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Quasineutral Particle/Fluid Simulation Techiques for Whistlers[1]
MARTIN LAMPE, NRL, GLENN JOYCE, George Mason University, WALLACE MANHEIMER, Icarus Research, ANATOLY STRELTSOV, Icarus Research, GURU GANGULI, NRL — We present a new hybrid fluid/PIC simulation scheme for whistlers, which eliminate both speed of light and electron plasma oscillation time scale, and concentrates simulation resources on the resonant parts of the electron phase space that control whistler evolution. The fluid part advances the velocity and magnetic field; the electric field is determined by the solution of a Poisson like equation. The code runs with time steps on the order of the electron gyro frequency, with nearly perfect conservation of energy and numerical stability. Examples are shown of application to whistler instability growth and saturation, and on the ducting of whistlers in density channels.

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