Frequency-Doubled oscillation of plasma density and temperature associated with dawnside ULF waves

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Geotail observed unusual plasma phenomena that show the plasma density and temperature oscillation at the double frequency of ULF waves (FD event). Similar phenomena are reported by Sakurai et al.(1999) and Mann et al.(1999).

In this paper, we report the characteristics of the phenomena and propose the generation mechanism.

The characteristics of FD event are as follows.

1) FD event occurs during the geomagnetically quiet period accompanied by Pc5 like ULF waves in the dawnside of the magnetosphere.

2) FD event is associated with the weak but rapid variation of the solar wind dynamic pressure.

3) Impulsive magnetic variation appears just before FD event in the magnetosphere.

4)The frequency of Pc5 like ULF wave with FD event is observed with the identical frequency on the ground station.

5) The plasma beta in the region where FD event is observed is below 1.

6) The plasma composition in the FD region is similar to that in the LLBL.

7) FD event appears in the region where plasma density is higher and temperature is lower compared with the background plasma.

8) Poynting flux of the ULF wave with FD event shows the flow direction from magnetopause to magnetotail.

We propose a new model of FD event occurrence based on these results. The model claims that FD event is generated in the detached LLBL produced by the solar wind variation.