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Particle Energization in Different Turbulent Environments with Applications to Solar Corona, Accretion Flows and Astrophysical Jets[1]
HUI LI, Los Alamos National Laboratory, LIPING YANG, National Space Science Center, China, XIAOCAN LI, FAN GUO, LANL — Plasma turbulence and magnetic reconnection are ubiquitous in astrophysical environments. Particle energization often arises in such environments, such as solar coronal heating, flares from accretion disk coronae and astrophysical jets. Recent theoretical and numerical studies have highlighted the role of dynamic current sheets, including their formation and associated reconnection processes, which in turn are postulated to strongly impact the turbulence dynamics as well as particle energization processes. Here, we present 3D MHD and kinetic simulations to study the interplay between turbulence and the pre-existing current sheets. These systems are large enough that turbulence can be fully developed. Whereas some turbulence properties are similar between these two cases, we highlight the differences in available free energy that can lead to different particle energization efficiency and processes. We will discuss the implications for solar and accretion disk corona and astrophysical jets.

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