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Particle-in-cell simulations of electromagnetic turbulence with kinetic electrons JEROME LEWANDOWSKI, Princeton University — The accurate treatment of electron dynamics in global (toroidal) particle-in-cell simulations is a considerable challenge from the numerical standpoint. The large thermal velocity of the (transit) electrons imposes a stringent condition on the time step for a brute force method. In the electrostatic case, it has been shown that the splitting scheme [1] for the electron dynamics is more accurate, both in the linear and nonlinear regimes, that the conventional perturbative delta f scheme. We present the electromagnetic version of the splitting scheme and specifically discuss the issues of energy and momentum conservation properties, the importance of the initial loading in phase space [2], and the spatial and time resolution requirements.

[1] J.L.V. Lewandowski, Physics of Plasmas, 8, 3204 (2003).
[2] J.L.V. Lewandowski, Physics Letters A, 313, 291 (2003).

Jerome Lewandowski
Princeton University

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