Relativistic Motions of Whistler-Mode Cyclotron Resonant Electrons

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Nonlinear Doppler-shifted cyclotron resonant electrons interacting with the whistler mode carrier signal are probable to generate sideband waves in the magnetosphere. According to Ikeda et al. (1988), Sonwalkar et al.(1997), and Ikeda (2002), these electrons may have the energy perpendicular to the external magnetic field, Eperp=0.6KeV-14KeV. So far, the electrons included in this energy range have been dealt with non-relativistic mechanics of whistler-mode resonance interaction. In this meeting, using relativistic motion equations for resonant electrons, the author describes the phase diagrams of Uz-XI and examines if the frequency gaps are formed by the scattering of the relativistic electrons. For example, Lorentz factor (=1+Eperp/mc**2) is calculated for the energy range described above. Then, it corresponds to only 1.01 – 1.03, where mc**2 is the rest mass of electron and c is the light speed. Furthermore, the author would like to show the comparison between results of relativistic cases and those of non-relativistic cases.