

Waveform analysis of Jovian S-bursts

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Jovian decametric radio S-bursts are characterized by their short duration time and rapid negative frequency drift with the drift speed within a range from -5 to -45 MHz/sec. It has been also well established that these S-bursts are generated by the interaction processes between the Jovian magnetosphere and the satellite Io. Recently, Carr et al. [1999] analyzed the waveform of the S-bursts and reported that an S-burst consists of several subpulses where the wave coherence is maintained. Investigation of waveform of the S-bursts is, then, an important clue to solve the problem of the origin of the coherent nature of the planetary radio emissions. The time scale of the wave coherence is thought to reflect the nature of the microscopic instabilities where efficient wave-particle interaction takes place. In the present study, the waveform analysis of the Jovian S-bursts has been made by using the data obtained at the decametric radio wave observatory of Tohoku University. As a result, the subpulses in the S-bursts discovered by Carr et al. (1999) have been identified also in these data. Further, it has been found that the duration time of the subpulse varies with the wave frequency, having a clear tendency that the duration time of the subpulse increases with decreasing the wave frequency. For the purpose of the understanding of the underlying physical process of the Jovian S-burst phenomenon, the present waveform analysis will provide us an important key concerning the generation of coherent radio emissions from planets.