for unpredictable events or targets of special interests. Different exposures with such different modes result in a wide range of background noise level, the number of background stars and the mover's projected speed in each image. The Moving Object Detection Program (MODP) utilizes multiple mosaic images being taken for the same target fields at different epochs at the three KMTNet sites. MODP employs existing software packages such as SExtractor (Source-Extractor) and SCAMP (Software for Calibrating Astrometry and Photometry); SExtractor generates object catalogs, while SCAMP conducts precision astrometric calibration, then MODP determines if a point source is moving. This package creates animated stamp images for visual inspection with MPC reports, the latter for checking whether an object is known or unknown. We evaluate the astrometric accuracy and efficiency of MODP using the year one dataset obtained from DEEP-South operations.

## [구 HS-05] DEEP-South: A New Taxonomic Classification of Asteroids

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Asteroid taxonomy dates back to the mid-1970's and is based mostly on broadband photometric and spectroscopic observations in the visible wavelength. Different taxonomic classes have long been characterized by spectral slope shortward of 0.75 microns and the absorption band in 1 micron, the principal components. In this way, taxonomic classes are grouped and divided into four broad complexes; silicates (S), carbonaceous (C), featureless (X), Vestoids (V), and the end-members that do not fit well within the S, C, X and V complexes. The past decade witnessed an explosion of data due to the advent of large-scale asteroid surveys such as SDSS. The classification scheme has recently been expanded with the analysis of the SDSS 4th Moving Object Catalog (MOC 4) data. However, the boundaries of each complex and subclass are rather ambiguously defined by hand. Furthermore, there are only few studies on asteroid taxonomy using Johnson-Cousins filters, and those were conducted on a small number of objects, with significant uncertainties. In this paper, we present our preliminary results for a new taxonomic classification of asteroids using SMASS, Bus and DeMeo (2014) and the SDSS MOC 4 datasets. This classification scheme is simply represented by a triplet of photometric colors, either in SDSS or in Johnson-Cousins photometric systems.

## [구 HS-06] DEEP-South: The Photometric Study of Non-Principal Axis Rotator (5247) Krylov

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The number of discovery of asteroids with peculiar rotational states has recently increased, and hence a novel approach for lightcurve analysis is considered to be critical. In order to investigate objects such as Non-Principal Axis (NPA) rotator, we selected a NPA candidate, (5247) Kryolv as our target considering its Principal Axis Rotation (PAR) code and the visibility in early 2016. The observations of Krylov were made using Korea Microlensing Telescope Network (KMTNet) 1.6 m telescopes installed at the three southern sites with TO (Target of Opportunity) observation mode. We conducted R-band time-series photometry over a total of 51 nights from January to April 2016 with several exposures during each allocated run. The ensemble normalization photometry was employed using the AAVSO Photomtric All-Sky Survey (APASS) catalog for the standardization. We successfully confirmed its NPA spin state based on the deviation from the reduced lightcurve, and thus Krylov is recorded as the first NPA rotator of its kind in the main-belt, with its precession and rotation periods, $P\varphi= 81.18$ h and $P\Psi= 67.17$ h, respectively. In this paper, we present the spin direction, the 3D shape model and taxonomy of the newly confirmed NPA asteroid (5247) Krylov.

## [구 SS-07] DEEP-South: Lightcurves of Near Earth Asteroids from Year One Operations

Myung-Jin Kim[1], Hong-Kyu Moon[1], Young-Jun Choi[1], Hong-Suh Yim[1], Jintae Park[1], Dong-Goo Roh[1], Hee-Jae Lee[1,2], Young-Seok Oh[1,3], Jung-Yong Choi[1,4], Young-Ho Bae[1], and the DEEP-South Team
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Deep Ecliptic Patrol of the Southern Sky (DEEP-South) observations have been conducted officially during the off-season for exoplanet search since October 2015. Most of the allocated time for DEEP-South is devoted to targeted photometry, Opposition Census (OC), of Near Earth Asteroids (NEAs) to increase the number of such objects with known physical properties. It is efficiently achieved by multiband, time series photometry. This Opposition Census (OC) mode target objects near their opposition, with km-sized PHAs in the early stage and goes down to sub-km objects. Continuous monitoring of the sky with KMTNet is optimized for spin characterization of various kinds of asteroids, including binaries, satellites, slow/fast- and non-principal axis-rotators, and hence is expected to facilitate the debiasing of previously reported lightcurve observations. We present the preliminary lightcurves of NEAs from year one of the DEEP-South with our long term plan.

## [구 SS-08] A Possible Cause for the Cool Homopause of the 8-micron North Polar Hot Spot of Jupiter

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We have found cool homopause temperatures (Kim et al. 2016) of 180 - 250 K for the 8-micron North Polar Hot Spot (8NPHS) of Jupiter, which has been observed to be stationary at 180 deg (SysIII) longitude since the early 1980s. The 3-micron spectro-images of Jupiter that we analyzed were obtained with GNIRS, Gemini Near-Infrared Spectrograph at Gemini North on January 13, 2013(UT), and at 8 μm on Feburary 6, 2013(UT) with TEXES, the Texas Echelon Cross Echelle Spectrograph at the NASA IRTF. The cool homopause was unexpected, and a possible implication of the relatively cool 8NPHS homopause compared with those of other auroral regions will be presented.

## [구 SS-09] A Study of Polarimetric Properties of Comet C/2013 US10 (Catalina) in Optical and Near-Infrared Wavelength Regions

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Polarization is a rich source of information on the physical properties of astronomical objects. In particular, scattered sunlight by optically thin media (e.g., cometary comae) shows linear polarization of light, which highly depends on the phase angle (an angle between the Sun-Comet-Earth), wavelengths, and physical properties of cometary dust particles such as size, composition, and structures. Here, we present a study of polarimetric properties of non-periodic comet C/2013 US10 (Catalina) in optical and near-infrared wavelength regions obtained from imaging, spectroscopy, and polarimetric observations taken on UT 2015 December 17 – 19 welcoming its (probably) first close approach to the Earth. In this presentation, we want to introduce our progress since the last Korean Astronomical Society meeting (at BEXCO, Busan, 2016 April 14 – 15) especially in terms of spatial variations of degree of linear polarization (DOLP) and its possible scenarios to explain the correlations with other observational results. In particular, we found that there is strong anti-correlation between the gas/dust flux ratio and DOLP at the cometocentric distance of (2 – 5) x 104 km. Besides, within 10 arcseconds in radii (corresponding to inner coma region of 104 km from the center), the inverse relationship of these two parameters does not hold anymore. We conjecture that the rapid outward increase of DOLP can be supported by either the sublimation/evaporation of icy volatiles, disaggregation of cometary dust particles ejected from the nucleus, and/or difference of dominant dust particle sizes. From our results, we can conclude that comet C/2013 US10 (Catalina) corroborates rather indefinite traditional classification of poalrimetric classes of comets, and provides good opportunity to study less processed material which probably cherishes its memory at the formation epoch of the Solar System.

## [구 SS-10] Thermal Modeling of Comet-Like Asteroids from AKARI Observation

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