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We perform hydrodynamical simulations of a late-type galaxy experiencing frequent high-speed encounters with intruding galaxies, called "galaxy harassment". Specifically, we simulate a Milky Way-like galaxy colliding consecutively with six twice-massive early-type galaxies containing hot diffuse gas on their halos, with various impact parameters ranging from 65 kpc/h to 15 kpc/h at the relative speed of about 1500 km/s. We show that galaxy-galaxy encounters play a significant role in a cluster environment in gas stripping and star formation quenching through hydrodynamic interactions of late-type galaxies with cluster early-type galaxies.

[포 GC-13] A pilot study on the formation and evolution of the Intracluster light: Preliminary results of the Coma cluster

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Galaxy clusters are the most massive gravitationally bound systems and thus probably the most recent objects to form. One of promising routes to understand the assembly history of galaxy clusters is to measure observable quantities of components in clusters that are sensitive to the evolutionary state of the cluster.

Recent deep observations on the nearby clusters show distinct diffuse intracluster light (ICL), that the light from stars are not bound any individual cluster galaxy, however until now this component has not been well studied due to its faint nature, with typical brightness of ~100 times fainter than the sky background.

As shown in galaxy cluster simulation studies, the ICL abundance increases during various dynamical exchanges of galaxies such as the disruption of dwarf galaxies, major mergers between galaxies and the tidal stripping of galaxies. Thus, the ICL is an effective tool to measure the evolutionary stage of galaxy clusters. Moreover, the investigation of the ICL evolution mechanism will allow us understand the galaxy evolution process therein.

In this pilot study, we target the Coma cluster, where the existing ICL studies are limited only in the central region. With large and uniform deep optical images from the Subaru telescope, available only recently (Okabe et al. 2014), we are developing a robust ICL measurement technique, extracting the ICL surface brightness and color profiles, which will allow us to study the origin of the ICL and its connection to the evolutionary history of the Coma cluster.

For the next phase, we plan to utilize the plenty of spectroscopy data from the MMT telescope to compare ICL properties with the star formation history of the brightest cluster galaxies (BCG), and discuss the ICL formation mechanism of the Coma cluster by comparing the distribution of cluster galaxies with the distribution of diffuse light inside the Coma cluster.

우주론 / 암흑물질, 에너지

[포 CD-01] Post-reionization Kinetic Sunyaev-Zel'dovich Effect in Illustris Simulation

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We develop a methodology to use the redshift dependence of the galaxy 2-point correlation function (2pCF) as a probe of cosmological parameters. The positions of galaxies in comoving Cartesian space varies under different cosmological parameter choices, inducing a redshift-dependent scaling in the galaxy distribution. This geometrical distortion can be observed as a redshift-dependent rescaling in the measured 2pCF. The shape of the 2pCF exhibits a significant redshift evolution when the galaxy sample is analyzed under a cosmology differing from the true, simulated one. Other contributions, including the gravitational growth of structure, galaxy bias, and the redshift space distortions, do not produce large redshift evolution in the shape. We show that one can make use of this geometrical distortion to constrain the values of cosmological parameters governing the expansion history of the universe. This method could be applicable to future large scale structure surveys, especially photometric surveys such as DES, LSST, to derive tight cosmological constraints. This work is a continuation of our previous works as a strategy to constrain cosmological parameters

using redshift-invariant physical quantities.

[포 CD-02] Systematic Tests for Light-Curve Fitters and Samples in YONSEI Supernova Catalogue

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The YONSEI (YOnsei Nearby Supernova Evolution Investigation) project is to investigate the luminosity evolution of Type Ia supernovae (SNe Ia) by using their early-type host galaxies. As a part of this project, we have constructed our own SN catalogue. SALT2 and MLCS2k2 light-curve fitters implemented in SNANA package are employed to analyze the light-curve data. The catalogue provides a rest-frame peak magnitude in *B*-band or distance modulus, a light-curve shape parameter, and a color or an extinction value of each SN in the redshift range from 0.01 to 1.4. In this poster, we will present our progress in the detailed systematic tests for this catalogue.

[포 CD-03] MMT Spectroscopy of Early-type Host Galaxies of Type Ia Supernovae

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The origin of the well-known correlation between Hubble residual of Type Ia Supernova (SN Ia) and mass of their host galaxies is yet to be fully understood. In our first paper of our YOnsei Evolutionary Supernovae Evolutionary Investigation (YONSEI) project, we found a significant (~3.9σ) correlation between host galaxy mass (velocity dispersion) and population age from high S/N host spectra observed using LCO 2.5 m telescope. Since there is no correlation with metallicity, our result suggests that stellar population age is mainly responsible for the relation between host mass and HR. In order to explore this more directly, we have subsequently observed more sample of nearby early-type host galaxies using MMT 6.5 m telescope. In this poster presentation, we will report our progress in this project and show the preliminary results from our MMT observations.

[포 CD-04] Constraining primordial non-Gaussianity with the 3-point correlation function of the SDSS-IV eBOSS DR14 quasar sample

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While quasars are sparse in number density, they reside at relatively high-redshift as compared to galaxies. Hence, they are likely to be less non-linearly evolved than the galaxy population, and thus have a distribution that more closely mirrors the primordial density field. Therefore, they offer an intriguing opportunity to search for primordial non-Gaussianity (PNG). To this end, the 3-point correlation function (3PCF) is an excellent statistical tool to detect departures from Gaussianity, vanishing for a Gaussian field. In this work, we will make the first-ever measurement of the large-scale quasar 3PCF from the SDSS-IV DR14 quasar sample (spanning the largest volume to-date) to place constraints on PNG through the usual f_NL-type parametrization. This work will use the order N^2-time 3PCF algorithm of Slepian & Eisenstein (2015), with N the number of objects.

[포 CD-05] Modeling the Galaxy-Halo Connection for Large-Volume Surveys

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With large-volume surveys becoming the norm, it is increasingly important to accurately model the galaxy-halo connection and being able to create mock universes of galaxies - starting from dark matter halo catalogs - that reproduce with high-fidelity all the characteristics of a given experiment. This step is necessary, in order to safely interpret cosmological data and fully control systematic effects. We are developing a new Python-based tool which integrates several existing packages and allows one to reproduce many of the forms used to describe galaxy-halo models, ranging from halo occupation distribution (HOD) to abundance matching techniques, along with the characteristics of a given survey and the main testable observables. We are making the code parallel for high-performance parallel-architectures.