[포 GC-10] Effect of Recent Star Formation of Galaxies on their Chemical Abundance Estimation

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We investigate the effect of recent star formation (RSF) on the $\alpha$-elements-to-iron ratio ($[\alpha$/Fe]) estimation for galaxies. Measuring galactic $[\alpha$/Fe] is a powerful tool to pinpoint the timescale of chemical evolution and star formation. Our working hypothesis is that, with increasing stellar surface temperature, absorption equivalent width (EW) of $\alpha$-elements decreases faster than that of Fe-peak elements, and thus RSF will lower the line ratio of EW($\alpha$/EW(Fe)). Moreover, young stars outshine, effectively lowering EW($\alpha$/EW(Fe)) of integrated light of RSF galaxies. Here we test our hypothesis using SDSS (optical spectrophotometric), GALEX (UV photometric) and IllustrisTNG datasets, and show that, if RSF is not considered thoroughly, EW($\alpha$/EW(Fe)) lowered by RSF can be routinely misinterpreted as low $[\alpha$/Fe]. We discuss possible implications of the result in the context of the conventional $[\alpha$/Fe]-mass relation of galaxies.

[포 GC-11] FLASH: The First Large Absorption Survey in HI with the Australian Square Kilometre Array Pathfinder

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FLASH is a blind neutral hydrogen (HI) absorption line survey, eventually targeting about 100,000 background radio continuum sources in the entire southern sky using the full 36-antenna of the Australian Square Kilometre Array Pathfinder (ASKAP). Our primary goal is to search for associated and intervening HI absorption lines in the intermediate redshift range 0.4 < z < 1.0. The survey aims to understand the evolution of HI gas in galaxies as well as various physical mechanisms in active galactic nuclei, such as accretion and feedback processes. In this poster, we give an overview of the FLASH survey and present the preliminary results from our first 100-hrs of pilot observations. The latest survey data covers 1,000 square degrees and is ideal for validating observation and data processing in the continuous 300MHz-width low frequency ASKAP band (700–1000MHz). One of the crucial objectives of the pilot survey is to establish the analysis methodology that will be applied to upcoming large absorption surveys in the future. We discuss our data quality validation and present some detections of associated/intervening HI absorption lines. These absorption lines allow us to trace the cold gas properties of active and normal galaxies at higher redshifts where the HI emission line is too weak to be detectable.

[포 GC-12] Lyman alpha profiles from an isolated dwarf galaxy

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수소 라이먼 알파선은 관측이 어려운 외부은하의 성간 물질이나 성은 주위의 물질의 운동학적, 기하학적 상태를 알려주는 지표이다. 특히 라이먼 알파 성간 스펙트럼의 두 희고점에서 측정할 선도 차이는 물질의 수축, 팽창 여부에 영향을 미치기 때문에은하의 역학적 특성을 연구하는 데 있어 새로운 도구로서 각광받고 있다. 관측에서 얻어지는 은하의 선도 차이는 100km/s에서 800km/s까지 넓은 영역에서 존재한다. 선행 분자가들의 규모의 연구에서 얻어진 선도 차이는 성별 연구에서 사용된다 (148.54km/s)를 기준으로 한다. 그리고 이 연구에서는 더 큰 규모의 은하에서 라이먼 알파 선도 차이를 확인하고 은하 내 물리량의 영향을 알아보고 싶다.

