

for MIR properties of galaxies in the Coma supercluster using multi-wavelength data from the optical to MIR including the Sloan Digital Sky Survey Data Release 12 and the *Wide-field Infrared Survey Explorer*. We investigate differences in MIR properties of galaxies among three galaxy systems, and discuss the results in relation with star formation history and morphological transformation of galaxies.

[포 GC-19] The Effective Cross-sections of a Lensing galaxy: Singular Isothermal Sphere with External Shear.

Dong-Wook Lee¹ and Sang-Joon Kim².

¹*T.B.D (무소속)*, ²*Kyung-Hee university(경희대)*

We present our recent work published in the MNRAS (Lee and Kim, 2014). Numerical studies of the imaging and caustic properties of the singular isothermal sphere (SIS) under a wide range of external shear (from 0.0 to 2.0) are presented. Using a direct inverse mapping formula for this lensing system, we investigate various lensing properties for both low-shear (i.e. $\gamma < 1.0$) and high-shear (i.e. $\gamma > 1.0$) cases. We systematically analyse the effective lensing cross-sections of double-lensing and quadruple-lensing systems, based on the radio luminosity function obtained by the Jodrell-VLA Astrometric Survey (JVAS) and the Cosmic Lens All-Sky Survey (CLASS). We find that the limit of a survey selection bias (i.e. between brighter and fainter images) preferentially reduces the effective lensing cross-sections of two-image lensing systems. By considering the effects of survey selection bias, we demonstrate that the long-standing anomaly over the high quads-to-doubles ratios (i.e. 50~70 % for JVAS and CLASS) can be explained by the moderate effective shear of 0.16~0.18, which is half that of previous estimates. The derived inverse-mapping formula could make the SIS + shear lensing model useful for galaxy-lensing simulations.

[포 GC-20] The temperature and density distribution of molecular gas in a galaxy undergoing strong ram pressure: a case study of NGC 4402

Bumhyun Lee and Aeree Chung

Department of Astronomy, Yonsei University

Galaxies are known to evolve passively in the cluster environment. Indeed, much evidence for HI stripping has been found in cluster galaxies to

date, which is likely to be connected to their low star formation rate. What is still puzzling however, is that the molecular gas, which is believed to be more directly related to star formation, shows no significant difference in its fraction between the cluster population and the field galaxies. Therefore, HI stripping alone does not seem to be enough to fully understand how galaxies become passive in galaxy clusters. Intriguingly, our recent high resolution CO study of a subsample of Virgo spirals which are undergoing strong ICM pressure has revealed a highly disturbed molecular gas morphology and kinematics. The morphological and kinematical peculiarities in their CO data have many properties in common with those of HI gas in the sample, indicating that strong ICM pressure in fact can have impacts on dense gas deep inside of a galaxy. This implies that it is the molecular gas conditions rather than the molecular gas stripping which is more responsible for quenching of star formation in cluster galaxies. In this study, using multi transitions of ¹²CO and ¹³CO, we investigate the density and temperature distributions of CO gas of a Virgo spiral galaxy, NGC 4402 to probe the physical and chemical properties of molecular gas and their relations to star formation activities.

[포 GC-21] Environmental Dependence of Galactic conformity in the Virgo Cluster

Hye-Ran Lee^{1,2}, Joon Hyeop Lee^{1,2}, Hyunjin Jeong^{1,2}, Byeong-Gon Park^{1,2}

¹*Korea Astronomy and Space Science Institute,*

²*Korea University of Science and Technology*

It is known that the galaxy evolution by direct interaction between galaxies is most active in a galaxy group. As a result, the satellite galaxies are closely related to their central galaxy in properties such as morphology, color and star formation rate (so-called 'galactic conformity'). However, it is not clear yet whether such conformity between galaxies is found in a galaxy cluster. Recently, Lee et al. (2014) have found a measurable correlation between the colors of bright galaxies and the mean colors of their faint companions in a cluster WHL J085910.0+294957 at $z = 0.3$, using the photometrically-selected cluster members. They suggest that such correlation may be the vestige of infallen groups in the cluster as one possibility. In order to confirm the small-scale conformity in galaxy clusters with higher reliability, we study the Virgo cluster using the Extended Virgo Cluster Catalog (EVCC). The cluster members are selected spectroscopically unlike in WHL J085910.0+294957. We examine the galactic conformity in two distinct

areas of the Virgo cluster: the inner X-ray emission region and its outer region. We find a marginal conformity in color ($> 2\sigma$ significance to bootstrap uncertainty) in the outer region, while no meaningful signal of small-scale conformity is detected in the X-ray emission region. We discuss the implication of this result, focusing on cluster mass assembly and cluster environmental effects on galaxy evolution.

