Young-Lo Kim[1], Mark Sullivan[2], Mathew Smith[2], and Young-Wook Lee[1]
[1]*Center for Galaxy Evolution Research & Department of Astronomy, Yonsei University, Seoul 03722, Korea,*
[2]*School of Physics and Astronomy, University of Southampton, Southampton SO17 1BJ, UK*

Recent studies suggest that the difference between global and local properties of galaxies (the local-global environmental (LoG) bias) might be important in the Type Ia supernova (SN Ia) host galaxy studies. Obtaining local spectroscopic properties of hosts at high redshift, however, is challenging. Here we will introduce a more efficient way to conduct this study by only using photometric data. We find that when we restrict a sample to the hosts whose stellar mass is less than 10^{10} $M_{\odot}$, a sample without LoG bias is efficiently selected. From the sample without LoG bias, we confirm that SNe Ia in locally star-forming environment are 0.103 ± 0.010 mag and 0.085 ± 0.012 mag fainter than those in locally passive region, for MLCS2k2 and SALT2, respectively. Because of ~6 times larger sample that covers much wider redshift range, our results are far more significant statistically, 10.3σ for MLCS2k2 and 7.1σ for SALT2, than previous results.

[구 GC-05] Internal kinematics of dwarf early-type galaxies with blue-center in the Virgo Cluster from Gemini GMOS long-slit spectroscopy

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

Dwarf elliptical galaxies (dEs), the most abundant galaxy type in clusters, were recently shown to exhibit a wide variety in their properties. Particularly, the presence of blue cores in some dEs, what we call dE(bc), supports the scenario of late-type galaxy infall and subsequent transformation into red, quiescent dEs. While several transformation mechanisms for these dE(bc)s within cluster environment have been proposed, all these processes are able to explain only some of the observational properties of dEs. In this context, internal kinematic properties of dE(bc)s provide the most crucial evidence to discriminate different processes for the formation of these galaxies. We present Gemini Multi Object Spectrograph (GMOS) long-slit spectroscopy of two dE(bc)s in the Virgo cluster. We obtained radial profiles of velocity and velocity dispersion out to ~1.3 effective radius. We found that two dE(bc)s exhibit kinematically decoupled components as well as distinct peculiar features in velocity profiles, supporting the scenario of mergers. We also found that these galaxies are structurally compatible with low surface brightness component of blue compact dwarf galaxies. We suggest that a part of dE(bc)s in the Virgo Cluster were formed through galaxy merger in low density environment such as galaxy group or outskirt of the cluster, and then were quenched by subsequent effects within cluster environment.

[구 GC-06] Optical properties of dwarf galaxies in Leo I galaxy group

Myo Jin Kim[1], Aeree Chung[1], Jong Chul Lee[2], Sungsoon Lim[3], Minjin Kim[2,6], Jongwan Ko[2,6], Soung-Chul Yang[2,5], Joon Hyeop Lee[2,6], Narea Hwang[2], Byeong-Gon Park[2,6], Hye-Ran Lee[2,6]
[1]*Department of Astronomy, Yonsei University,*
[2]*Korea Astronomy and Space Science Institute,*
[3]*Department of Astronomy, Peking University, China*
[4]*Kavli Institute for Astronomy and Astrophysics, Peking University, China*
[5]*The Observatories of the Carnegie Institution of Washington,*
[6]*Korea University of Science and Technology*

Since the serendipitous discovery of a large-scale atomic hydrogen (H I) ring discovered in the Leo I galaxy group, its origin has been under debate till today, whether it is the leftover after group formation or stripped gas structure during the galaxy-galaxy interaction. Intriguingly a number of H I clumps have been identified along the gas ring, some of which turn out to be associated with optically catalogued dwarf galaxies. The formation history based on detailed optical and H I gas properties of those dwarf galaxies will enable us to verify the origin of the Leo ring. In this work, we first probe the redshift and multi-color properties of those dwarf galaxies, using deep photometric and spectroscopic data from CFHT, Gemini and Magellan telescope.

