

Session: [B5B-4] S4 : Galaxies, AGN and Cosmology

Date: August 22, 2014 (Friday)

Time: 11:00~12:30

Room: Room D (Room 105~106)

Chair: Tinggui Wang (University of Science and Technology of China)

[B5B-4-1]

11:00~11:20

[Invited] Active Galactic Nuclei Interaction with the Hot Gas Environment: Understanding from the Radio and the X-ray Data

Dharam Vir Lal (National Centre for Radio Astrophysics (NCRA-TIFR), India)

Recognition of the role of radio galaxies in the universe has been on upswing in recent years. Their colossal energy output over huge volumes is now widely believed to play a key role not only in the formation of galaxies and their super-massive blackholes, but also in the evolution of clusters of galaxies and, possibly, the cosmic web itself. More specifically, outbursts of radio galaxies have significant impact on structure formation and evolution. It has been suggested that a cool core is always required for strong radio, active galactic nucleus of bright cluster galaxy. For example, the inflation of radio bubbles in the hot gas atmospheres of clusters of galaxies plays an important role in the overall energy budget of the ICM. Regular gentle (i.e. subsonic) nuclear outbursts may be able to provide sufficient energy to the gas in the cool cores of clusters to offset radiative losses; one method to supplement the total energy input into the gas is for the radio plasma filling the cavities, seen as radio lobes, to initially drive strong shocks into the gas. We will present results from Chandra observations of the hot gas atmospheres of powerful, nearby radio galaxies in poor clusters.

[B5B-4-2]

11:20~11:40

[Invited] Novel Picture of the AGN Central Engine Established by X-ray and Optical Simultaneous Studies

Hirofumi Noda (University of Tokyo, Japan)

The primary X-ray properties reflect physical conditions of the central engine in Active Galactic Nuclei (AGNs), which is composed of accretion disks and Comptonizing coronae. In many X-ray studies, the primary signal has been assumed as a single kind of Compton continuum (e.g., Resaliti et al. 2004), and strong secondary components, affected by relativistic effects (Miniutti et al. 2007) and/or partial absorption, have been employed to reproduce the X-ray spectra. However, this assumption has not yet observationally proven, and the picture of the AGN central engine is still uncertain. To overcome this situation, we utilized a variability-assisted spectral analysis (e.g., Chrazov et al. 2001, Taylor et al. 2003), which enables us to decompose X-ray spectral components model-independently, and systematically applied it to the Suzaku archive of type I AGNs. As a result, we found that multiple kinds of Compton continua with distinct timing and spectral properties are included into a primary X-ray continuum (Noda et al. 2013; 2014), differently from the previous assumption. This gives us a novel picture that the AGN central engine consists of multiple different X-ray generating regions. To reveal the geometry of the X-ray regions around an accretion disk, we are now running X-ray and optical simultaneous monitors on several AGNs.

[B5B-4-3]

11:40~11:55

Small-Scale Environments in Galaxy Clusters: Conformity between Bright Galaxies and Their Faint Companions

Joon Hyeop Lee (Korea Astronomy and Space Science Institute, Korea), Hye-Ran Lee, Minjin Kim, Kwang-Il Seon, Sang Chul Kim, Chang Hee Ree, Jong Chul Lee, Hyunjin Jeong, Soung-Chul Yang, Jongwan Ko, and Changsu Choi

In a group environment, it is known that the properties of satellite galaxies are closely related to those of their central galaxy, such as its mass, morphology and star formation rate. Such a small-scale galactic conformity is generally expected to be relatively weak in a galaxy cluster, because the encounter time between cluster galaxies is too short to cause some direct interactions, due to the high velocity dispersion of a cluster. However, if a galaxy cluster is dynamically young enough, the galactic conformity from recently-accreted galaxy groups may remain until the group binding is completely broken up by the cluster potential. To systematically understand such small-scale environments of galaxies in galaxy clusters, we carry out photometric studies of galaxy clusters in various dynamical stages. At this time, we present the results for two galaxy clusters at $z \sim 0.3$: WHL J085910.0+294957 and Abell 2744. After selecting cluster members with scaling relations of galaxies, we investigate the dependence of the weighted mean colors of faint cluster galaxies on their local environments and on the properties of their adjacent bright galaxies. In WHL J085910.0+294957, we find a marginal conformity in color, in the sense that faint ($-18 < M_i < -15$) companions adjacent to blue bright ($M_i < -18$) galaxies tend to be blue, whereas such a conformity is not found in Abell 2744. These results support the idea that the small-scale conformity in galaxy clusters originates from recently-accreted groups, because WHL J085910.0+294957 is a dynamically young cluster, while Abell 2744 is a very massive cluster undergoing current cluster-cluster merger.

Poster Session

11:55~12:30

Chairs: **Tingui Wang** (University of Science and Technology of China)

Habib G. Khosroshahi (Institute for Research in Fundamental Science)