구 두 발 표 초 록

초 청 강 연

[초 IT-02] Galaxy Clusters at High Redshift

Myungshin Im
CEOU/Astronomy Program, Dept. of Physics & Astronomy, Seoul National University

Hierarchical galaxy formation models under LCDM cosmology predict that the most massive structures such as galaxy clusters ($M > 10^{14}$ $M_{\odot}$) appear late ($z < 1$) in the history of the universe through hierarchical clustering of small objects. Galaxy formation is also expected to be accelerated in overdense environments, with the star formation rate-density relation to be established at $z \sim 2$. In this talk, we present our search of massive structures of galaxies at $0.7 < z < 4$, using the data from GOODS survey and our own imaging survey, Infrared Medium-deep Survey (IMS). From these studies, we find that there are excess of massive structures of galaxies at $z > 2$ in comparison to the Millennium simulation data. At $1 < z < 2$, the number density of massive structures is consistent with the simulation data, but the star formation history is more or less identical between field and cluster. The star formation quenching process is dominated by internal process (stellar mass). The environmental effect becomes important only at $z < 1$, which contributes to create the well known star formation-density relation in the local universe. Our results suggest that galaxy formation models under LCDM cosmology may require further refinements to match the observation.

[초 IT-03] Profile, Facilities, and Options for Collaboration with Steward Observatory

Richard F. Green
Steward Observatory/University of Arizona

Steward Observatory has a rich and diverse program of investigations, with significant groups working on star and planet formation and astrobiology, galaxy and quasar formation and evolution, technology for adaptive optics and interferometry, computational astrophysics, and effectiveness of educational practice. To support this work, Steward operates and offers a range of observational and other facilities, including the Large Binocular Telescope, the MMT, the Magellan Telescopes, the Arizona Radio Observatory, and a suite of 1- and 2-m class telescopes. A special opportunity for IR astronomy exists with Arizona now running UKIRT. Steward Observatory astronomers would welcome the opportunity to form genuine scientific collaborations that are mutually beneficial for high-impact projects and improving the observing facilities.

[초 IT-04] Streaming Gas Clouds associated with the Circumnuclear Disk (CND) of our Galactic Center

Young Chol Minh
KASI

The supermassive black hole (SMBH) of our Galactic Center is surrounded by the circumnuclear disk (CND) in the radii of about 2-3 pc. New data from the Submillimeter Array and Green Bank Telescope clearly reveal the irregular and clumpy structures of the CND and its surroundings which may be a dynamically evolving integrated system. The CND seems to be the convergence of the various gas streamers inflowing, shaped mostly via local disturbances associated with, rather than a quasi-stationary stable structure.

[초 IT-05]]IGRINS and the Revolution in High Resolution Infrared Spectroscopy

Daniel T. Jaffe
University of Texas at Austin

The Immersion Grating Infrared Spectrograph (IGRINS) is the first of a new generation of infrared instruments with high sensitivity, high spectral resolution, and broad spectral grasp. IGRINS, a joint project of the University of Texas and the Korea Astronomy and Space Science Institute, designed and constructed by a team at UT, KASI, and Kyung Hee University, has been available to the Korean and Texas communities on the McDonald Observatory 2.7m telescope since 2014 September. On this modest-sized telescope, the instrument has 30 times the spectral grasp of CRIRES at the 8m VLT and is only slightly less sensitive. Already, Korean and UT astronomers have produced a raft of new results in star formation studies, investigations of the interstellar medium, and the nature of cool stars. Several programs are under way to detect and study the atmospheres of exoplanets. We will present

highlights from the first 6 months of IGRINS operations and look at the future of IR spectroscopy both with IGRINS and with GMTNIRS, a UT/KASI/KHU instrument for the Giant Magellan Telescope.

