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Turbulent dissipation in weakly-collisional plasmas

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Understanding the dissipation of energy and the associated heating in weakly collisional turbulent plasmas represents still an unresolved challenge. Here we examine an ensemble of parameters commonly adopted to characterize processes of energy dissipation and conversion in plasmas by means of hybrid Vlasov-Maxwell simulations describing plasma turbulence at sub-proton scales in the whole six-dimensional phase-space.

We make a distinction between ``energy-based'' and ``distribution-function'' based parameters. The first class is related to energy transfer mechanisms, while the second one requires exact knowledge of the particle distribution function in velocity space. All these measures highlight that energy dissipation occurs inhomogeneously and close to regions that are characterized by intense magnetic stresses. The dependence of these processes with respect to the proton β parameter is finally explored.