Time evolution of radiation belt electrons resonating with chorus and EMIC emissions

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Using results of test particle simulations of a large number of electrons interacting with a pair of chorus emissions, we create Green's functions to model the electron distribution function after all of the possible interactions with the waves [*Omura et al.,* 2015]. Assuming that the waves are generated in a localized range of longitudes in the dawn side, we repeat taking the convolution integral of the Green's function with the distribution function of the electrons injected into the generation region of the localized waves. From numerical and theoretical analyses, we find that electron acceleration process only takes place efficiently below 4 MeV. Because extremely relativistic electrons go through the wave generation region rapidly due to grad-B_0 and curvature drift, they don't have enough interaction time to be accelerated. In setting up the electrons after all interaction with chorus emissions as initial electron distribution function, we also compute the loss process of radiation belt electron fluxes due to interaction with EMIC rising-tone emissions generated in a localized range of longitudes in the dusk side [*Kubota and Omura,* 2017].

References

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