non cool-core clusters

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We report preliminary results of KaVA observations of central galaxies in cool-core and non cool-core clusters. The main goal is to study how cooling environments of galaxy clusters affect the central AGN activities especially at its innermost region. For KaVA observations, 7 radio bright AGNs have been selected from the extended Highest Flux Galaxy Cluster Sample (eHIFLUGCS; the X-ray flux limited & all sky galaxy cluster catalog) with various cooling timescales. In our previous KVN study, we have found that most AGNs in the cool-core clusters show the hint of pc-scale jet-like features while the ones in the non cool-core clusters do not. Using the KaVA 22/43 GHz data of a much higher resolution than the KVN resolution, we have investigated detailed pc-scale jet properties such as physical size, morphology, and radiative age. Based on the KaVA data, we discuss the effect of cluster cooling environment on the evolution of AGNs in the cluster center.

[포 GC-16] Comparison between the Pair Fractions of Dark Matter Halos and Galaxies in Cosmological Simulations

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We investigate the pair fractions of dark matter halos and galaxies in cosmological simulations. The cosmological simulations are performed by a tree-particle-mesh code GOTPM (Grid-of-Oct-Tree-Particle-Mesh) and the dark matter halos are identified by a halo finding algorithm PSB (Physically Self-Bound). The 'galaxy' pair fractions are obtained from galaxy catalogues of L-Galaxies semi-analytical galaxy formation runs in the Millennium database. We present and compare the pair fractions of the dark matter halos and galaxies as functions of redshifts, halo masses and ambient environments.

[포 GC-17] The Environmental Dependence of the Mass-Size Relation for the Most Massive Galaxies

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We study the environmental dependence of the mass-size relation for the most massive early type galaxies ($M>10^{10.7}M_{\odot}$) in the redshift range 0.10~0.15. The sizes of galaxies are measured by non-parametric method. We find that galaxies more massive than $10^{11.1}M_{\odot}$ show the environmental dependence in the mass-size relation. The galaxies with $M>10^{11.1}M_{\odot}$ located in the densest, cluster like environment have larger sizes and extended surface brightness profiles than their counterparts located in a low dense environment. We also find that the environmental dependence of the mass-size relation is more significant for the brightest cluster galaxies (BCGs) than non-BCGs. We use the semi analytic galaxy formation simulation based on the Millennium 1 Simulation for interpretation. Our result can be explained with a hierarchical growth of the most massive galaxies through dissipation-less merger in dense environment.

[포 GC-18] A Phase-space View of Environmentally Driven Processes in the Virgo Cluster

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We study the orbital histories of Virgo galaxies undergoing different HI gas stripping stages using phase-space diagrams. Based on the HI properties of galaxies, we find that location of galaxies is in good agreement with ram-pressure stripping predicted by numerical simulations with different infall time. For example, galaxies experiencing active gas stripping are mostly found in the first infall region showing high velocity with respect to the cluster center. Meanwhile, most galaxies that are likely to have lost gas a while ago are found in the cluster outskirts with low orbital velocities. We also discuss the cases where observational properties of galaxies and their locations in the phase-space do not well agree. In addition, we probe the phase-space of filaments and subgroups

around or within Virgo. Our results strongly suggest that substructures can play important roles in galaxy evolution while galaxies are falling to the cluster.

[포 GC-19] A pilot study of dense molecular gas in a Virgo spiral using a KVN single-dish

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NGC 4402 is a spiral galaxy located in the Virgo cluster. It is undergoing active HI gas stripping due to the strong ICM pressure, showing evidence for recent quenching of star formation. Its CO disk is also highly disturbed as HI, yet unlike HI disk, no sign of significant molecular gas stripping is found. Aiming to better understand how atomic gas stripping and disturbed molecular gas result in star formation quenching, we probe properties of molecular gas in the densest forms. As a pilot study, we observed HCN (1-0) and HCO+ (1-0) in the center of NGC 4402 using one of the Korean VLBI Network (KVN) antennas located at Yonsei site. In this work, we present the result from the KVN single-dish observations and discuss its implications.

[포 GC-20] The Contribution of Mergers on Star Formation in Nearby UV-Bright Galaxies (별탄생 은하의 별 생성에 대한 병합 작용의 기여도 연구)

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Star formation in galaxies is one of the key factors in galaxy evolution. It is believed that star formation is triggered and enhanced by mergers among galaxies or secular evolution. However, how much these two mechanisms contribute on star formation is not well known yet. Recently, many other studies show observational evidences of faint merger features(tidal tails, stellar streams) around nearby galaxies with deep optical imaging. This study aims to investigate the fraction of star forming galaxies exhibiting faint features to total galaxies. We are analyzing samples of 76 star forming galaxies (NUV < -18) to find merger features from stacked B, R band frames taken at Maidanak 1.5m, McDonald 2.1m telescope and g, r frames from Canada-France-Hawaii Telescope (CFHT) MegaCam archival data. With the fraction, we can expect to know the contribution of mergers on star formation to galaxies.

[포 GC-21] Polarization of Rayleigh Scattered Lyα in Active Galactic Nuclei

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Active galactic nuclei (AGNs) typically show a non-thermal continuum locally represented by a power-law and many prominent emission lines in the UV and optical regions. AGNs are classified by two types, where Type I AGNs exhibit both broad and narrow lines and only narrow lines are observed in Type 2 AGNs. The unification models of AGNs invoke the existence of a molecular torus just outside of the broad line region. In the presence of a high column HI region associated with the molecular torus, we propose that significant fraction of broad line photons near Lyman series can be scattered by atomic hydrogen in the torus. In particular, Lyα being the strongest emission line, strong linear polarization may develop around Lyα through Rayleigh scattering. We adopt a Monte Carlo technique to investigate the polarized transfer of Lyα in a thick HI region with the shape of a torus. We consider the range of HI column density N_HI = 1020-23 with fixed geometric parameters of the torus such as the inner and outer radii and the height. We present the polarized spectra and angular distribution of Rayleigh scattered radiation around Lyα. We find that the Lyα core part is polarized in the direction perpendicular to the symmetry axis whereas in the far wing part it is polarized in the parallel direction. It is concluded that the unification of AGNs implies that Lyα can be uniquely polarized through Rayleigh scattering.

[포 GC-22] SNU AGN Monitoring Project (SAMP) using reverberation mapping of luminous AGNs

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