

The Role of Environment on Star Formation Activity

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One of the key questions in galaxy evolution is to reveal the role of mass and environment in star formation activity. To address this question, we need large samples of galaxies that have deep, multi-wavelength coverage to accurately measure stellar mass and star formation rates, cover large comoving volumes to probe different environments and a wide range of redshifts. The latest CANDELS data that we used provides a deep, mass-complete sample of galaxies covering multiple fields in the sky and allows us to address this key question in extragalactic astrophysics. We measure the density contrast (an indicator of environment/density) for each galaxy in the 5 CANDELS fields (GOODSN, GOODSS, EGS, UDS and COSMOS) using a Gaussian kernel density estimation method and take into account the edge effects using a pseudo-data approach. Not correcting for edge effects can result in an underestimation of the density contrast. The density catalog that we recently made allows us to select candidates based on their environment which we can then follow-up with spectroscopy to measure star formation rates using $H\alpha$. We also computed dust-corrected UV- and SED-based star formation rates for all galaxies in the CANDELS fields. The combination of precise spectral information from Keck and HST-based data is a powerful tool to explore the star formation rate - density relation at high redshifts, especially at the peak of cosmic star formation activity ($z\sim 2$). I will talk about our recent results regarding the SF-density relation at high redshift universe.