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On June 16 AT2018cow (ATLAS 18qqn) was discovered as a bright and fast-evolving transient in nearby universe z ~ 0.01. It brightened by more than 4 mag within a day, and its light curve was decayed rapidly and has a high luminous peak which is more luminous than most of core-collapse supernova. It also overall showed a blue color in an unprecedented case of transients.

There have been attempts to explain this behavior with existing models, but most of them have been insufficient except for one - tidal disruption by intermediate-mass black hole.

We began to monitor this transient from about 4 days after the discovery until August 21 in the optical bands with 1m-class telescopes over the world. Here, we present a light curve of AT2018cow in the B, V, R and I bands, and analyze its photometric properties and compare to other transients and models.

[포 GC-06] Radiation-hydrodynamic simulations of ram pressure strippin on star-forming galaxies

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Recent observational studies suggest that the environmental effects can shape the evolution of galaxies in clusters. In an attempt to better understand this process, we perform idealized radiation-hydrodynamic simulations of RAM pressure stripping on star-forming galaxies using RAMSES-RT. We find that extended HI disks are easily stripped by moderate ICM winds, while there is no significant decrease in the total mass of molecular gas. RAM pressure tends to compress the molecular gas, leading to enhanced star formation especially when the gaseous disk is hit by edge-on winds. On the other hand, strong ICM winds that are expected to operate at the centre of clusters strip both HI and molecular gas from the galaxy. Interestingly, we find that the strong ICM winds can induce the formation of relatively dense (~1H/cc) HI gas clouds at a distance from the disk.

[포 GC-07] Secondary bars in barred galaxies

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나선 은하의 60%의 은하들은 그 중심에 막대를 가지고 있다고 알려져 있다. 그리고 막대 은하들 중 다시 30%의 은하들이 그 중심에 두 번째 막대를 가지고 있다는 보고들이 있었다. 우리는 SDSS/DR7을 기반으로 z < 0.01 안에 은하들을 눈으로 분류한 Ann et al. (2015) 카탈로그 중 Lee et al. (2018, submitted)에서 사용된 Mr = -15.2 보다 밝고, 60°이하로 기울어진 막대 은하 553개를 이용하여 막대 안에 있는 두 번째 막대를 찾고자 했다. 우리는 ellipse fitting profile을 조사하여 58개의 은하들에서 그 중심에 기존 막대의 형태를 따르지 않고 장축이 어긋나 있으며, 타원율에 변화를 보이는 두 번째 막대의 흔적을 찾았다. 그 중 9개의 은하에서 색지도, 등광도 그리고 unsharp image 등에서 두 번째 막대를 확인했다.

이것은 이전의 30개 내외의 은하들을 대상으로 했던 연구들에서 확인된 것에 비해 매우 적은 비율이라 할 수 있다. 9개의 두 번째 막대들 중 5개는 강한 막대 (SB)안에서 발달해 있고, 4개는 약한 막대 (SAB) 안에 발달해 있어, 수치적으로는 두 번째 막대의 강한 막대와 약한 막대 사이의 선호도 차이는 없어 보인다. 하지만, 약한 막대 안에 발달해 있는 두 번째 막대들은 막대와 서로 다른 방향의 타원 구조만 보이는 반면, 강한 막대 안에 발달해 있는 두 번째 막대들은 nuclear ring, nuclear arm등과 함께 더욱 발달된 모습을 보인다. 또한 두 번째 막대를 가지고 있는 8개의 은하 모두에서 주 막대를 따라 중심부로 길게 늘어서 먼지 띠가 뚜렷하게 보이고, 허블 분류에서는 Sab (T=3), Sb (T=4)에 주로 분포해있다.

