

Development of the Iitate near-infrared camera and a plan for Venusian atmospheric observation

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Recent progresses of near-infrared (NIR) imaging technology have brought many interesting findings in planetary atmospheres. However, a chance of observation with a NIR camera on a large telescope is rather limited. To make continuous observations of planetary atmospheres, we are developing a NIR imaging camera with a sensor of 256x256 InSb array of which sensitivity is from 1 to 5 μm . The NIR camera will be mounted on the Cassegrain focus of Iitate Planetary Telescope ($f=7200$ mm, $D=575$ mm), Tohoku University. Optical components of the NIR camera consist of collimation lens ($f=50$ mm), two filter turrets, aperture (cold) stop ($D=4.1$ mm), and focusing lens ($f=100$ mm). The resulting plate scale is 0.43 arcsec./pixel. These components are assembled in a Dewar, and cooled down to 35 K, and 100 K, respectively, using a helium cold refrigerator.

The first target with the NIR camera is the observation of Venusian cloud image seen in the nightside disk. We will operate the measurement of Venusian cloud and background images using interference filters with a center wavelength of 2.294 μm (FWHM=10 nm), and 2.329 μm (FWHM=10 nm), respectively.

At present, we have already prepared the sensor, filters, lenses, and electrical circuit boards, and almost finished the mechanical design of camera including a Dewar, filter turrets, and lens mounts. We are going to set up the electrical circuit system to read-out and control the sensor. In this talk we report the current status of the development of the camera, and the science objectives of the Venusian cloud observation in detail.