Reflectance on Asteroid (25143) Itokawa from the Hayabusa Spacecraft Multi-band Imaging Camera(AMICA)

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Remote-sensing observation is one of the observation methods that provide valuable information, such as composition and surface physical conditions of solar system objects. The Hayabusa spacecraft succeeded in the first sample returning from a near-Earth asteroid, (25143) Itokawa. It has established a ground truth technique to connect between ordinary chondrite meteorites and S-type asteroids. One of the scientific observation instruments that Hayabusa carried, Asteroid Multi-band Imaging Camera(AMICA) has seven optical-near infrared filters (ul, b, v, w, x, p, and zs), taking more than 1400 images of Itokawa during the rendezvous phase.

The reflectance of planetary body can provide valuable information of the surface properties, such as the optical aspect of asteroid surface at near zero phase angle (i.e. Sun-asteroid-observer's angle is nearly zero), light scattering on the surface, and surface roughness. However, only little information of the phase angle dependences of the reflectance of the asteroid is known so far.

In this study, we investigated the phase angle dependences of Itokawa's surface to understand the surface properties in the solar phase angle of 0° – 40° using AMICA images. About 700 images at the Hayabusa rendezvous phase were used for this study. In addition, we compared our result with those of several photometry models, Minnaert model, Lommel-Seeliger model, and Hapke model. At this conference, we focus on the AMICA's v-band data to compare with previous ground-based observation researches.

[구 SS-05] Color Ratios of Parallel-Component Polarization as a Maturity Indicator for the Lunar Regolith

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Polarization of the light reflected off the Moon provides information on the size and composition of the particles in the lunar regolith. The mean particle size of the regolith can be estimated from the combination of the albedo and degree of polarization, while the color ratio of the parallel-component polarization (CP) has been suggested to be related to the amount of nanophase metallic iron ($npFe^0$) inside the regolith particles. Both the mean size and $npFe^0$ abundance of the particles have been used as maturity indicators of the regolith since sustained impacts of high energy particles and micro-meteoroids cause comminution of particles and production of $npFe^0$. Based on our multispectral polarimetric observations of the whole near side of the Moon in the U, B, V, R, and I bands, we compare the maps of the mean particle size, CP, and the optical maturity (OM). We find that the mean particle size map is sensitive to the most immature (~0.1 Gyr) soil, the OP map to the intermediate immaturity (a few 0.1 Gyr) soil, and the CP map to the least immature (~1 Gyr) soil.

[구 SS-06] Development of a Prototype System for the Optical-Video-Detection and Characterisation of Meteors/Fireballs in South Korea

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(Talk by Hinse, Jeong & Lee)

During a six-month period (autumn 2014 within the framework of a research & education project) we have constructed a professional double-station video-meteor detection network at the SOAO and BOAO mountain summits. Meteor detection is achieved by pixel-to-pixel motion-detection trigger. Each station is nearly autonomous and has three cameras with fixed viewing angles monitoring part of the night-sky over Korea. Various field of views are in use for testing purpose and captured video-meteor data is automatically transferred to a central FTP server on a nightly basis. Data is publicly available. The network has been operational since September 2014 and could serve as a prototype system for a more extended national network for meteor/fireball monitoring and detection in Korean airspace. We will report on the network construction, technical setup and present first results of detected meteors and fireballs. Further information: Meteors@KASI: