

Acceleration and diffusion of energetic particles by coherent MHD structures

Kenichirou Beppu[1]; Tohru Hada[2]

[1] none; [2] ESST, Kyushu Univ

beppu@esst.kyushu-u.ac.jp

Presence of magnetohydrodynamic (MHD) turbulence (and its ability to scatter charged particles) is essential in many space and astrophysical phenomena, e.g., diffusive shock acceleration of cosmic rays. Such MHD turbulence is often assumed to be a superposition of MHD waves with random phases. It is well known, however, that MHD turbulence in real space is not truly phase random, but coherent MHD structures are often embedded. By performing test particle simulations, Kuramitsu and Hada (2000, hereafter KH00) showed that energetic particles are more efficiently accelerated when wave phases are coherent compared with the case when the wave phases are random. In this presentation, we extend KH00 in various ways, and discuss whether the Fermi-type acceleration mechanism proposed in KH00 is still pertinent when more realistic simulation settings are employed. Using the obtained results, we will make remarks on the shock acceleration and transport of cosmic rays.