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Fully kinetic simulations of weak turbulence in electron-positron plasma V. ROYTERSHTEYN, LANL, H. KARIMABADI, UCSD, S.P. GARY, LANL, L. RUDAKOV, Icarus Research, Inc. — Wave turbulence in electron-positron plasma is investigated using fully kinetic electromagnetic particle-in-cell (PIC) simulations. Electron-positron plasma supports two linear modes (Alfven-like and magnetosonic-like modes) and it is demonstrated that this model provides a convenient testbed for investigation of some of the kinetic effects pertinent to the short-wavelength domain of the solar wind turbulence. PIC simulations provide essentially first principle description of the plasma dynamics and allow these questions to be rigorously addressed. In the present work, the emphasis is placed on quantifying the ability of the numerical method to correctly capture elementary linear and nonlinear processes (such as the dispersion relation for the linear waves, Landau damping, three-wave coalescence/decay, nonlinear scattering of waves by plasma particles, etc) and the comparison of the numerical results with predictions of the weak turbulence theory. These results will be used to guide and interpret the full-spectra simulations of a decaying turbulence.

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