# 相対論的電子加速に対するホイッスラーコーラス波動の周波数上昇率依存性

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# Dependence of frequency drift rates of whistler chorus elements for the relativistic electron accelerations

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It is thought that whistler chorus waves accelerate radiation belt electrons efficiently. Quasi-linear theory supports the electron acceleration by whistler chorus and explains time scale of acceleration observed in the radiation belts. However, one of the important properties of whistler chorus waves, nonlinear trapping that would lead efficient acceleration of radiation belt electrons in a short time scale, cannot be included in the quasi-linear theory. Test-particle simulations suggest that the nonlinear trapping by whistler chorus waves has an important role to produce the relativistic electrons efficiently. So it is important to reveal characteristics of the nonlinear trapping for the electron acceleration.

The test-particle simulations also suggest that the acceleration time and the energy gain depend on the frequency drift rate of chorus waves. This property has not well been investigated so far. In this talk, we will discuss the electron acceleration depending on the frequency drift rate of whistler chorus elements. We use GEMSIS-RBW (Geospace Environment Modeling System for Integrated Studies - Radiation Belt with Wave-particle interaction model) simulation code to calculate electron scattering through whistler-electron interactions, where electrons are bouncing along a dipole magnetic field line and whistler chorus waves propagate along the field line toward the northern and southern direction from the magnetic equator. We will compare the simulation results of coherent scattering (including the nonlinear trapping) with the incoherent scattering (the nonlinear trapping is suppressed) in order to confirm whether the scattering including the nonlinear trapping can have an advantage for relativistic electron production over the incoherent scattering model.