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Identify the nonlinear wave-particle interaction regime during chorus wave generation XIN TAO, Univ of Sci Tech of China, LIU CHEN, UCI/ZJU, FULVIO ZONCA, ENEA — Nonlinear wave particle interaction during chorus wave generation was assumed to be in the adiabatic regime in previous studies; i.e., the particle phase-space trapping time scale (τ_{tr}) is considered to be much smaller than the nonlinear dynamics time scale τ_{NL}. In this work, we use particle-in-cell simulations to demonstrate that $\tau_{tr} \sim \tau_{NL}$; i.e., the interaction regime during chorus generation is in the non-adiabatic regime. The time scale for nonlinear evolution of resonant particle phase space structures is determined by making the time averaged power exchange plot, which clearly demonstrates that particles with pitch angle near 70 make the most significant contribution to wave growth. The phase-space trapping time scale is also comparable to the amplitude modulation time scale of chorus, suggesting that chorus subpackets are formed because of the self-consistent (non-perturbative) evolution of resonant particle phase-space structures and spatiotemporal features of the fluctuation spectrum.

Xin Tao
Univ of Sci
Tech of China

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