Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

PCG10-P03 Room:Convention Hall Time:May 24 16:15-17:30

The development of an InSb array driving electronics for the infrared imager and the echelle spectrometer

Eriko Noguchi[1*], Takeru Uno[1], Takeshi Sakanoi[1], Ichikawa Takashi[2], Kotani Kouji[3]

[1]Geophys., Graduate School of Science, Tohoku Univ., [2]Astronomy, Graduate School of Science, Tohoku Univ., [3]Electronics, Graduate School of Engineering, Tohoku Univ.

The Atmospheres, Ionospheres and Magnetospheres of planets change with various time scale. The prominent example is auroral phenomena on the planets including Jupiter. Especially, infrared H3+ emissions are suitable for long-term observation because only the IR emissions are observable at the ground through the optical-window at the 2 um or 4 um. The time limitation of space telescopes such as HST and the largest ground-based telescopes such as SUBARU make it difficult to observe long-term variation of the planetary phenomena. So, it is the only solution to probe the temporal variation of planetary aurorae that uses the small- to mid-size own telescope for longer machine-times combined with own IR instrument.

Our group has been developing the infrared imager which widely available to planetary observation (Takahashi, 2005; Kobuna, 2008; Kitami, 2010) and the infrared echelle spectrometer (Uno, 2009), as a primary goal to conduct monitoring of Jupiter's magnetosphere from observations of aurora of Jupiter and volcanic Io activity. These devices are both using an InSb array sensor of 256x256 pixel, with high sensitivity in the 1-5 um. The infrared imager is a refractive optical system using achromatic lens. Infrared narrow band filter, of which center wavelength is 3.414 um and half-width about10 nm, is installed onto the filter turret for the observations of infrared H3+ aurora. On the infrared echelle spectrometer, it adopts the reflective optics with parabolic mirrors, and its wavelength resolution is about 20,000. These will be install on our Tohoku University 60 cm telescope at the summit of Mt. Haleakala in Hawaii (operations will be started in 2013) and the 1.8 m PLANETS telescope (operation will be started in 2014). We will make continuous observations of Jupiter and other planets. This study is focusing on the development of InSb sensor driving electronics for these instruments. In this research, we verified multiplexer of imager, and define adequate bias voltage and high-level time of clock. This development succeeded the infrared imaging test, and the rest thing is calibration of infrared imager including noise evaluation. On the other hand, we are proceeding designing and production of fan-out-board. Now, making model of element, simulation, and production of demonstration equipment are proceeding. This presentation will mention about the drive system developed.