

Abstract Submitted
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Generating quasi-linear diffusion coefficients using the delta-f PIC method¹ TRAVIS AUSTIN, DAVID SMITHE, MATTHEW WROBEL, VAHID RANJBAR, Tech-X Corporation — Linear wave codes, AORSA and TORIC, used by the SciDAC Center for Simulation of Wave-Plasma Interaction couple to the bounce-averaged nonlinear Fokker-Planck code CQL3D through quasi-linear diffusion coefficients. Both AORSA and TORIC rely on the quasi-local approximation that only includes first-order parallel and perpendicular gradient variations of cyclotron frequency and ignores field line curvature along with temperature and density gradient effects. Previously, the delta-f particle-in-cell (DFPIC) method has been used for simulating ion-cyclotron fast wave behavior. Particle behavior such as multiple pass resonance, banana orbits, and superadiabaticity can also be examined with this method. We present recent results on using eqdisk fusion data to generate quasi-linear diffusion coefficients that permit the VORPAL code to compare to AORSA and TORIC and to eventually couple to CQL3D. The results are generated for a single toroidal mode using DFPIC simulations in RZ geometry.

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