Test particle simulation of relativistic electrons interacting with EMIC triggered emissions

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We perform test particle simulations of relativistic electrons interacting with electromagnetic ion cyclotron (EMIC) triggered emissions with rising-tone frequencies observed in the inner magnetosphere [1]. Generation of EMIC triggered emissions is explained by the nonlinear wave growth theory [2], it is also confirmed by hybrid code simulations [3]. When relativistic electrons in radiation belt interact with EMIC triggered emissions, some of them are trapped by the wave potential and efficiently guided down to lower pitch angles [4]. This results in scattering of relativistic electrons into the loss cone and precipitation of relativistic electrons. We study dynamics of relativistic electrons in various magnetospheric conditions changing parameters such as ion densities and rates of frequency variation. In the previous study we assumed a constant amplitude for the triggered emission. However, EMIC triggered emissions are characterized by growing wave amplitudes as well as rising-tone frequencies. We study effect of growing wave amplitudes on pitch angle scattering by EMIC triggered emissions.

References
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