Development of a near-infrared camera for imaging observation of planetary atmosphere

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Remote sensing of planetary atmosphere in the near-infrared (NIR) range using a telescope is extremely important since many emission/absorption lines and bands of atoms and molecules, respectively, and thermal emission exist in the NIR range. In order to clarify the environment of planetary atmosphere, we have started development of a NIR imaging camera for a ground-based telescope. The detector of the NIR camera is a 256 x 256 InSb array of which sensitive range is 1 – 2.5 um. An interference filter is used to select a specific spectral range. Using the NIR camera at a focus of the telescope at Iitate observatory, we plan to observe Jovian aurora in 2.09 – 2.11 um range, CO absorption and CO2/H2O ice clouds of Mars, and the cloud pattern of Venus.

Remote sensing with a imaging detector coupled with a large-telescope is a powerful technique to observe the planetary atmosphere. In particular, a near-infrared (NIR) observation of planetary atmosphere is extremely important since variety of emission/absorption lines and bands of atoms and molecules, respectively, and thermal emission exist in the NIR range. In order to clarify the environment of planetary atmosphere, we have started development of a NIR imaging camera for a ground-based telescope. The detector of the NIR camera is a 256 x 256 InSb array of which sensitive range is 1 – 2.5 um.The InSb detector is cooled down to 30 K to reduce its dark noise, by a closed-cycle cold head. An interference filter is used to select a specific spectral range. Using the NIR camera at a focus of the telescope at Iitate observatory, we plan to observe Jovian aurora in 2.09 – 2.11 um range, CO absorption and CO2/H2O ice clouds of Mars, and the cloud pattern of Venus.