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Energy transfer down to kinetic scales and the role of pressure tensor in heating of kinetic plasma YAN YANG, WILLIAM MATTHAEUS, TULASI PARASHAR, University of Delaware — The classical energy cascade theory suggests that energy is transferred from large to small scales at a constant rate. This scenario is of great importance in explaining the heating of corona and solar wind. One can envision that energy residing in large-scale fluctuations is transported to smaller scales where dissipation occurs and finally drives kinetic processes that absorb the energy flux and energize charged particles. When filtering the Vlasov equation, we can introduce several energy transfer functions across scales. We propose to use kinetic plasma simulations and investigate how the characteristics of energy transfer vary going from MHD to kinetic scales. It has been shown that in compressible MHD turbulence, apart from dissipation, the pressure dilatation can trigger an alternative channel of the conversion between fluid flow energy and thermal energy. We will address the analogous roles of the (tensor) pressure dilatation in collisionless plasma. We study, for example, effects of anisotropic and isotropic pressure, and of the diagonal and off-diagonal pressure tensor, and related influences on dissipation and heating.

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