

# Development of portable Jovian radio wave receiver system for application in high school science education

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We propose portable receiver system for Jovian radio waves in high school science education. Radio waves are used ordinarily in our daily life as a result of the development and spread of cell-phone and other wireless equipment. The radio is emitted not only by artificial system, but also by natural phenomena. Planets and the Sun that have magnetic fields and atmosphere would be the natural radio sources such as Sun, Earth, and Jupiter. Solar and Jovian radio waves whose frequency range is higher than 10 MHz can be observed from ground stations because they can penetrate the terrestrial ionosphere. So, the ground-based radio wave receiver can be a useful tool for exploration of the planets and the Sun. Furthermore, among several types of the Jovian radio waves, decametric S-bursts shows unique occurrence such as quasi-periodicity with the repetition frequency of  $\sim 20$ Hz, and the negative drift rate ( $\sim -20$ MHz/s). Ergun et al. [2006] and Su et al. [2006] proposed Jovian ionosphere Alfvén resonator model. According to these previous studies, eigenfrequencies of Jovian IAR are expected to determine the repetition rate of S-bursts of Jovian decametric radiation.

Observing Jovian radio waves would interest to high school students and be attractive scientific experiment-teaching material. In this study, we propose Jovian S-bursts receiver system that is easy to use in high school education. However, if we install antenna and receiver in the high school site in or near the urban area, artificial noises would make it difficult to detect Jovian radio waves. Therefore, the receiver system must be transportable. For getting the data to provide contributions for studies on mechanism of Jovian S-bursts in the future, the time resolution of the receiver must be better than 1 milliseconds. Hence we will develop it in considerations of the following points: (a) the portability, (c) the cost, (d) sensitivity, (e) the frequency range, and (f) the time resolution.

We have two receiver system plans: One is based on Radio JOVE receiver provided by NASA Radio JOVE project (<http://radiojove.gsfc.nasa.gov>) and the other is based on 1seg TV tuner USB device controlled by Software Defined Radio. We are going to choose one based on comparisons of the expected performances on (a)-(f).

In this presentation, we will report the scheme and the state of progress.

Keywords: Jovian radio waves, ground-based receiver