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Can the Interaction of Electrons with VLF Chorus in the Magnetosphere be Accurately Described by Quasi-Linear Theory?

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VLF chorus in the magnetosphere comprises an overlapping sequence of intense discrete emissions of short duration (of the order of 0.1 sec) that are quasi-monochromatic. Since such emissions are narrowband and phase-coherent, the effect of VLF chorus on charged particles cannot strictly be treated by quasi-linear theory. However, since the effect of each discrete VLF emission is to change the momentum of particles by some finite amount, the total effect of many discrete emissions is equivalent to diffusion in momentum space, and hence quasi-linear theory can be applied. Quasi-linear theory can be expected to provide a reasonable description of gyroresonant electron diffusion by chorus, but cannot incorporate nonlinear effects such as phase trapping.