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Intermittency and turbulent dissipation at the tail of the MHD cascade FRANK JENKO, ALEJANDRO BANON NAVARRO, UCLA, BOGDAN TEACA, Coventry University, DANIEL TOLD, DANIEL GROSELJ, PAUL CRANDALL, UCLA — We present the first systematic and detailed study of intermittency and turbulent dissipation in weakly collisional Alfvenic turbulence, using high resolution gyrokinetic and fully kinetic simulations spanning the range of scales between the ion and the electron gyroradii. The electron dynamics are found to be strongly intermittent and dominated by linear phase mixing, while nonlinear phase mixing dominates the weakly intermittent ions. These effects are quantified via phase space measures, generalizing techniques known from fluid turbulence. Moreover, real space structures that have a higher than average heating rates are shown not to be confined to current sheets. This novel result is at odds with previous studies, which use the electromagnetic work in the local electron fluid frame as a proxy for turbulent dissipation to argue that heating follows the intermittent spatial structure of the electric current. Furthermore, we show that electrons are dominated by parallel heating while the ions prefer the perpendicular heating route. We comment on the far reaching implications of the results presented here for the interpretation of computer simulations, laboratory experiments, and space observations.

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