

Spectrum observation of Jupiter's synchrotron radiation at the frequencies from 325 to 2295MHz

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

[1] Planet. Plasma and Atmos. Res. Cent., Tohoku Univ., [2] Planet. Plasma 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

Jupiter's synchrotron radiation (JSR) is generated by the relativistic electrons trapped in Jupiter's radiation belt. Variation of JSR is, therefore, an important probe to investigate generation and dissipation processes of the relativistic electrons and deformation of their global distribution in Jupiter's inner magnetosphere. For more than 40 years since its discovery, JSR has been thought to be quite stable emission except for a long-term variation at a time scale of nearly the solar-cycle. However regular and systematic JSR observations have been made by several groups particularly after the event of the comet P/SL9 impacts to Jupiter, and revealed the existence of short term variations at a time scale of several days to months inferring some electro-magnetic activities in the inner magnetosphere. Nowadays it's the time to investigate the details of variation characteristics and origin of the time variation.

A program of a multi-frequency observation for JSR has been started since 2001. The JSR spectrum measurements give us information of variations of pitch angle and/or characteristics of radial diffusion of the relativistic electrons. In this program four observation frequencies measured with different facilities are adopted; i.e., 325MHz at Tohoku Univ. and Nagoya Univ., Japan, 929MHz and 1.42GHz at EISCAT, and 2295MHz at Comm. Res. Lab.(CRL), Japan. JSR at the frequency range is generated from the relativistic electrons at the energy from 6 to 17MeV in Jupiter's inner magnetosphere. As for the 325MHz observation, although the Tohoku Univ. system will start the regular JSR observation in the middle of 2003, the Nagoya Univ. system has made the JSR observations for about three months a year since 1995. The observation method has been already established at 2295MHz using the CRL system by our group. On the other hand, we made test experiments for JSR using the EISCAT 929MHz system in the autumn of 2001 and made ten successive day observation in the end of November of 2002. Now we plan to make the spectrum observation with the four frequencies in this autumn.

In the presentation, outline and objectives of the spectrum observation will be shown with the first result of the JSR observation around 1GHz.