

Observation of Planetary Atmosphere and Magnetosphere from the Haleakala Observatories in Hawaii

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Tohoku University has carried out continuous observations at Haleakala observatory in Hawaii from 2006 using a 40-cm telescope and a high-resolution spectrograph in visible. Our observing targets are faint emissions from planetary magnetosphere and upper atmosphere in our solar system such as sodium atmosphere on Mercury and the Moon, Jupiter plasma torus, Enceladus torus and so on. In order to promote further observation in near-infrared to mid-infrared, we are now progressing relocation of 60-cm telescope from Iitate Observatory in Fukushima to the Haleakala Observatory. The dome construction will be accomplished by June 2014, and installation of the telescope will be made on July 2014. Three spectroscopic instruments for different wavelength range are planned to be fed with Coude focus of the telescope: a visible high-resolution spectrograph ($R \sim 50000$), a near-infrared high-resolution Echelle spectrograph ($R \sim 20000$, 2-4 μm), and an ultra-high resolution mid-infrared heterodyne spectrometer ($R > 10000000$, 7-10 μm). A fast steering mirror will be installed to achieve better image correction as well. For the visible high-resolution spectrograph, integral field unit (IFU) is equipped to get two-dimensional image with high-spectral resolution simultaneously. The IFU consists from 16 by 8 optical fibers with microlens array. Field-of-view can be changed from 64" by 32" through 24" by 12" by changing fore-optics. The visible spectrograph and the MIR heterodyne spectrometer are now almost ready for the installation.