이 연구에서는 별개유체역학 시뮬레이션 코드 RAMSES-RT를 활용한, 각각 다른 물리량을 가진 은하 시뮬레이션 결과를 활용하였다. 은하 내 가스의 비율, 금속함량비를 다르게 하였으며, 각 시뮬레이션들은 온데-카풀로 간선성 복사선단 코드 RASCAS를 이용하여 라이먼 알파선의 복사 과정을 계산하였다. 첫 번째로 기존 은하 시뮬레이션과 분자가들의 시뮬레이션(Kimm+19)의 결과를 비교한 결과 148.54km/s에서 221.76km/s로 선도 차이의 평균 값이 상승한 것을 확인하였다. 이는 성간 물질의 존재 유무의 차이로 인한 것이다. 은하 내 가스의 금속함량비를 증가시킨 경우, 은하 내 먼지량과 젊은 별들이 별 생성 구역에 머무는 시간이 증가하기 때문 에 기존 은하와 비교하여 선도 차이가 작아졌다.(206.9km/s) 반면 은하의 가스량을 증가시켰을 때는 산란 횟수 증가로 한정 상태적으로 큰 선도 차이 (298.51km/s)를 확인할 수 있었다. 또한 기존분과에 대해, 난류의 효과를 포함하여 선도 차이를 비교한 결과.
ALMA/ACA CO (1-0) observations of group galaxies

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Galaxy groups are the place where many galaxies feel the impact of the surroundings (e.g., merging, tidal interaction, ram pressure stripping) before joining bigger structures like (sub)clusters. A significant fraction of galaxies is quenched in the group environment. Such “pre-processing” of galaxies in groups is likely to affect galaxy evolution tremendously. To better understand how environmental processes in galaxy groups affect molecular gas, star formation activity, and galaxy evolution, we carried out CO imaging observations of group galaxies, using the Atacama Compact Array (ALMA/ACA). We selected all the targets that have been detected in the GEMS-HI survey for two groups, making the sample of 40 galaxies (18 galaxies in IC 1459 group and 22 galaxies in NGC 4636 group). Our ALMA/ACA observation is the first CO imaging survey for two groups. In this work, we present CO images of group galaxies, together with their star formation maps and HI images. Our ACA CO data show the asymmetric distribution of molecular gas in some of our samples. We discuss the impact of the group environment on molecular gas and star formation activity.

Properties of Galaxies in Cosmic Filaments around the Virgo Cluster

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We present the properties of galaxies in filaments around the Virgo cluster with respect to their vertical distance from the filament spine. Using the NASA-Sloan Atlas and group catalogs, we select galaxies that do not belong to groups in filaments. The filament member galaxies are then defined as those located within 3.5 scale length from the filament spine. The filaments are mainly (~86%) composed of low-mass dwarf galaxies of $\log h^2 M_*/M_\odot < 9$ dominantly located on the blue cloud in color-magnitude diagrams. We observe that the $g-r$ color and stellar mass of galaxies correlate with their vertical distance from the filament spine in which the color becomes red and stellar mass decreases with increasing vertical filament distance.

The galaxies were divided into two subsamples in different stellar mass ranges, with lower-mass ($\log h^2 M_*/M_\odot \leq 8$) galaxies showing a clear negative $g-r$ color gradient, whereas higher-mass ($\log h^2 M_*/M_\odot > 8$) galaxies have a flat distribution against the vertical filament distance. We observe a negative EW(Ha) gradient for higher-mass galaxies, whereas lower-mass galaxies show no distinct variation in EW(Ha) against the vertical filament distance. In contrast, the NUV − r color distribution of higher-mass galaxies shows no strong dependence on the vertical filament distance, whereas the lower-mass galaxies show a distinct negative NUV − r color gradient. We do not witness clear gradients of HI fraction in either the higher- or lower-mass subsamples. We propose that the negative color and stellar mass gradients of galaxies can be explained by mass assembly from past galaxy mergers at different vertical filament distances. In addition, galaxy interactions might be responsible for the contrasting features of EW(Ha) and NUV − r color distributions between the higher- and lower-mass subsamples.

The HI fraction distributions of the two subsamples suggest that ram-pressure stripping and gas accretion could be ignorable processes in the Virgo filaments.

Phas-space Analysis of Halos around Large-scale Filamentary Structures

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It has been studied that galaxies evolve following a typical trajectory on the phase space under the influence of deep gravitational potential of galaxy clusters. Similarly, the large-scale filaments could also affect the evolution of galaxies before falling into the clusters. In this study, using a dark