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Studies of the particle-continuum method for large-scale simulations of ETG and edge turbulence SCOTT PARKER, U. of Colorado, YANG CHEN, U. of Colorado, C.S. CHANG, NYU, WEI-LI LEE, PPPL — Delta-f methods result in a huge reduction in particle number over conventional full-f particle-in-cell methods in situations where fluctuations in delta-f are small compared to field fluctuations. We note delta-f can be arbitrarily large when using the delta-f method. This just requires using as many particles as one would for full-f for the same problem. There are situations where delta-f can become quite large for timescales of interest. Such situations can be dealt with by simply increasing particle number. However, an alternative approach, which may be much more efficient, is to use the particle-continuum method. Such a scheme has been shown to solve the so-called "growing weight problem." Here, we discuss the particle-continuum method and our progress on implementing it in five-dimensions. We will test the method in flux-tube geometry on electron-temperature-gradient turbulence. ETG turbulence is a good test bed because the streamer dominated turbulence has a high flux level that drives the particles' delta-f to a relatively large value. For ETG simulations we are confident in our converged simulation results. However, simulations of time evolution of the edge pedestal may require application of the particle-continuum method or even full-f particle-in-cell simulation using Denavit's "hybrid" method where no distinction is made between the equilibrium and perturbed distribution function. Work is supported by DOE SciDAC.

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