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

spectral decomposition of the [OIII] and Hα line profiles with spatial information on ~0.5kpc scales to understand the outflow kinematics and energetics in these objects. We find clear evidence for strong outflows in [OIII] and occasionally Hα that are clearly driven by the ionizing radiation of the AGN. We kinematically and spatially decompose outflowing and rotating ionized gas components. We find [OIII] to be a better tracer of AGN outflows, while Hα appears to be strongly affected by both stellar rotation and outflows induced by ongoing star formation. The observed kinematics and spatial distribution of the ionized gas imply a large opening angle for the outflow. Finally, we find the projected outflow velocity to decrease as a function of distance, while its dispersion shows a more complex structure with a potentially initially increasing trend (out to 0.5-1kpc distances).

[구 GC-15] How did the merger remnant galaxy M85 form?: A follow-up spectroscopy for M85 globular clusters

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M85 is a nearby merger remnant galaxy located at the northern part of the Virgo Cluster. Because of its remarkable merging features, it is an interesting object to investigate its formation history. Globular clusters are a great tracer of the formation history of early-type galaxies, so that we study the globular cluster system of M85. It has been already found that there are “intermediate-color” globular clusters as well as blue and red ones based on the photometric survey using CFHT/Megacam. For follow-up research, we obtain the spectra of 21 globular clusters in the central region of M85 using Gemini-N/GMOS. We estimate their ages and metallicities based on the strength of Lick indices. We detect the intermediate-age population (~ 2 Gyr) with solar metallicities, comprising about 50% of the observed globular clusters, as well as old and metal-poor population. It suggests that M85 experienced a major merging event around 2 Gyr ago. We discuss these results regarding to the formation history of M85.

[구 GC-16] Deciphering Diverse Color Distribution Functions of Globular Cluster Systems

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The color distribution functions (CDFs) of globular clusters (GCs) in individual early-type galaxies show great diversity in their morphology. Based on the conventional "linear" relationship between colors and metallicities of GCs, the inferred GC metallicity distribution functions and thus their formation histories should be as diverse as they appear. In contrast, an alternative scenario rooted in the "nonlinear" nature of the color-to-metallicity transformation finds the various CDFs pointing systematically to a simple picture, i.e., such a high degree of variety stems predominately from only one parameter, the mean metallicity of GCs. The simulated CDFs of GCs aimed to reproduce 67 massive early-type galaxies from the ACS Virgo & Fornax Cluster Survey show that over 70% of the CDFs concur fully with the nonlinearity scenario. We discuss our new findings in terms of early-type galaxy formation in the cluster environment.

[구 GC-17] Mean Velocity of Globular Cluster Systems in M86 Virgo Giant Elliptical Galaxy and Massive Early-Type Galaxies

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We present the spectroscopic study of the globular clusters (GCs) in the massive elliptical galaxy M86 in the Virgo galaxy cluster. Using the spectra obtained from the Multi-Object Spectroscopy (MOS) mode of Faint Object Camera and Spectrograph (FOCAS) on the Subaru Telescope, we measure the radial velocities for 56 GCs in M86. The mean velocity of the GCs is derived to be $\langle v_p \rangle = -335 \pm 41$ km/s, which is different from the velocity of the M86 nucleus ($\langle v_{gal} \rangle = -224 \pm 5$ km/s) within ~ 2.5 σ. The mean velocity ($\langle v_p \rangle = -342 \pm 60$ km/s) of 33 blue GCs in M86 is similar to that ($\langle v_p \rangle = -314 \pm 71$ km/s) of 23 red GCs. We also derive the mean velocities of the GC systems in other 16 nearby early-type galaxies (ETGs) from the radial velocity data in the