[구 GC-07] Recent galaxy mergers and star formation history of red sequence galaxies in rich Abell clusters at z ≤ 0.1

Yun-Kyeong Sheen[1], Sukyoung K. Yi[2], Chang H. Ree[1], Yara Jeffé[3], Ricardo Demarco[4], and Ezequiel

Treister[5]
[1]*Korea Astronomy and Space Science Institute,* [2]*Yonsei University,* [3]*ESO-Chile,* [4]*University of Concepcion, Chile,* [5]*Pontificia Universidad Catolica de Chile, Chile*

We explored the GALEX UV properties of optical red sequence galaxies in 4 rich Abell clusters at z ~ 0.1. In particular, we tried to find a hint of merger-induced recent star formation (RSF) in red sequence galaxies. Based on the NUV - r' colors of the galaxies, about 36% of the post-merger galaxies were classified as RSF galaxies with a conservative criterion (NUV - r' ≤ 5), and that number was doubled (~ 72%) when using a generous criterion (NUV - r' ≤ 5.4). Post-merger galaxies with strong UV emission showed more violent, asymmetric features on the deep optical images. Also it turned out that all massive RSF galaxies (Mr' < -22 and NUV - r' ≤ 5) exhibited post-merger signatures. Our results suggested that only 30% of RSF red sequence galaxies show morphological hints of recent galaxy mergers. This implies that internal processes (e.g., stellar mass-loss or hot gas cooling) for the supply of cold gas to early-type galaxies may play a significant role in the residual star formation of early-type galaxies at a recent epoch.

[구 GC-08] Merger Induced Kinematic Anomalies in Abell 119

Sree Oh[1], Hyunjin Jeong[2], Yun-Kyeong Sheen[2], Scott Croom[3], Sukyoung Yi[1]
[1]*Yonsei University,* [2]*Korea Astronomy and Spacescience Institute,* [3]*Univeristy of Sydney*

Galaxy clusters are the sites where the most massive galaxies are found, and so the most dramatic merger histories are embedded. Our deep (mu ~ 28 mag/arcsec^2) images of Abell 119 at z = 0.044 using the Blanco 4-m telescope at CTIO revealed post-merger signatures in ~35% of galaxies brighter than Mr < -19.5, suggesting that so many galaxies even in clusters have gone through galaxy mergers at recent epoch. We went further to understand the impact of mergers in cluster galaxies using stellar kinematics from the SAMI Integral Field Unit on the galaxies of Abell 119 in three aspects of kinematics : orientations, levels of rotation, and kinematic shapes. We found that 30% of the merger-featured galaxies show misalignment in the angle between the photometric major and the rotation axes, and most of them show complex kinematics. For comparison, only 5% of non-merger-featured galaxies show the misalignment. Moreover, our analysis using the Tully-Fisher relation shows that galaxy interactions can both enhance or reduce galaxy spin depending on the merger geometry. We present our preliminary result and discussion on the role of galaxy mergers in cluster environment from the perspective of kinematics.

[구 GC-09] Investigating X-ray cavities and the environmental effects

Jaejin Shin[1], Jong-HakWoo[1], and JohnS. Mulchaey[2]
[1]*Seoul National University,* [2]*Carnegie Observatories, Pasadena, CA, USA*

X-ray cavities are typically detected as surface brightness depression in X-ray diffuse emission from hot gas in high resolution X-ray images (i.e., Chandra and XMM-Newton). Showing the coincidence of location with radio jets, X-ray cavities imply that the radio jets interact with interstellar/intergalactic medium. It is important to understand them since they can be a clue of understanding AGN feedback to their host galaxies. To understand the physics of the AGN feedback, X-ray cavity has been actively studied while there are only a few statistical studies on X-ray cavity based on small or incomplete samples. Hence, a systematic study with a large sample is needed. With the condition of sufficient X-ray photons to detect surface brightness depression, we constructed a large sample of 133 galaxy clusters, galaxy groups, and individual galaxies to investigate X-ray cavities. We detected 201 cavities from 94 objects using two detection methods (i.e., beta-modeling and unsharp masking method), and confirmed the cavity size-distance relation over a large dynamical range. The size-distance relation does not vary for different environments (i.e., galaxy cluster, groups, and individual galaxies), suggesting that there is little environmental effect on the formation of X-ray cavity.

[구 GC-10] Phase Space as a Tool for Understanding Galaxy Cluster Environmental Effects

Rory Smith, Jin Su Rhee, Hoseung Choi, Sukyoung Yi
Yonsei University

A galaxy-cluster phase space diagram is a simple plot of clustocentric velocity versus clustocentric radius for each member of the cluster. Using state-of-the-art, cosmological