

ram-pressure stripping in these clusters is much stronger than in low-mass clusters. We present preliminary results of star formation rates, kinematics, dynamical states, and ionization mechanisms of our sample galaxies and discuss how ram-pressure stripping relates with the star formation activity of jellyfish galaxies in massive clusters.

### [7 GC-11] Ram pressure stripping conditions : Theory vs. Observation

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Ram pressure stripping (RPS) which is known to be one of the key effects that can remove the interstellar gas in the dense environment, can be described as a simple momentum transfer relation (Gunn & Gott 1972). However, it has been suggested that the actual gas stripping process is likely more complicated than Gunn & Gott's prescription due to the complexity of gas physics such as compression, cooling and heating. By comparing the gas truncation radius predicted by theory with the stripping radius measured from the HI observation of Virgo cluster galaxies, we attempt to verify how well the RPS process can be understood by momentum transfer alone. Among the sample of galaxies undergoing active RPS, we generally find a good agreement between what is predicted and what is observed within the measurement uncertainties. However, those galaxies with the signs of other environmental effects than RPS such as tidal interaction, and/or the ones likely at relatively early or later stages of RPS show some offsets between the theory and the observation. These results imply that Gunn & Gott's formula works reasonably well in a broad sense when the RPS is a dominant process and the surrounding environment at the current location of the sample can be well defined. Otherwise, the impact of the second mechanism, as well as the (current and past) environment of the sample, should be more carefully reviewed to assess the impact of RPS on galaxy evolution.

### [7 GC-12] The Molecular Gas Kinematics of HI Monsters

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Our HI monster sample is a set of local HI-rich galaxies identified by the ALFALFA survey (Arecibo Legacy Fast Survey ALFA) at  $z < 0.08$ . Intriguingly, they are also found with a relatively large molecular gas reservoir compared to the galaxies with similar stellar mass and color, yet their star formation rate is quite comparable to normal spirals. This makes our HI monsters good candidates of galaxies in the process of gas accretion which may lead to the stellar mass growth. One feasible explanation for their relatively low star formation activity for a given high cool gas fraction is the gas in monsters being too turbulent to form stars as normal spirals. In order to verify this hypothesis, we probe the molecular gas kinematics of 10 HI monsters which we observed using the Atacama Large Millimeter/sub-millimeter Array (ALMA). We utilize the tilted ring model to investigate what fraction of the molecular gas in the sample is regularly and smoothly rotating. In addition, we model the molecular gas disk using the GALMOD package of the Groningen Image Processing System (GIPSY) and compare with the observations to identify the gas which is offset from the 'co-planar differential rotation'. Based on the results, we discuss the possibility of gas accretion in the sample, and the potential origin of non-regularly rotating gas and the inefficient star formation.

### [7 GC-13] Physical Origin of the Planar Alignment of Satellite Galaxies

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The Milky Way (MW) and other systems including M31 and Cen A have flattened structures of their satellites (Disk of Satellites, DoS). Such structures are rare in simulations under the  $\Lambda$ CDM paradigm. DoS is known to depend mainly on 1) the alignment of satellite orbits and 2) the degree of central concentration of satellites. In this work, we examine quantitatively how these two parameters affect the flatness of a system. We find that the MW-like DoS is rare in IllustrisTNG100 simulation because its two parameters are out of the 1-s range and furthermore the MW has a structure more flattened than the other systems having similar parameters. Besides, we propose a new criterion for the MW-like systems superseding the conventional ones such as major-minor axis ratio

of the MW's DoS with a value of 0.183. Each satellite system has a specific orbital combination and thus has a particular distribution of its parameters (and thus flatness). The median of the distribution is set as the representative value of each system. And the representative value of the MW can be used as a new criterion for classifying the MW-like DoS. We reconstruct the orbital combination of the observed MW satellites using GAIA DR2 data and find the systems in the simulation that have representative values similar to the new criterion from the reconstructed MW system. This allows us a new interpretation on the rarity of MW-like DoS in cosmological simulations.

### [ㄱ GC-14] Dark Matter Deficient Galaxies Produced via High-velocity Galaxy Collisions In High-resolution Numerical Simulations

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The recent discovery of diffuse dwarf galaxies that are deficient in dark matter appears to challenge the current paradigm of structure formation in our Universe. We describe the numerical experiments to determine if the so-called dark matter deficient galaxies (DMDGs) could be produced when two gas-rich, dwarf-sized galaxies collide with a high relative velocity of  $\sim 300\text{km/s}$ . Using idealized high-resolution simulations with both mesh-based and particle-based gravito-hydrodynamics codes, we find that DMDGs can form as high-velocity galaxy collisions separate dark matter from the warm disk gas which subsequently is compressed by shock and tidal interaction to form stars. Then using a large simulated universe ILLUSTRISTNG, we discover a number of high-velocity galaxy collision events in which DMDGs are expected to form. However, we did not find evidence that these types of collisions actually produced DMDGs in the ILLUSTRISTNG100-1 run. We argue that the resolution of the numerical experiment is critical to realize the "collision-induced" DMDG formation scenario. Our results demonstrate one of many routes in which galaxies could form with unconventional dark matter fractions.

### [ㄱ GC-15] Reverberation Mapping of Nearby AGN with Medium-band and LSGT

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Reverberation mapping is one of the best ways to investigate the physical mechanism of broad-line regions around central supermassive black holes of active galactic nuclei (AGNs). It is usually used to estimate the masses of supermassive black holes. Although spectroscopic reverberation mapping has used to study dozens of AGN, spectroscopic monitoring campaign of large sample is expansive. Here, we present results of photometric reverberation mapping with medium-band photometry.

We monitored five nearby AGN which were already studied with H-alpha emission line. Observation has been performed for  $\sim 3$  months with  $\sim 3$  days cadence using three medium-band filters installed in LSGT (Lee Sang Gak Telescope; 0.43m).

We found 0.01-0.08 magnitude variations from differential photometry. Also time-lags between continuum light-curves and H-alpha emission line light-curves are found using JAVELIN software. The result shows that our study and previous studies are consistent within uncertainty range. In the near future, medium-band photometric reverberation mapping seems useful to study large AGN samples. We will present preliminary result of following study that report new time lag measurement of six AGNs in the similar way.

### [ㄱ GC-16] The Infrared Medium-deep Survey. VIII. Quasar Luminosity Function at $z \sim 5$

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