and the spin parameter of $\lambda = 0.049$. The two substructures appear to have passed each other 4.4 Gyr ago and are moving away to the maximum separation.

[구 GC-09] Probing galactic and intergalactic magnetic fields using Faraday tomography (optionally title in Korean in parentheses)

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For probing magnetic fields in the universe, rotation measure (RM) have been often used. RM allows us to obtain the information of integrated (or averaged) magnetic fields along a line of sight (LOS). On the other hand, the new technique so-called Faraday tomography will be used in practical in the near future thanks to the wide-band polarimetry by Square kilometre Array and/or its precursors. The technique allows us to obtain so-called Faraday dispersion function (FDF). FDF is the distribution function of magnetic fields and polarized sources along a LOS. Because of this fact, it is expected that the studies of magnetic fields associated with various astronomical objects will progress dramatically. Since FDF also includes information of cosmic-rays and thermal electrons, the investigation of FDF may advance the studies of dynamics of external galaxies and/or the star formation activities.

We have studied the potentials of Faraday tomography such as a tool to probe the intergalactic magnetic field associated with filaments of galaxies in the large scale structure. We have also studied the realistic FDFs of galaxies for understanding global magnetic field, cosmic-ray and thermal electrons of external galaxies. In the talk, we briefly introduce the Faraday tomography technique and report the results related to the Faraday tomography.

[구 GC-10] Near-Infrared Polarization Source Catalog of Northeastern Regions in the Large Magellanic Cloud

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We present a near-infrared photometric and polarimetric catalog of sources in the 39′ × 69′ fields on the northeastern part of the Large Magellanic Cloud (LMC), which was observed using SIRPOL, an imaging polarimeter of the Infrared Survey Facility (IRSF). This catalog contains 1,858 sources brighter than 14 mag at H band with polarization signal-to-noise ratio greater than 3 in at least one of J, H, and Ks bands. We examined the polarization structures around the star-forming regions, where coherent polarization position angle distributions are seen. We also estimated magnetic field strengths in some selected fields using Chandrasekhar and Fermi analysis. The magnetic field strengths are estimated to be 3 ~ 25 μG. The wavelength dependence of polarization degrees indicates that the polarization is most likely to be originated from dichroic extinctions by the local interstellar dusts in the LMC. We found that the polarization patterns are well aligned along the molecular clouds around star-forming regions.

[구 GC-11] ISM Properties and Star Formation Activities in IC 10 : 2D Cross Correlation Analysis of Multi-wavelength data

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We present the physical properties of star forming regions in IC 10 obtained from Korea VLBI Network (KVN) 22GHz, the Submillimeter Array (SMA) CO, Very Large Array (VLA) HI 21cm, optical (U, B, V and H-alpha), and Spitzer infrared observations. IC 10 is a nearby (~0.7Mpc) irregular blue compact dwarf (BCD) galaxy which is likely to be experiencing an intense and recent burst of star formation. This nearby infant system showing high star formation rate but low metallicity (<20% of that of the Sun) provides critical environment of interstellar medium (ISM) under which current

galactic star formation models are challenged. To make quantitative analysis of the ISM in the galaxy, we apply 2D cross-correlation technique to the multi-wavelength data for the first time. By cross-correlating different tracers of star formation, dust and gas phases in IC 10 in a two dimensional way, we discuss the gas properties and star formation history of the galaxy.

[구 GC-12] Quenching of star formation in massive halos at z~2

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The gradual infall of small dark matter halos onto larger ones has become a relatively straightforward aspect of the standard hierarchical formation paradigm. What happens to the baryons they contain, however, is less well understood. Of special relevance are the processes that regulate and ultimately suppress star formation in galaxies in the early universe.

The z=1.5-2.5 epoch is then particularly interesting as a transition period when global star-formation in the universe starts peaking but also where the first ostensibly collapsed and virialized galaxy clusters appear, along with segregated galaxy populations. From a theoretical point of view, the mode of gas accretion in massive halos is also expected to change around this time, switching from a cold to a hot phase and affecting the build-up and evolution of the galaxies they host.

A lot of effort has thus been devoted to the search for high-redshift structures, in particular galaxy clusters, through a variety of methods. However, as the limited area for which deep datasets are available remains relatively limited, only few massive z>1.5 structures have been found so far. Here I will instead discuss the regulation of star-formation in lower-mass, X-ray detected halos at z~2 and its implication for galaxy quenching at high redshift. As these smaller, group-size halos are vastly more abundant and structurally simpler than massive clusters, they allow for true statistical studies and offer a novel way to probe environmental effects in this transitional epoch.

[구 GC-13] The Key role of the Bulge Compactness in Star-forming Activity in Late-type Galaxies

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Which mechanism governs star-formation activity in galaxies is still one of the most important, open questions in galactic astronomy. To address this issue, we investigate the specific star formation rate (sSFR) of late-type galaxies as functions of various structural parameters including the morphology, mass, radius, and mass compactness (MC). We use a sample of ~200,000 late-type galaxies with z = 0.02 ~ 0.2 from SDSS DR7 and a catalog of bulge-disk decomposition (Simard et al. 2011; Mendel et al. 2013). We find a remarkably strong correlation between bulge's MC and galaxy's sSFR, in the sense that galaxies with more compact bulge tend to be of lower sSFR. This seems counter-intuitive given that galactic sSFR is driven predominantly by disks rather than bulges and suggests that the central mass density plays a key role in recent star-forming activity. We discuss the physical cause of the new findings in terms of the bulge growth history and AGN activities.

[구 GC-14] Revealing the complexity of ionized gas outflows in powerful Type 2 AGN in the local Universe

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There exist scaling relations that link the mass of supermassive black holes with both the velocity dispersion and the mass of the central stellar cusp of their host galaxies. This implies that these two components grow in tandem. Feedback from actively accreting supermassive black holes (AGN), in the form of multi-phase gas outflows, has been argued to be the agent of this co-evolution. Here we employ the powerful GMOS integral field spectroscopy unit on the 8.2m Gemini-North telescope to investigate ionized gas outflows of luminous Type 2 AGN in the local Universe (z<0.1). Our sample of 6 galaxies is drawn from the Sloan Digital Sky Survey (SDSS) and was selected based on their [OIII] dust-corrected luminosity (>1042 erg/s) and signatures of outflows in the [OIII] line profile of their spatially integrated SDSS spectra. These are arguably the best candidates to explore AGN feedback in action since they are < 1% of a large local type 2 AGN SDSS sample selected based on their [OIII] kinematics. We combine a careful