

## Three-dimensional trajectories of Doppler-shifted cyclotron resonant electrons near the separatrix

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Using a new equation system, the trajectories of non-linear Doppler-shifted cyclotron resonant electrons interacting with the whistler mode carrier signal in the magnetosphere are examined. It is imagined that the trajectories just near the separatrix have direct effects upon the generation of self-exciting whistler-mode sideband waves. Thus, the trajectories are labeled in detail and the characteristics of them are clarified by the numerical calculations. Especially, this paper is aimed at the presentations of three-dimensional trajectories of Doppler-shifted cyclotron resonant electrons near the separatrix in the phase space and their asymmetry shown above and below the separatrix. Furthermore, it is imagined that their trajectories in the phase diagram form the trajectory gap near the separatrix, and so form phase-bunched sideband currents due to a strong non-linearity.