

Electron cyclotron harmonic wave bursts: GEOTAIL observations

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Electron cyclotron harmonic wave bursts (ECH wave bursts) were initially reported by the Geotail observations just inside the dayside magnetopause [Matsumoto et al., 1997; Usui et al., 1999]. The main feature of the ECH wave bursts is its frequency range of the spectrum, which extends to higher order harmonic frequencies beyond the local UHR frequency. By the limited data observed in the distant tail phase of the Geotail, we found that the ECH wave bursts are mainly observed in the dawn-side region of the dayside magnetosphere and that they are well correlated with the existence of two component electrons with different temperatures. However, the generation mechanism is still unclear, because only two component electrons does not destabilize the ECH mode.

Recently, Brinca et al. [2004] proposed the new model for the generation of the ECH wave bursts. They demonstrate that the ECH waves is unstable in the frequency range beyond the local UHR waves by the existence of ion beams perpendicular to the ambient magnetic field as well as the two component electrons. Further, the geotail data in the near tail orbit phase are available and we can collect more events of the ECH wave bursts. In the present paper, we show the ECH wave bursts can be observed mainly in the local time from 0:00 to 12:00 using the latest Geotail observation data sets. This tendency is quite similar to that of the chorus emission. We also find the correlation of the ion motion in the perpendicular direction relative to the magnetic field. We will discuss the generation of the ECH wave bursts based on the Geotail observations consulting the generation model of Brinca et al. [2004].