[1]Astronomy Program, Department of Physics and Astronomy, Seoul National University, Seoul 08826, Korea;
[2]Department of Astronomy and Atmospheric Sciences,
Kyungpook National University, Daegu 41566, Korea;

The Seoul National University AGN Monitoring Project (SAMP) is a welldesigned long-term AGN reverberation mapping project. SAMP focuses on the luminous AGNs out to z~0.5 with relative long time lags between AGN continuum and broad emission lines and aims to probe the high-end of the AGN broad line region (BLR) size-luminosity (R-L) relation. The pilot observations started in October 2015 for 100 AGNs to confirm the variability and the H and [O III] emission line strengths. Based on the initial variability test, 48 quasars has been continued spectroscopic monitoring since Feb. 2016 with Lick 3m and MDM 2.4m telescopes with a cadence of ~20 days. Supporting photometric monitoring in B and V band was conducted at multiple facilities including the MDM 1.3m, LOAO, and DOAO telescopes with a cadence of ~10 days. By the time of Feb. 2021, we have obtained five years spectroscopic and photometric data. More than 30 AGNs shows significant variability in five-year baseline and 16 of them show well detected lags between B-band and H . Here, we report some examples of SAMP light curves and lag detections using the first five-year data as well as the location of our 16 targets in the AGN BLR R-L relation. These measurements are consistent with the existing R-L relation and located at the high-end. With the coming data, SAMP are hopefully to report more AGNs with well detected lags. Our results demonstrate the general feasibility and potential of long-term reverberation project with medium cadence for luminous AGNs.

[포 GC-11] A GMOS/IFU Study of Enhanced Star Formation Activity of Jellyfish Galaxies in Massive Galaxy Clusters

Jeong Hwan Lee[1], Myung Gyoon Lee[1], Jisu Kang[1], Brian S. Cho[1], and Jae Yeon Mun[2]
[1]Seoul National University, [2]Australian National University

Ram-pressure stripping (RPS) is known as a typical mechanism of quenching star formation (SF) of galaxies orbiting in clusters, but it can also boost the SF activity within a short period of time. Jellyfish galaxies, with eye-catching blue tails and knots, are such starburst galaxies undergoing strong RPS in galaxy clusters. Thus, they are very useful targets to understand their SF activity in relation to RPS. We study the SF activity of three jellyfish galaxies in massive clusters at z=0.3-0.4 (MACSJ1752-JFG2, MACSJ0916-JFG1, and A2744-F0083) with Gemini GMOS/IFU and compare our results to those of jellyfish galaxies in low-mass clusters. We obtain total star formation rates (SFRs) of up to 60 Mo/yr and SFRs in the tails of up to 15 Mo/yr, which are much higher than those of jellyfish galaxies in low-mass clusters with the median SFRs of 1.1 Mo/yr in total and 0.03 Mo/yr in tails. In addition, these SFRs are also significantly higher than the SF main sequence of galaxies at the redshifts of the three jellyfish galaxies. This implies that their SF activity is much more enhanced compared to jellyfish galaxies in low-mass clusters due to extreme RPS in massive clusters.

[포 GC-12] Intensive Monitoring Survey of Nearby Galaxies (IMSNG) : Constraints on the progenitor system of a normal Type Ia SN 2019ein from its light curve at the early phase

Gu Lim[1,2] (임구), Myungshin Im[1,2] (임명신), Dohyeong Kim[3] (김도형), Gregory S. H Paek[1,2] (백승학), Changsu Choi[1,2] (최창수), Sophia Kim[1,2] (김소피아), Sungyong Hwang[1,2] (황성용), and IMSNG team
[1]SNU Astronomy Research Center, Seoul National University, Korea
[2]Astronomy Program, Department of Physics & Astronomy, Seoul National University, Korea
[3]Department of Earth Sciences, Pusan National University, Busan 46241, Republic of Korea

The progenitor of Type Ia supernovae (SNe Ia) is mainly believed to be a close binary system of acarbon-oxygen white dwarf (CO WD) and non-degenerate companion (single degenerate) or another WD (double degenerate). However, it is unclear which system is more prevalent. Here, we present a high cadence optical/Near-IR light curve of normal but slightly faint type Ia SN 2019ein from IMSNG project. We fit the early light curve (t <+8.3 days from the first detection) with various models to find the shock-heated cooling emission from SN ejecta-companion interaction. No significant shock-heated cooling emission is found, from which we constrain the progenitor star size as the following. The upper limit ($R_{upper,*}$) of the companion size in R-band is ~$0.2R_{\odot}$ when forcing the first light time (t_{fl}) to have one value and ~0.9 $R_{\odot}$ when using the mean value of tfl from the fitting in each band. Assuming the source of the I-band curve is almost powered from the radioactive decay, we obtained $R_{upper,*}$~$1.2R_{\odot}$. The early B−V color curve is in agreement with the model color curve of the 2M$_\odot$ main sequence companion. These results allow us to at least rule out large stars like red giants as a companion star of the binary progenitor system of this supernova. B−R and V−R color do not show any significant signs of a red bump, which shows a thin helium shell (MHe<0.1M$_\odot$) for the sub-Mch WD (double detonation model). In addition, we estimated the distance to NGC 5353 as 37.098±0.028Mpc.

