target galaxy has a mass of ~10^{10} Msun, using ~17 million particles covering a cubic box of 1 $(Mpc/h)^3$. Here, individual particle masses for dark matter (DM) and gas are M_{DM} = 4.1×10^3 Msun and Mgas = 7.9×10^2 Msun, respectively, and thus each satellite can be resolved with more than several hundreds of particles.

[포 GC-03] On the origin of Na-O anticorrelation in globular clusters

Jaeyeon Kim and Young-Wook Lee
Center for Galaxy Evolution Research & Department of Astronomy. Yonsei University

In order to investigate the origin of multiple stellar populations in the halo and bulge of the Milky Way, we have constructed chemical evolution models for the low-mass proto-Galactic subsystems such as globular clusters (GCs). Unlike previous studies, we assume that supernova blast waves undergo blowout without expelling the pre-enriched gas, while relatively slow winds of massive stars, together with the winds and ejecta from low and intermediate mass asymptotic giant branch stars, are all locally retained in these less massive systems. We first applied these models to investigate the origin of super-helium-rich red clump stars in the metal-rich bulge as recently suggested by Lee et al. (2015). We find that chemical enrichments by the winds of massive stars can naturally reproduce the required helium enhancement (dY/dZ = 6) for the second generation stars. Disruption of these “building blocks” in a hierarchical merging paradigm would have provided helium enhanced stars to the bulge field. Interestingly, we also find that the observed Na-O anticorrelation in metal-poor GCs can be reproduced, when multiple episodes of starbursts are allowed to continue in these subsystems. Specific star formation history with decreasing time intervals between the stellar generations, however, is required to obtain this result, as would be expected from the orbital evolution of these subsystems in a proto-Galaxy. The “mass budget problem” is also much alleviated by our models without ad-hoc assumptions on star formation efficiency and initial mass function.

[포 GC-04] Chemical Properties of Star-Forming Dwarf Galaxies in Different Environments

Jiwon Chung[1], Soo-Chang Rey[1], Eon-Chang Sung[2], Woong Lee[1], Suk Kim[2], Yongdae Lee[2]
[1]Chungam National University, [2]Korea Astronomy and Space Science Institute

Star forming dwarf galaxies in various environments are attractive objects for investigating the environmental effects on chemical evolution of dwarf galaxies. Using SDSS DR7 spectroscopic data and GALEX ultraviolet (UV) imaging data, we study the chemical properties of star forming dwarf galaxies in various environments of the Virgo cluster, Ursa Major group, and field. We derived gas-phase abundance, galaxy mass, and UV specific star formation rate (sSFR) of subsample, early-type (ETD) and late-type star forming dwarf (LTD) galaxies, which are divided by visually classified galaxy morphology. We found no O/H enhancement of LTDs in cluster and group environments compared to the field, implying no environmental dependence of the mass-metallicity relation for LTDs. LTDs in the Virgo cluster and Ursa Major group have similar sSFR at a given galaxy mass, but they exhibit systematically lower sSFR than those in isolated field environment. We suggest that LTDs in the Virgo cluster are an infalling population that was recently accreted from the outside of the cluster. We found that ETDs in the Virgo cluster and Ursa Major group exhibit enhanced O/H compared to those in the field. However, no distinct difference of N/O of galaxies between different environments. The chemically evolved ETDs in the Virgo cluster and Ursa Major group also show similar mass-sSFR relation, but systematically lower sSFR at a fixed galaxy mass compared to the field counterparts. We suggest that ETDs in the Virgo cluster and Ursa Major group have evolved under the similar local environments. We also discuss the evolutionary path of ETDs and LTDs with respect to the environmental effects of ram pressure stripping and galaxy interaction/merging.

[포 GC-05] Chemically young AGNs at high redshift

Jaejin Shin[1], Jong-Hak Woo[1], Tohru Nagao[2]
[1]Seoul National University
[2]Ehime University, Japan

Metallicity is one of the most important properties in understanding galaxy evolution. However, measuring metallicity is limited to low redshift (z<3.5) due to the faintness of the metallicity indicators in normal galaxies. For high redshift universe, active galactic nuclei (AGN) can be used to constrain the host galaxy metallicity.

