Southern sky) is one of the secondary science projects of KMTNet (Korea Microlensing Telescope Network). The objective of this project is twofold, the physical characterization and the discovery of small Solar System bodies, focused on NEOs (Near Earth objects). In order to achieve the goals, we are implementing a software package to detect and report moving objects in the 18k×18k mosaic CCD images of KMTNet. In this paper, we present preliminary results of the moving object detection experiments using the prototype MODP (Moving Object Detection Program). We utilize multiple images that are being taken at three KMTNet sites, towards the same target fields (TFs) obtained at different epochs. This prototype package employs existing softwares such as SExtractor (Source-Extracto) and SCAMP (Software for Calibrating Astrometry and Photometry); SExtractor generates catalogs, while SCAMP conducts precision astrometric calibration, then MODP determines if a point source is moving. We evaluated the astrometric accuracy and efficiency of the current version of MODP. The plan for upgrading MODP will also be mentioned.

항성 및 항성계

[포 ST-01] Excessive CNO yield of the non-rotating massive Pop III stars

Changwoo Kye, & Sung-Chul Yoon
Department of Physics and Astronomy, Seoul National University

During the last decade, high-resolution spectra of many very metal-poor (VMP) stars have been observed and their surface compositions have been measured. The abundance patterns of the VMP stars strongly constrain the nucleosynthesis of Pop III stars because they born from material enriched by supernovae or wind ejecta of Pop III stars. The observations show overabundances of light elements like C, N, O, Na, Mg and Al and very low C^{12}/C^{13} ratios. These results indicate that mixing between the H-burning and He-burning region occurred in Pop III stars. To explain these observational results, we performed 1D stellar evolution simulations for non-rotating Pop III stars with ZAMS masses ranging from 20M□ to 50M□ and various overshooting parameters. In our grid calculation, convective mixing between helium burning layers and the hydrogen burning shell generally occurred in models with masses less than 40M□ without rotation and these models show an excess of light element abundances. From this result, it is expected that we could explain the observed abundance patterns with convective mixing in non-rotating massive Pop III stars and we do not necessarily have to invoke rotational mixing.

[포 ST-02] Low Resolution Near-Infrared Stellar Spectra Observed by CIBER

MinGyu Kim[1,2], Hyung Mok Lee[1], and CIBER team*
[1]Dept. of Physics and Astronomy, Seoul National University, Seoul 151-742, Korea
[2]Korea Astronomy and Space Science Institute (KASI), Daejeon 305-348, Korea
**Various universities and institutions from Korea, Japan, and USA*

We present near-infrared (0.8 - 1.8 microns) spectra of 63 bright (J_mag < 10) stars observed with Low Resolution Spectrometer (LRS) onboard the rocket-borne Cosmic Infrared Background Experiment (CIBER). Two Micron All Sky Survey (2MASS) photometry information is used to find cross-matched stars after reduction and extraction of the spectra. We identify the spectral types of observed stars by comparing with spectral templates from the Infrared Telescope Facility (IRTF) library. All the observed spectra are consistent with late F to M stellar spectral types, and we identify various infrared absorption lines. As our observations are performed above the Earth's atmosphere, our spectra are free from telluric contamination. Including HST/NICMOS and Cassini/VIMS, the spectral coverage has rarely been achieved in space, and the methods developed here can inform statistical studies with future low-resolution spectral measurements such as GAIA photometric and radial velocity spectrometer.

[포 ST-03] On the Equivalent Width Measurements of High-Resolution Spectra

Hyeong-Jun Kim, Wan-Su Cho and Jae-Woo Lee
Dept. Physics and Astronomy, Sejong University

In the course of the homogeneous spectroscopic study of globular clusters in our Galaxy, we revisit the strategy of measuring equivalent widths (EWs) for the large set of data in a consistent manner. In our presentation, we show comparisons of the EW measurements from various approaches and environments for over two thousand lines in Arcturus and discuss the implication in our future

study.

[포 ST-04] PLANETARY CAUSTIC PERTURBATIONS OF A CLOSE-SEPARATION PLANET ON MICROLENSING

Yoon-Hyun Ryu[1], Han-Seek Kim[2], Sun-Ju Chung[1], and Dong-Jin Kim[1]
[1]Korea Astronomy and Space Science Institute, Daejeon 305-348, Korea
[2]School of Physics, The University of Melbourne, Parkville, VIC 3010, Australia

We investigate the properties and detection conditions for the planetary caustic perturbation of close-separation planets. To find the properties of the planetary caustic perturbation, we construct deviation maps by subtracting the single-lensing magnification of the lens star from the planetary lensing magnification for various lensing parameters. We find that each deviation area of the positive and negative perturbations disappears at the same normalized source radius according to a given deviation threshold regardless of mass ratio but disappears at a different normalized source radius according to the separation. We also estimate the upper limit of the normalized source radius to detect the planetary caustic perturbation. We find simple relations between the upper limit of the normalized source radius and the lensing parameters. From the relations, we obtain an analytic condition for the detection limit of the planet, and which show that we can sufficiently discover a planet with the mass of sub-Earth for typical microlensing events. Therefore, we expect to add the number of low-mass planets in the next-generation microlensing experiments and conclude that our detection condition of the planet can be used as a important criteria for maximal planet detections considering the source type and the photometric accuracy.

[포 ST-05] The Chemical Abundances of Hypervelocity Stars in the Milky Way Disk

Bum-Suk Yeom, Young Sun Lee, Young Kwang Kim, Doo-Ri Han
Department of Astronomy and Space Science, Chungnam National University, Daejeon 34134, Korea, cometyeom@cnu.ac.kr

We present preliminary results of the analysis of chemical abundances for seven hypervelocity star (HVS) candidates. These objects are G and K dwarfs in the Galactic disk selected from the Sloan Extension for Galactic Understanding and Exploration. Unlike other HVSs discovered thus far, their stellar orbits and kinematics suggest that they do not originate in the Galactic center or in an accretion event. These factors imply yet-unknown mechanisms that give rise to these kinematically-extreme disk stars. In order to study in detail their progenitors and possible formation mechanisms, we obtained spectra of these stars at a resolving power of R~6000, with the Dual Imaging Spectrograph at the Apache Point Observatory. We derive the abundances of chemical elements, C, Mg, Ca, Ti, Cr, Fe, and Ba from the observed spectra, using MOOG. We compare them with the ones of typical Galactic disk stars and discuss discrepancies between them to search for clues to their origin.

[포 ST-06] It is surface gravity.

Jae-Woo Lee
Department of Physics and Astronomy, Sejong University

In our previous study, we showed that the peculiar globular cluster M22 contains two distinct stellar populations with different physical properties, having different chemical compositions, spatial distributions and kinematics. We proposed that M22 is most likely formed via a merger of two GCs with heterogeneous metallicities in a dwarf galaxy environment and accreted later to our Galaxy. In their recent study, Mucciarelli et al. claimed that M22 is a normal mono-metallic globular cluster without any perceptible metallicity spread among the two groups of stars, which challenges our results and those of others. We devise new strategies for the local thermodynamic equilibrium abundance analysis of red giant branch stars in globuar clusters and show there exists a spread in the iron abundance distribution in M22.

[포 ST-07] Evolution of primary stars in Pop III binary systems

Hunchul Lee, & Sung-Chul Yoon
Department of Physics and Astronomy, Seoul National University

Binary interactions may have significant impact on Pop III stellar evolution. Pop III single star evolution indicates that for primary masses less than 20$M_{\odot}$, no significant binary mass transfer