[포 GC-08] Star formation history of dwarf elliptical-like galaxies

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We present the physical and environmental properties of nearby dwarf elliptical-like galaxies. The present sample consists of ~ 1,100 dwarf elliptical-like galaxies within redshifts 0.01. The morphological types of the present study were determined by Ann, Seo, and Ha (2015) who classified the dwarf elliptical-like galaxies by the five subtypes of dS0, dE, dSph, dEbc, and dEblue. We examine their star formation history using STARLIGHT. The star formation history of dwarf elliptical-like galaxies depends on their subtypes. The luminosities of dS0, dE, and dSph galaxies are dominated by the extremely old stars ($\geq 10^{10} yr$) with $z \approx 0.0004$ while those of dEbc and dEblue galaxies are mainly due to the young ($\sim 10^{7} yr$) stars together with the nearly equal contribution by extremely young stars ($\sim 10^{6} yr$) and old ($\sim 10^{9} yr$) stars. Young populations have a variety of metallicity, from $z = 0.0001$ to $z = 0.04$, while old populations have metallicity of $z = 0.0001$ and

$z = 0.0004$. While the formation history of stars older than ~1010yr depends mainly on the luminosity of galaxies, the formation history of stars younger than ~108yr is mainly affected by their environment. However, luminosity and environment are equally important for the star formation history if there is no star formation at the early phase of galaxy formation.

[포 GC-10] On the origin of low escape fractions in LBGs at z ~ 3

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Theoretical models of reionization require that approximately 10% of the Lyman Continumm (LyC) photons escape from their host dark matter haloes and re-ionize neutral hydrogen in the Universe. However, observations of Lyman break galaxies (LBGs) at z~3 report much lower escape fractions of f_{esc}~1%. In an attempt to understand the discrepancy, we perform radiation-hydrodynamics simulations of isolated disk galaxies using RAMSES-RT with high resolution (maximum ~ 9 pc). We find that f_{esc} is ~6% on average for the reference run (Z= 0.1Z⊙), whereas the fraction decreases to ~1% in the case of metal-rich disk (Z= 1Z⊙). This happens because dense metal-poor gas clumps are disrupted early due to strong Lya pressure and supernova explosions, while star particles are trapped for a longer period of time in the metal-rich environments. We also find that f_{esc} is still significant (~4%) even when the amount of metal-poor gas is increased by a factor of 5. Our preliminary results suggest that the low escape fractions in LBGs may be better explained by (locally) metal-enriched gas near young stars than high gas fractions in galaxies.

[포 GC-11] Ionized gas outflows in z~2 WISE-selected Hot Dust Obscured Galaxies

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The Wide-field Infrared Survey Explorer (WISE) mission enabled efficient selection of Active Galactic Nuclei (AGN) with high luminosities and large obscuration. According to the merger driven AGN powering scenarios, luminous and obscured AGN are in a stage where they go through feeding of gas accretion into the central black hole, and feedback to the host galaxy through outflows. We report the rest-frame UV-optical spectra of Hot Dust Obscured Galaxies (Hot DOGs) at z~2, WISE color-selected to be extremely reddened AGN. Most of the targets show blueshifted and broadened [OIII] line profiles indicative of ionized gas outflows. We present the occurrence and strength of the outflows, and discuss the impact of luminous, obscured AGN activity on their hosts.

우주론/암흑물질,에너지

[포 CO-01] Analytical halo model of galactic conformity

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Galactic conformity is an observation that satellite galaxies in groups whose central galaxy is red are preferentially red, even when the groups are restricted to reside in dark matter halos of the same mass. In this talk, I will present a fully analytical halo model of colour-dependent clustering which incorporates the effects of galactic conformity in a halo occupation distribution (HOD) framework. This model describes conformity through a correlation between the colour of a galaxy and the concentration of its parent halo, leading to a correlation between central and satellite galaxy colours at fixed halo mass. The strength of the correlation is set by a tunable 'group quenching efficiency'. I will show that our model can separately describe the group-level correlations between galaxy colour (1-halo conformity) and large scale correlations induced by assembly bias (2- halo conformity). Further, I will talk about our analytical clustering results and compare them with that of mock galaxy catalogs, showing that this model is accurate at the 10-20 percent level for a wide range of luminosities and length scales.

천문우주관측기술

[포 AT-01] Mirrors and Optomechanical Structures Design and Analysis for Linear Astigma-tism Free Three Mirror System (LAF-TMS)