Previous studies investigated AGN metallicity using emission line flux ratios (i.e., NV/CIV and FeII/MgII), finding no evolution up to z~6. Those results might be due to selection effect since previous studies are based on very luminous AGNs. The observed luminosity-metallicity relation of AGNs (e.g., Nagao et al. 2006) suggests that luminous AGNs may be already matured at the observed epoch. Considering the luminosity-metallicty relation, we focused on low luminosity AGNs to find young AGNs (i.e., low metallicity). Through the Gemini/GNIRS observation in 2012A and 2015A (K-GMT GN-2015A-Q-203 PI: Shin, J.), we obtained the Gemini/GNIRS data for 7 high redshift AGNs ($3.0<z<3.5$). We will present and discuss our preliminary results on the their metallicity.

[포 GC-06] Do Galaxy Mergers Enhance Star Formation Rate in Nearby Galaxies?

Gu Lim(임구), Myungshin Im(임명신), Changsu Choi(최창수), Yongmin Yoon(윤용민)
Center for Exploration of the Origin of the Universe (CEOU), Astronomy Program, 1Dept. of Physics & Astronomy, Seoul National University (서울대학교)

We present our study of the correlation between star formation rate(SFR) and merging activities of nearby galaxies(d<150Mpc). Our study uses 265 UV-selected galaxies which are not classified as AGN. The UV selection is made using the GALEX Atlas of Galaxies (Gil de Paz+07) and the updated UV catalog of nearby galaxies (Bai+15). We use deep R band optical images reaching to 1σ surface brightness detection limit ~27 mag/arcsec^2 to classify merger features by visual inspection. We also estimated unobscured SFR(SFR_{NUV}) and obscured SFR(SFR_{W4}) using Near-UV continuum and 22 micron Mid-IR luminosity respectively as a indicator of star forming activity. The fraction of galaxies with merger features in each SFR bin is obtained to see if how the fraction of galaxies with merging features(F_m) changes as a function of SFR. As a result, for 203 late type galaxies(LTGs), we found that merger fraction increases from ~8% up to 50% with SFR_{W4}, while for 229 LTGs SFR_{NUV} shows relatively consistent fraction(~18%) of merger fraction. For early type galaxies(ETGs), we could also find no significant correlation between F_m and SFR(both SFR_{NUV} and SFR_{W4}). This result suggests that a main driver of star forming activity of UV bright galaxies, especially for obscured late types, is mergers.

[포 GC-07] The Seoul National University AGN Monitoring Project (SAMP) : Photometric Light Curves

Donghoon Son[1], Jong-Hak Woo[1], Hyun-Jin Bae[1,2], Yiseul Jeon[1], Huynh Anh Le[1], Songyoun Park1, Jaejin Shin[1], Minjin Kim[3], Daeseong Park[3], Hyun-il Sung[3], Ellena Gallo[4], Edmund Hodges-Kluck[4], Aaron Barth[5], Tommaso Treu[6], Matt Malkan[6], Vardha Nicola Bennert[7]
[1]Department of Physics and Astronomy, Seoul National University
[2]Department of Astronomy, Yonsei University
[3]Korea Astronomy and Space Science Institute
[4]Department of Astronomy, University of Michigan
[5]Department of Physics and Astronomy, UC Irvine
[6]Department of Physics and Astronomy, UCLA
[7]Physics Department, California Polytechnic State University

We have been carrying out the long-term (3-5 years) AGN monitoring project since October 2015 to investigate the variability and measure the H beta line time lag of 69 nearby ($0.06 < z < 0.47$) AGNs based on the reverberation mapping method. Our targets have B band magnitudes of 14.4－18.6, luminosities of log L5100 = 45.6－48.1 erg/s, and the expected time lags of 28－597 light days. BVR band images are being taken with ~20-day cadence using MDM 1.3m, LOAO 1m and MDM 2.4m telescopes.

Recently, Nickel 1m at Lick and DOAO 1m at Deokheung observatory are joined with photometric observations. Follow-up spectroscopic observations are on-going using the Lick 3m and MDM 2.4m telescopes. In this poster, we will describe our project including sample selection and the observational strategy, and present the preliminary results based on the 1st year photometry.

[포 GC-08] Weak Lensing Analysis of the High-z Massive Galaxy Cluster SPT-CL J0205-5829 Using HST Data

Seojin F. Kim, Myungkook J. Jee
Yonsei University

Discovered in the South Pole Telescope Sunyaev-Zel'dovich (SPT-SZ) survey, the galaxy cluster SPT-CL J0205-5829 at z = 1.322 might be the most massive known SZ-selected galaxy cluster at $z > 1.2$. The SZ and X-ray combined mass estimate is M500 = $(4.8 \pm 0.8) \times 10^{14}$ $M_\odot$. To confirm this extreme mass, we perform weak