외부은하 / 은하단

[구 GC-01] A comparison of single-epoch black hole masses at z>0.5

M. Karouzos[1], Jong-Hak Woo[1], Kenta Matsuoka[2], Christopher Onken[3], Juna Kollmeier[4], Dawoo Park[1], and Tohru Nagao[2]
[1]*Seoul National University, S. Korea,*
[2]*K yotoUniversity, Japan,*
[3]*The Australia National University, Australia,*
[4]*Carnegie Observatories, USA*

Accurately estimating black hole (BH) masses at high redshifts is imperative in the current and future era of large-area extragalactic spectroscopic surveys. We present an extension of existing comparisons between rest-frame UV and optical virial BH mass estimators to intermediate redshifts, lower luminosities, and lower BH masses, comparable to the local Hβ reverberation-mapping sample. We use data from the AGES survey and also newly acquired near-infrared spectra from the FMOS instrument on Subaru telescope for 89 broad-lined active galaxies at redshifts between 0.5 and 1.6. We focus on the MgII, CIV, and CIII broad emission lines and compare them to both Hα and Hβ, using two different prescriptions to describe their emission profile width. We confirm that MgII shows a tight correlation with Hα, with a scatter of ~0.25 dex. The CIV and CIII estimators can be considered viable virial mass estimators, despite large scatter values. We combine our dataset with previous high redshift and high luminosity CIV and CIII measurements from the literature and we calculate a scatter of ~0.4 dex and an offset to the 1:1 relation consistent with 0 for the combined sample. This updated comparison spans a total of 4 decades in BH mass, a much wider range than any previous individual study.

[구 GC-02] Identifying Young AGNs using the Korean VLBI Network

Yongjin Jeong[1,2], Bong Won Sohn[2], Aeree Chung[1]
[1]Department of Astronomy, Yonsei University,
[2]Korea Astronomy and Space Science Institute

High frequency peakers (HFPs) are promising candidates for young active galactic nuclei (AGNs). Their small physical scale (< 1 kpc) and radio spectrum peaked at high frequency (> 5 GHz) are suggestive that it has been only about 10^2-10^3 years since a central massive black hole in their host galaxies was launched. Until recently however, long-term monitoring radio observations at frequencies which are high enough to cover the true peak of HFP candidates were rare. Therefore, previous HFP samples are often contaminated by blazars, which are highly variable, hence may show a similar radio spectrum as HFPs depending on the observational epoch. In this work, we challenge to identify genuine young AGNs by monitoring HFP candidates at high radio frequencies. We performed single-dish monitoring of 19 candidates in 18 epochs over 2.5 years at 22 and 43 GHz using the Korean VLBI Network (KVN). Also, using KaVA, a combined array of the KVN and the VERA in Japan, we carried out 22 GHz VLBI observations of two HFPs and one blazar selected from our sample in order to compare their parsec scale (milli-arcsecond scale) morphology. HFPs are expected to have double/triple features, so called compact symmetric objects, which are scaled-down versions of extended radio galaxies, while blazars typically show core-jet morphology. We discuss the properties of AGNs at their very early evolutionary stage based on the results of the KVN and KaVA observations.

[구 GC-03] AGN gas outflows out to z ~ 0.2

Jong-Hak Woo[1], Donghoon Son[1], Hyun-Jin Bae[1,2]
[1]*Astronomy Program, Department of Physics and Astronomy, Seoul National University*
[2]*Department of Astronomy, Yonsei University*

Using a large sample of 32,000 type 2 AGNs out to z = 0.2, we present the statistical results on the ionized gas outflows, based on the analysis of the velocity shift of narrow emission lines with respect to the systemic velocity measured from the stellar absorption lines. Considering the projection effect, the fraction of type 2 AGNs with the [O III] velocity offset, which is ~50%, is comparable to that of type 1 AGNs. The velocity dispersion of [OIII] is typically larger than that of Ha, suggesting that outflow is prevalent in type 2 AGNs. A weak correlation of the OIII luminosity with velocity shift and velocity dispersion indicates that outflow velocity is stronger for higher luminosity AGNs. Based on our 3-D biconical outflow models with simple assumptions on the velocity structure, we simulate the projected 2-D velocity and velocity dispersion