[포 GC-13] Understanding the connection between O32 and LyC escape based on numerical simulations

Suhyeon Choe[1], Taysun Kimm[1], Harley Katz[2], Teahwa Yoo[1]
[1]Department of Astronomy, Yonsei University, 50 Yonsei-ro, Seodaemun-gu, Seoul 03722, Republic of Korea
[2]Astrophysics, University of Oxford, Denys Wilkinson Building, Keble Road, Oxford OX1 3RH, UK

Identifying the main source of reionization is one of the essential astrophysical problems that remain to be solved. But there are difficulties in directly measuring the Lyman continuum (LyC) escape fraction (fesc) from high-z galaxies, and other indirect methods have been suggested to identify potential LyC leakers. The O32 ratio ([OIII] λ5007 / [OII] λ3727) is one of those examples, which appear to positively correlate with fesc according to some observations and photoionization modelling of HII regions. However, recent studies fail to find such a correlation. Here we exploit a set of radiation-hydrodynamic simulations of giant molecular clouds to understand the physical connection between O32 and fesc. We post-process our simulations with the photo-ionization code Cloudy, and discuss the results obtained from the runs with different metallicities and input SEDs.

[포 GC-14] Giant Molecular Cloud Properties of WISDOM galaxies - NGC 5806 and NGC 6753

Woorak Choi[1], Lijie Liu[2]. Martin Bureau[3], Timothy Davis[4], Aeree Chung[1] and the WISDOM Team
[1]Yonsei University, [2]Technical University of Denmark, [3]University of Oxford, [4]Cardiff University

Constraining the structure and thus the fate of giant molecular clouds (GMCs), the primary sites of star formation in galaxies, is crucial to understand the evolution of galaxies themselves. Exploiting the unprecedented sensitivity and angular resolution of the Atacama Large Millimeter/sub-millimeter Array (ALMA), we have measured the spatially-resolved (~ 20 pc resolution) properties of the GMCs in two nearby late-type galaxies, NGC 5806 (SAB(s)b) and NGC 6753 ((R)SA(r)b), as part of the WISDOM project. Although these results are preliminary, we identified ~ 200 resolved GMCs in NGC 5806 within a radius of 500 pc, most within a nuclear ring structure, and ~ 400 resolved GMCs in NGC 6753 within a radius of 2 kpc, most within a flocculent spiral structure. The GMCs of NGC 5806 have similar sizes but slightly higher linewidths than clouds in the Milky Way disc. Because the GMCs also have higher surface densities, the calculated cloud Virial parameters are nevertheless about unity, suggesting that the GMCs of NGC 5806 are in gravitational equilibrium and thus long lived. This is contrary to other WISDOM results on earlier-type galaxies, where large cloud linewidths are likely due to shear associated with the local (circular) orbital motions (rather than the clouds' self-gravity), and the clouds are either marginally or not gravitationally bound. These results support the notion that spheroids alter the dynamical states of clouds (morphological quenching), that are otherwise (i.e. in galaxy discs) fairly homogenous and similar to those of the Milky Way.

[포 GC-15] Evolution of the spin of late-type galaxies caused by galaxy-galaxy interactions

Jeong-Sun Hwang[1,2], Changbom Park[3], Soo-hyeon Nam[4], and Haeun Chung[5]
[1]Department of Physics and Astronomy, Sejong University, [2]Department of Science Education, Gwangju National University of Education, [3]School of Physics, Korea Institute for Advanced Study, [4]Department of Physics, Korea University, [5]University of Arizona, Steward Observatory

We use N-body/hydrodynamic simulations to study the evolution of the spin of a Milky Way-like galaxy through interactions. We perform a controlled experiment of co-planner galaxy-galaxy encounters and study the evolution of disk spins of interacting galaxies. Specifically, we consider the cases where the late-type target galaxy encounters an equally massive companion galaxy, which has either a late or an early-type morphology, with the closest approach distance of about 50 kpc, in prograde or retrograde sense. By examining the time change of the circular velocity of the disk material of the target galaxy from each case, we find that the target galaxy tends to lose the spin through prograde collisions but hardly through retrograde collisions, regardless of the companion galaxy type. The decrease of the spin results mainly from the deflection of the orbit of the disk material by tidal disruption. It is found that the