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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