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We present the results from our comparisons of HCN and HCO+ (J=4-3) with HI and H_2 gas in NGC 6946, a sample from a mapping study of the dense molecular gas in the strongest star-forming galaxies (MALATANG). The MALATANG is one of the JCMT legacy surveys on the nearest 23 IR-brightest galaxies beyond the Local Group, which aims to study the relations of dense molecular gas with more general cool gas such as atomic and molecular hydrogen gas, and star formation properties in active galaxies. In this work, we particularly focus on the comparisons between the JCMT HCN/HCO+ (J=4-3) data and the THINGS HI/the NRO CO (J=1-0) data. We probe the dense molecular gas mass as a function of HI and H_2 mass in different locations in the central ~1.5 kpc^2 region. We discuss how the excess/deficit of HI/H_2 or total cool gas ($HI+H_2$) mass controls the presence and/or the fraction of dense molecular gas.

[포 GC-15] ISM truncation due to ram pressure stripping: Comparisons of Theoretical Predictions and Observations

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It has been proposed by Gunn & Gott (1972) that galaxies may lose their interstellar gas by ram pressure due to the dense intra-cluster medium while falling to the cluster potential. The observational evidence for this process, which is known as ram pressure stripping, is increasing, and it is believed to be one of the key environmental effects that can dramatically change the star formation activity of galaxies and hence their evolution. Intriguingly however, some cases with clear signs of ram pressure stripping are found in the environment which betrays our expectations (e.g. large clustercentric distances), and our understandings to the detailed working principle behind ram pressure stripping seem to be still lacking. As one of the ways to gain more theoretical insights into the conditions for ram pressure stripping process, we have been comparing the gas truncation radius which is predicted based on the simple Gunn & Gott's prescription with what is actually observed in a sample of carefully selected Virgo galaxies. In this work, we present the results of our comparisons between the theoretically predicted truncation radius and the observationally measured truncation radius for individual galaxies in the sample and discuss which additional conditions are needed in order to fully understand the observations.

[포 GC-16] Cool gas and star formation properties of ram pressure stripped galaxy NGC 4522: Insights from the TIGRESS simulation

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NGC 4522 is one of the best-known examples among the Virgo galaxies undergoing active ram pressure stripping. There have been a number of detailed observational and theoretical studies on this galaxy to constrain its stripping and star formation history. However, the impact of ram pressure on the multi-phased ISM, in particular molecular gas which plays an important role in star formation, is still not fully understood. NGC 4522, as a system where the extra-planar molecular gas is identified, is an ideal case to probe in depth how ram pressure affects molecular gas properties. Aiming to get more theoretical insights on the detailed stripping process of multi-phased ISM and its consequences, we have conducted simulations using the TIGRESS which could reproduce the realistic ISM under comparable conditions as NGC 4522. In this work, we compare the fraction of gas mass to stellar mass, star formation rates and gas depletion time scales of NGC 4522 with those measured from the simulations, not only inside the disk but also in the extra-planar space.

[포 GC-17] High-z Universe probed via Lensing by QSOs (HULQ): How many QSO lenses are there?

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Aims. The evolution of scaling relations between

SMBHs and their host galaxies becomes uncertain at high redshifts. The HULQ project proposes to use gravitational lensing to measure the masses of QSO host galaxies, an otherwise difficult goal. SMBH masses of QSOs are relatively easy to determine using either reverberation mapping or the single-epoch method. These measurements, if made for a substantial number of QSOs at various redshifts, will allow us to study the co-evolution of SMBHs and their host galaxies. To determine the feasibility of this study, we present how to estimate the number of sources lensed by QSO hosts, i.e. the number of deflector QSO host galaxies (hereafter QSO lenses).

Method and results. Using SMBH masses measured from SDSS DR14 spectra, and the M_BH - Sigma relation, the Einstein radii are calculated as a function of source redshift, assuming singular isothermal sphere mass distributions. Using QSOs and galaxies as sources, the probability of a QSO host galaxy being a QSO lens is calculated, depending on the limiting magnitude. The expected numbers of QSO lenses are estimated for ongoing and future wide-imaging surveys, and additional factors that may affect these numbers are discussed.

우주론/암흑물질에너지

[포 CD-01] Mapping the real-space distributions of galaxies in SDSS DR7

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Using a method to correct redshift space distortion (RSD) for individual galaxies, we mapped the real space distributions of galaxies in the Sloan Digital Sky Survey (SDSS) Data Release 7(DR7). We use an ensemble of mock catalogs to demonstrate the reliability of this extension, showing that it allows for an accurate recovery of the real-space correlation functions and galaxy biases. We also demonstrate that, using an iterative method applied to intermediate scale clustering data, we can obtain an unbiased estimate of the growth rate of structure $f\sigma_8$, which is related to the clustering amplitude of matter, to an accuracy of $\sim 10\%$.

Applying this method to the Sloan Digital Sky Survey (SDSS) Data Release 7 (DR7), we construct a real-space galaxy catalog spanning the redshift range $0.01 \leq z \leq 0.2$, which contains 584,473 galaxies in the North Galactic Cap (NGC). Using this data we, infer 0.376 ± 0.038 at a median redshift z=0.1, which is consistent with the WMAP9 cosmology at 1σ level. By combining this measurement with the real-space clustering of galaxies and with galaxy-galaxy weak lensing measurements for the same sets of galaxies, we are able to break the degeneracy between f, σ_8 and b. From the SDSS DR7 data alone, we obtain the following cosmological constraints at redshift $z=0.1$ for galaxies.

[포 CD-02] Alcock-Paczynski Test with the Evolution of Redshift-Space Galaxy Clustering Anisotropy: Understanding the Systematics

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We develop an Alcock-Paczynski (AP) test method that uses the evolution of redshift-space two-point correlation function (2pCF) of galaxies. The method improves the AP test proposed by Li et al. (2015) in that it uses the full two-dimensional shape of the correlation function. Similarly to the original method, the new one uses the 2pCF in redshift space with its amplitude normalized. Cosmological constraints can be obtained by examining the redshift dependence of the normalized 2pCF. This is because the 2pCF should not change apart from the expected small non-linear evolution if galaxy clustering is not distorted by incorrect choice of cosmology used to convert redshift to comoving distance. Our new method decomposes the redshift difference of the 2-dimensional correlation function into the Legendre polynomials whose amplitudes are modelled by radial fitting functions. The shape of the normalized 2pCF suffers from small intrinsic time evolution due to non-linear gravitational evolution and change of type of galaxies between different redshifts. It can be accurately measured by using state of the art cosmological simulations. We use a set of our Multiverse simulations to find that the systematic effects on the shape of the normalized 2pCF are quite insensitive to change of cosmology over \Omega_m=0.21 - 0.31 and w=-0.5 - -1.5. Thanks to this finding, we can now apply our method for the AP test using the non-linear systematics measured from a single simulation of the fiducial cosmological model.