rigorously not only via ground-based photometric, spectroscopic, polarimetric, and radar observations, but also via the in-situ observation by the Chinese Chang'e-2 spacecraft. However, one of the most fundamental physical properties, the geometric albedo, is less determined. In order to derive the reliable geometric albedo and further study the physical condition on the surface, we made photometric observations of Toutatis near the opposition (i.e., the opposite direction from the Sun). We thus observed it for four days on 2018 April 7-13 using three 1.6-m telescopes, which consist of the Korean Microlensing Telescope Network (KMTNet). Since the asteroid has a long rotational period (5.38 and 7.40 days from Chang'e-2, Zhao et al., 2015), the continuous observations with KMTNet matches the purpose of our photometric study of the asteroid. The observed data cover the phase angle (Sun-asteroid-observer's angle) of 0.65-2.79 degree. As a result, we found that the observed data exhibited the magnitude changes with an amplitude of ~0.8 mag. We calculated the time-variable geometrical cross-section using the radar shape model (Hudson & Ostro 1995), and corrected the effect from the observed data to derive the geometric albedo. In this presentation, we will present our photometric results. In addition, we will discuss about the regolith particles size together with the polarimetric properties based on the laboratory measurements of albedo-polarization maximum.

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Zhao, Y. et al. 2015 MNRAS 450, 3620

[구 SS-03] Investigation of surface homogeneity of (3200) Phaethon

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We present observational evidence of the surface homogeneity on Phaethon based on the time-series multi-band photometry and spectrometry. The observations of Phaethon were conducted in Nov.-Dec. 2017. We confirmed that Phaethon is a B-type asteroid, as was previously known, and its rotational color variation was not detected. During our observation period, the sub-solar latitude of this asteroid was approximately 55 °S, corresponding to the southern hemisphere of the body. Thus, we found that the southern hemisphere of Phaethon has a homogeneous surface from our observation results. In addition, we compared our spectra with archival data to investigate the latitudinal surface properties of the asteroid. The result showed that it doesn't have a latitudinal color variation. To verify this assumption, we investigated its solar-radiation heating effect, and the result suggested that this asteroid underwent a uniform thermal metamorphism regardless of latitude, which is consistent with our observations. Based on this result, we discuss the homogeneity of the surface of the body.

[구 SS-04] Interaction of Magnetic Flux Ropes in Relation to Solar Eruption

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Twisted magnetic flux tubes (also called magnetic flux ropes) are believed to play a crucial role in solar eruptive phenomena. The evolution of a single flux rope with or without the influence of an overlying field of a simple geometry has been extensively studied and its physics is rather well understood. Observations show that interacting flux tubes are often involved in solar eruptions. It was Lau and Finn (1996) who intensively studied the interaction between two flux ropes, whose footpoints are anchored in two parallel planes. In this too simplified setting, the curvature of the flux rope axial fields is totally ignored. In our study, the footpoints of flux ropes are placed in a single plane containing a polarity inversion line as in the real solar active region. Our simulation study is performed for four cases: (1) co-axial field and co-axial current (co-helicity), (2) counter-axial field and co-axial current (counter-helicity), (3) co-axial field and counter-axial current (counter-helicity), and (4) counter-axial field and counter-axial current (co-helicity). Except case 3, each case is found to be related with certain eruptive features.

[구 SS-05] Cross-Correlation of Oscillations in A Fragmented Sunspot

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