[☞ GC-22] NGC 6273 as a new building block candidate

Dongwook Lim, Sang-Il Han, Young-Wook Lee
Center for Galaxy Evolution Research & Department of Astronomy, Yonsei University

Recent studies for the Milky Way globular clusters (GCs) have reported that most of them host multiple stellar populations. However, only a few GCs have shown abundance variations in heavy elements such as iron and calcium. These GCs, as galaxy building blocks, are important to understand the formation of the Milky Way in hierarchical merging paradigm. In this study, we report our discovery from the Ca narrow-band photometry and low-resolution spectroscopy that NGC 6273 is a new Milky Way building block candidate.

[☞ GC-23] Balmer Wing Formation in Active Galactic Nuclei.

Seok-Jun Chang, Hee-won Lee
Department of Physics and Astronomy, Sejong University.

Powered by a supermassive black hole, active galactic nuclei (AGNs) are characterized by prominent emission lines including Balmer lines. The unification scheme of AGNs requires the existence of a thick molecular torus that may hide the broad emission line region. In this configuration, it is expected that the far UV radiation from the central engine can be Raman scattered by neutral hydrogen to reappear around Balmer lines which can be identified observationally with broad Balmer wings. Another mechanism that can form Balmer wings is considered by invoking a fast moving medium around the central engine. In this presentation, we produce Balmer wings that are formed through Raman scattering and also those expected from a fast moving emission flow. It is noted that Raman Balmer wings exhibit stronger red part whereas the opposite behavior is seen in the Balmer wings

obtained from a fast moving emission flow.

[☞ GC-24] A New Selection Strategy of High Redshift Quasars: Medium-Band Observation with SQUEAN

Yiseul Jeon¹, Myungshin Im¹, Soojong Pak², and IMS/SQUEAN team^{1,2}

¹*CEO/Astronomy Program, Dept. of Physics & Astronomy, Seoul National University*

²*School of Space Research, Kyung Hee University*

About 70 high redshift quasars with $z \geq 5$ have been discovered through combinations of standard broad-band filters to distinguish them from contaminating sources. However, among the discovered quasars so far, there is a redshift gap at $5 \leq z \leq 6$ due to the limitation of traditional filter sets and selection techniques. To understand the early mass growth of supermassive black holes and the final stage of the cosmic reionization, it is important to find a statistically meaningful sample of quasars with various physical properties. Here we suggest a new selection technique of high redshift quasars using medium-band filters: nine filters with bandwidths of 50nm and central wavelengths from 625 to 1025nm. Photometry with these medium-bands traces the spectral energy distribution (SED) of a source, similar to spectroscopy with $R \sim 15$. We installed these filters to SED camera for QUasars in EARly uNiverse (SQUEAN) on the 2.1m telescope at McDonald Observatory, and conducted test observations of known high redshift quasars at $4.7 \leq z \leq 6.1$ and also dwarf stars for comparison. We found differences in SED shapes between high redshift quasars and dwarf stars, determined their locations on color-color diagrams, and demonstrated that the medium-band filters can enhance the efficiency of selecting robust quasar candidates in this redshift range. In this poster, we propose an effective selection method of high redshift quasars using these medium-band filters and discuss its effect on our high redshift quasar survey.

[☞ GC-25] Gas and Stellar Kinematics of 9 Pseudo Bulge Galaxies

Kooksup Jo¹, Jong-Hak Woo¹, Kenta Matsuoka²,

Hojin Cho¹

¹*Seoul National University,*

²*Kyoto University*

We present the spatially resolved kinematics of