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Electron Dynamics in a Chorus Wave Field Generated from Particle-in-Cell Simulations

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How to properly describe resonant interactions between electrons and quasi-coherent chorus waves is still an open question. Previous studies have progressed from modeling chorus as a single wave to considering effects such as amplitude modulation or phase decoherence in wave particle resonance. However, incorporating realistic features of chorus waves in test particle calculations has always been a challenging but critically important step to evaluate their nonlinear effects. In this work, we use a chorus wave packet generated by a particle-in-cell simulation in test-particle simulations. The used chorus wave naturally has features including amplitude modulation, phase decoherence and dynamic evolution during propagation. Our results suggest that, while being latitudinal dependent, realistic features of chorus generally lead to significant suppression of nonlinear effects. This result should be important to understand phase space transport of electrons due to interactions with chorus waves.