinetic simulations of collisionless turbulence with parameters relevant to the solar wind. Specifically, large-scale hybrid simulations (fully kinetic ions and massless fluid electrons) are used to study ion anisotropies and dynamics of current sheets and magnetic reconnection at MHD scales. Fully kinetic particle-in-cell simulations are used to study the dynamics of turbulence at and below proton scales, focusing on formation of electron-scale current sheets and coupling between fluctuations at relatively low and high frequencies (compared to proton gyrofrequency).

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