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DEEP-South Scheduling and Data reduction System (DS SDS) consists of two separate software subsystems: Headquarters (HQ) at Korea Astronomy and Space Science Institute (KASI), and SDS Data Reduction (DR) at Korea Institute of Science and Technology Information (KISTI). HQ runs the DS Scheduling System (DSS), DS database (DB), and Control and Monitoring (C&M) designed to monitor and manage overall SDS actions. DR hosts the Moving Object Detection Program (MODP), Asteroid Spin Analysis Package (ASAP) and Data Reduction Control & Monitor (DRCM). MODP and ASAP conduct data analysis while DRCM checks if they are working properly. The functions of SDS is three-fold: (1) DSS plans schedules for three KMTNet stations, (2) DR performs data analysis, and (3) C&M checks whether DSS and DR function properly. DSS prepares a list of targets, aids users in deciding observation priority, calculates exposure time, schedules nightly runs, and archives data using Database Management System (DBMS). MODP is designed to discover moving objects on CCD images, while ASAP performs photometry and reconstructs their lightcurves. Based on ASAP lightcurve analysis and/or MODP astrometry, DSS schedules follow-up runs to be conducted with a part of, or three KMTNet telescopes.

[구 KMT-08] DEEP-South: Preliminary Lightcurve Analysis of Potentially Hazardous Asteroids (PHAs)

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Near Earth Asteroid (NEA) population has attracted keen attention not only from the scientific community but from the general public ever since their terrestrial impact risk achieved wide recognition. Potentially Hazardous Asteroids (PHAs), the subset of NEAs, recently became the center of interest of planetary defense folks and mining industry due to their proximity to, and the potential effects on planet Earth. However, we have long been ignorant about either the physical properties or dynamical source regions of individual objects. For instance, their rotational periods are only known for five percent of the total population (The NEA Database of DLR, updated on Feb 2016).

The primary scientific objective of DEEP-South (DEep Ecliptic Patrol of the Southern sky) is to physically characterize 70 percent of km-class PHAs until 2019. In order to achieve this goal, we implemented an observation mode so-called “OC (Opposition Census)” targeting objects around opposition. OC observations were conducted during the period between Feb 2015 and Mar 2016, at CTIO in early periods, and at three KMTNet stations (CTIO, SSO and SAAO) since late July 2015, excluding the “bulge season” when the telescope time is exclusively used for exoplanet search. We present the preliminary lightcurves of 66 PHAs and 59 NEAs that we obtained during the OC runs.

[구 KMT-09] DEEP-South: Photometric Study of NPA rotators 5247 Krolv and 14764 Kilauea

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The spin states of asteroids is regarded as an important clue to understand not only the physical property of an individual object but also the dynamical evolution of the of the population as a whole. Single asteroids can be broadly classified into two separate groups according to their rotational states; Principal Axis (PA) and Non-Principal Axis (NPA) rotators. To date, lightcurve observations have been carried out mostly for PA asteroids. However, discovery of NPA objects has recently been increased due to new observing techniques, and this is the reason why rotational properties of NPA rotators became an issue.

As a DEEP-South pilot study for NPA, we selected two targets, 5247 Krolv (1982 UP6) and 14764 Kilauea (7072 P-L) considering their Principal Axis Rotation (PAR) code and visibility. Observations were made between Jan. and Feb. 2016 for 17 nights employing Korea Microlensing Telescope Network (KMTNet) 1.6 m telescopes installed at SSO and SAAO using DEEP-South TO (Target of Opportunity) mode. To obtain