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 ± 0.8) × 10^{14} M$_\odot$. To confirm this extreme mass, we perform weak

lensing analysis of SPT-CL J0205-5829 using HST data. Our analysis produces a mass estimate consistent with the previous results obtained from non-lensing methods.

In this poster, we describe details of the method including shape measurement, PSF correction, source selection, and mass estimation. We also present a two-dimensional mass map and compare this to the galaxy distribution.

[포 GC-09] Weak Lensing Analysis On The Merging Galaxy Cluster Abell 115

Mincheol Kim, Myungkook J. Jee
Yonsei University

The galaxy cluster Abell 115 shows ongoing merger features, which suggest that it might be in an intermediate phase of dynamical evolution. As merging clusters often show, the characteristic hints of A115's merging activities include radio relics, double X-ray peaks, and large offsets between the cluster member galaxies and the X-ray distributions. To constrain the exact stage of the merger, it is necessary to obtain its dark matter distribution. In this study, we carry out a precision weak lensing study of this interesting system based on Subaru images. We present our mass reconstruction together with descriptions on our core procedure of the analysis: Subaru data reduction, galaxy shape measurement, and source selection. We find that Abell 115 consists of two massive dark matter clumps, which closely follow the cluster galaxies. Our weak lensing mass estimate is a few factors lower than the published dynamical mass obtained from velocity dispersion. This large mass discrepancy may be attributed to a significant departure from dynamical equilibrium.

[포 GC-10] Where is the Dark Matter in the Double Radio Relic Galaxy Cluster PLCKG287.0+32.9?

Kyle Finner[1]; Myungkook J. Jee[1], William Dawson[4], Nathan Golovich[2], Daniel Gruen[3], Brian Lemaux[2], David Wittman[2]
[1]Yonsei University, [2]UC Davis, [3]Stanford University, [4]Lawrence Livermore National Lab

Diffuse radio relics are often detected in merging galaxy clusters and are emitted by synchrotron process. Radio relics are believed to trace the shock waves in the intracluster medium induced by ram pressure during a major cluster merger. Radio halos and relics are found in approximately 50 galaxy clusters to date that are all in a state of merging. The rarest of these galaxy clusters contain pairs of relics of similar brightness as well as a radio halo. The massive galaxy cluster PLCKG287.0+32.9 belongs to this rare population and is the second most significant detection from the Planck SZ All-sky Survey. Perhaps even more intriguing is that the radio relics are observed at vastly different distances from the X-ray peak requiring a complex merging scenario. In this study, we use weak-lensing to peer deeper into the merging scenario by reconstructing the dark matter distribution. We relate the mass distribution to the radio, X-ray, and optical emissions to provide constraints for future simulations of the merger. Fitting an NFW profile to the tangential shear we infer the mass of the cluster and discuss its implications for the merging scenario.

[포 GC-11] IONIZED GAS KINEMATICS ALONG THE RADIO JET IN TYPE 2 AGNS

HUYNH ANH N. LE, JONG-HAK WOO, AND DONGHOON SON
Astronomy Program, Department of Physics and Astronomy, Seoul National University

To investigate the connection between radio activity and AGN outflows, we present a study of ionized gas kinematics by using [O III] λ5007 emission line along the radio jet for six radio AGNs. These AGNs are selected based on the radioactivity (L1.4GHz $\geq$ 1039.8 erg s-1) as well as optical properties as type 2 AGNs. By using the high spatial resolution of the Red Channel Cross Dispersed Echellette Spectrograph at the Multiple Mirror Telescope, we investigate in detail the [O III] and stellar kinematics. We spatially resolve and probe the central AGN-photoionization sizes, which is important in understanding the structures and evolutions of galaxies. We find that the typical central AGN-photoionization sizes of our targets are in range of 1.8-3.8 kpc. We study the [O III] kinematics along the radio jets to test whether there is a link between gas outflows in the narrow-line region and radio jet emissions. Contrary to our expectation, we find no evidence that the gas outflows are directly connected to radio jet emission.

[포 GC-12] The evolution of a late-type galaxy through multiple high-speed galaxy-galaxy collisions