Preliminary observational result of the Jovian synchrotron radiation with Iitate Planetary Radio Telescope

Fuminori Tsuchiya[1], Hiroaki Misawa[2], Riichi Kudou[1], Yoshizumi Miyoshi[3], Takuo Watanabe[2], Akira Morioka[4], Tetsuro Kondo[5]

[1] Planet. Plasma Atmos. Res. Cent., Tohoku Univ., [2] Planet. Plasma and Atmos. Res. Cent., Tohoku Univ., [3] Planet. Plasma and Atmos. Res. Cent., Tohoku Univ., [4] Planet. Plasma and Atmos. Res. Cent.,Tohoku Univ., [5] KSRC,CRL

http://pparc.geophys.tohoku.ac.jp/

First light of the Jovian synchrotron radiation (JSR) by the Iitate Planetaty Radio Telescope (IPRT) and the preliminary results are reported here.

IPRT has been developed at the Iitate village in Fukushima Prefecture, Japan. Front-end receivers had been already set up and test observations have been started at the frequency of 325 MHz. Primary purpose of IPRT is continuous monitoring of JSR and research of the dynamics in the Jovian inner magnetosphere by detecting short-term variations of JSR with the time scale of a few days to a few months. The short term variation reflects dynamic acceleration and transport processes of relativistic electrons in the inner radiation belt of Jupiter.

The total flux observation of JSR by using a single dish telescope is a useful tool for the investigation of the acceleration and transport of relativistic electrons because the spectrum and polarization of JSR reflect energy spectrum and pitch angle distribution of the relativistic electrons, respectively.

The back-end receiver system for the total power measurement and the new beam forming feed system for 325 MHz were developed in 2002. The new feed system consisted of a half wave dipole and beam forming elements and improved apperture efficiency of IPRT as high as 70%. After the set up of the receiver system and the feed system, Jupiter and some calibration stars were observed in February 2003.

The preliminary analysis of observation data showed that the flux density of JSR was about 5 Jy, which was consistent with that reported by previous observations.

We plan to start continuous observations of JSR from this spring. The polarization measurement system of JSR will be also developed in this spring in order to obtain information of pitch angle distribution of trapped relativistic electron in Jupiter's radiation belt.