Effects of Spatial Variation of Thermal Electron on Magnetospherically Reflected Whistler Waves Using Ray Tracing

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Magnetosphereically reflected whistler waves has been studied by using ray tracing program to investigate their trajectories and amplitude growth or damping. The ray tracing program HOTRAY[Horne1989] written by Horne is suitable to a hot, magnetized plasma containing several electron and ion species with components at different temperatures. Therefore, the adopted plasma model for HOTRAY have a limitation that temperature of every component is constant throughout space. In this paper, our concern is how large extent on which the model with temperature variation influences ray path and amplitude of whistler waves propagating in the magnetosphere. Here, based on the description of HOTRAY in Horne's paper[Horne1989], a more capable program is further developed to deal with the adopted plasma model containing three components– cold electrons and ions[Denton2002], and hot anisotropic eletrons[Huang1992]. The results show that the component of hot electrons effects little on ray path of whistler waves propagation. However, it changes the growth rate of waves dramatically, which is sensitive to the ratio of hot electron density and its anisotropy.

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