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3D3V hybrid-kinetic simulations with electron inertia effects of kinetic-range solar-wind turbulence SILVIO SERGIO CERRI, Dipartimento di Fisica, Universit di Pisa, 56127 Pisa, Italy Department of Astrophysical Sciences, Princeton University, Princeton, NJ 08544, USA, SERGIO SERVIDIO, Dipartimento di Fisica, Universit della Calabria, 87036 Rende (CS), Italy, FRANCESCO CALIFANO, Dipartimento di Fisica, Universit di Pisa, 56127 Pisa, Italy — Characterizing the nature of the turbulent fluctuations below the ion gyroradius in solar-wind turbulence and its dependence on the plasma parameters is a great challenge. Here we present a study of the sub-proton-scale cascade based on high-resolution hybrid-Vlasov (Eulerian) simulations of freely-decaying turbulence in 3D3V phase space, including finite electron inertia effects. Two proton plasma beta regimes are explored: $\beta_p = 1$ and $\beta_p = 0.2$ (β is the ratio between thermal and magnetic pressures). At $\beta_p = 1$, the magnetic energy spectum exhibit $k_\perp^{-8/3}$ and $k_\parallel^{-7/2}$ power laws, while they are slightly steeper for $\beta_p = 0.2$. Nevertheless, both regimes develop a spectral anisotropy consistent with $k_\parallel \sim k_\perp^{2/3}$ at $k_\perp \rho_p > 1$, and small-scale intermittency (the $\beta_p = 0.2$ case being slightly more intermittent than the $\beta_p = 1$ counterpart). In this context, we find that kinetic-range turbulence is consistent with a cascade of kinetic Alfvén waves type of fluctuations at $\beta_p = 1$, whereas the low-β case presents a more complex scenario suggesting the simultaneous presence of several type of fluctuations.

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