

Initial results of IR2 camera on board Akatsuki

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Akatsuki, after its successful orbit insertion on 7 Dec 2015, is under the initial check-out phase. IR2, a 2-um camera on board Akatsuki, is to investigate the Venusian atmospheric dynamics, distribution of the trace gas, aerosol properties and mechanisms of their production and maintenance.

The detector of IR2 is a 1024x1024 pixels PtSi (17-um pixel pitch), combined with the f=84.2 mm lens (F/4, Nikon). The field of view is a square of 12 degrees on a side. To suppress the dark current in PtSi, it is cooled to ~65 K, while the optics including filters are < 190 K to reduce the infrared radiation. Such cooling is achieved by a single-stage Stirling cooler from Sumitomo Heavy Industries, the company responsible to the entire IR2 system.

IR2 has 4 Venus filters: 1.735, 2.26, and 2.32 um are for the night-side of Venus. These "windows" are wavelength regions where CO₂ absorption is relatively weak and the thermal emissions originating the lower atmosphere can leak to the space. Therefore, these windows allow imaging of lower clouds as silhouette and enable measurements of atmospheric dynamics in deeper levels. The 2.32-um filter, in CO absorption band, allows to map the distribution of CO in the lower atmosphere. We de-cloud by differentiating 2.32-um image from nearly-simultaneous 2.26-um image. The 2.02-um filter for the day-side allows the cloud top altimetry by utilizing the strong CO₂ absorption.

In this paper, we present initial results of data analysis acquired during the check-out phase, and will present the latest data from the orbit.

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