

Galaxy Evolution in Different Environment Within Redshift $z \sim 0.8$ Universe

The distribution of galaxies in the universe can be studied via several catalogs of galaxy survey. In this research, galaxy sample was collected from the Sloan Digital Sky Survey (SDSS) Data Release 15 (DR15) database. This database contains a huge number of galaxies for studying the extragalactic field, e.g., the physical parameters of galaxies in the cluster, and the large-scale distribution of galaxies. For the large-scale distribution, matter in the universe is believed to distribute uniformly. It is connected together like the filament surrounding the empty space. However, the matter density along the redshift may not uniformly distributed, thus it may differently affect the behavior of galaxies with different redshift. This study focuses on the physical parameters in two different sky areas with the range of redshift $0.0 \leq z \leq 0.8$, to analyze the number density of galaxy, the evolution in galaxy's colors, and star formation activities. The selected sky areas are two areas, which have Right Ascension (RA) at 10^{hr} and 14^{hr} . Both RAs cover in -0.5° to 23.5° Declination range. We expect that the variation of some physical parameters in correspondence with redshift value could be used to explain the evolution of galaxies in each hierarchical of times. The study of the different areas and redshift may help us to understand the galaxy evolution in different areas and redshift in the universe. In summary, the number density is not clearly different, although the Declination and RA of the sky areas are disparate. However, the number density still steeply declines along the redshift direction. Considering the number density together with galaxies' $\text{H}\alpha$ emission line from spectroscopic data, we find that both $EW(\text{H}\alpha)$ and $\text{H}\alpha$ flux similarly tend to decrease like the number density trends. Furthermore, the galaxies' color trend is found to be redder as a function of the redshift.

Primary author: YOIFOI, Ponlawat

Co-author: Mr KRIWATTANAWONG, Wichean (Chiang Mai University)

Presenter: YOIFOI, Ponlawat

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