

Multi-frequency observation of Jupiter's synchrotron radiation

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Jupiter's synchrotron radiation (JSR) is generated by the relativistic electrons trapped in Jupiter's inner 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. Regular and systematic JSR observations have been made by several groups including us 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 (Klein et al., 1997; Galopeau et al., 1997; Miyoshi et al., 1999; Misawa and Morioka, 2000). Now 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 three observation frequencies measured with different facilities have been adopted; i.e., 325MHz at Tohoku Univ., Japan, 929MHz at EISCAT, Sweden and 2.25GHz at NICT, Japan. JSR at the frequency range is generated from the relativistic electrons at the energy from 6 to 20MeV in Jupiter's inner magnetosphere, and has been hardly observed regularly. Approximately 2 week successive JSR observations have been made in October, 2003 and July, 2004 at the three frequencies. A preliminary analysis for the spectrum observation shows a small variation of JSR flux density. In particular, it seems that the variation showed frequency dependence on both amplitude and timing; i.e., amplitudes of the variation were larger in lower frequencies and timing was delayed in higher frequencies.

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