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**Current sheets and heating in fluid and kinetic simulations of MHD turbulence** KIRIT MAKWANA, FAUSTO CATTANEO, Univ of Chicago, HUI LI, WILLIAM DAUGHTON, Los Alamos National Laboratory, VLADIMIR ZHDANKIN, Univ of Wisconsin-Madison — Magnetohydrodynamic (MHD) turbulence is often invoked as a way to convert magnetic and kinetic energy in large scale plasma motions to thermal energy of plasma particles, thus leading to energy dissipation. However, collisional diffusion is very weak in plasmas. It is believed that kinetic diffusion processes might play an important role in the dissipation mechanism. To understand such processes, we analyze MHD turbulence using both fluid and particle-in-cell kinetic codes. We simulate an ensemble of strongly interacting shear-Alfven waves and compare their turbulent spectra. The kinetic code produces a slightly steeper energy spectrum. The global energy dynamics for both the codes are very similar, despite their vastly different physics at the small scales. We focus on the formation of thin current sheets and the dissipation within them by comparing the current sheet morphology between the two codes. It is found that the current sheet thickness is related to the particle inertial length. Heating is correlated with the current sheets and is preferentially in the parallel direction. This provides a way for directly simulating physical dissipation in plasmas.

Kirit Makwana
Univ of Chicago

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