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Kinetic turbulence and non-thermal particle acceleration in relativistically hot plasma VLADIMIR ZHDANKIN, GREGORY WERNER, DMITRI UZDENSKY, Univ of Colorado - Boulder — We describe particle-in-cell numerical simulations of driven turbulence in collisionless, relativistically hot pair plasma. We initialize each simulation as a thermal bath, which is disrupted by the driving to develop turbulent fluctuations across a broad range of scales. We measure the energy spectra at fluid scales and at sub-Larmor scales, showing them to be consistent with a magnetohydrodynamic cascade and phase-space cascade, respectively. We demonstrate that a non-thermal particle distribution develops across a broad range of energies, with a late-time power-law index that decreases with increasing magnetization (decreasing plasma beta), much like in similar studies of magnetic reconnection. We suggest that turbulence may a ubiquitous and versatile mechanism of non-thermal particle acceleration in high energy astrophysical systems such as pulsar wind nebulae.

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