

$z=1\sim 2$ , massive galaxies start to dominantly form disk stars, while less massive galaxies do much later. Furthermore, massive galaxies are forming thinner and larger disks with time, and the preexistent disks are heated or even disrupted to become a part of dispersion-dominated component. Thus, the mass growth of spheroidal components at later epochs is dominated by disrupted stars with disk origins and accreted stars at large radii.

### [구 GC-15] Environmental Dependence of High-redshift Galaxies in CFHTLS W2 Field

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Star formation activity of galaxies, along with color and morphology, show significant environmental dependence in local universe, where galaxies in dense environment tend to be more quiescent and redder. However, many studies show that such environmental dependence does not continue at higher redshifts beyond  $z\sim 1$ . The question of how the environmental dependence of galactic properties have developed over time is crucial to understanding cosmic galactic evolution. By combining data from Canada-France-Hawaii Telescope Legacy Survey(CFHTLS), Infrared Medium-Deep Survey(IMS), and other surveys, the photometric redshifts of galaxies in CFHTLS W2 field were estimated by fitting spectral energy distribution. The distribution of galaxies was mapped in redshift bins of 0.05 interval from 0.6 to 1.4. For each redshift bin, the number density was mapped. The galaxies in high density regions were grouped into clusters using friend-of-friend method. The color of galaxies were analyzed to study the correlation with redshift as well as environmental difference between field galaxies and cluster member galaxies.

### [구 GC-16] Search for Faint Quasars at $z\sim 5$ using Medium-band Observations

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Cosmic reionization era in the early universe was playing a leading part on making the present universe we know. However, we have not been able to reveal the main contributor to the cosmic reionization to date. Faint quasars have been mentioned as the alternative due to the uncertainty of the faint end slope of the quasars luminosity function. With the availability of the deep ( $\sim 25$ mag) images from Subaru Hyper Suprime-Cam (HSC) Strategic Program survey, we have tried to find more quasar with low luminosity in the ELAIS-N1 field. Faint quasar candidates were selected from several multi-band color cut criteria based on the track of the simulated quasar at  $z \sim 5$ . The Infrared Medium-deep Survey (IMS) and The UKIRT Infrared Deep Sky Survey (UKIDSS) - Deep Extragalactic Survey (DXS) provide J band information which is used to cover the relatively long wavelength range of quasar spectra. To search the reliable candidates with possible Lyman break, medium-band observation was performed by the SED camera for QUasars in EARly uNiverse(SQUEAN) in the McDonald observatory and Seoul National University 4k Camera(SNUCAM) in the Maidanak observatory. Photometric redshifts of the observed candidates were estimated from chi-square minimization. Also, we predicted the importance of the faint quasar to the cosmic reionization from the expected number density of the faint quasar.

### [구 GC-17] Big Data Astronomy: Large-scale Graph Analyses of Five Different Multiverses

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By utilizing large-scale graph analytic tools in the modern Big Data platform, Apache Spark, we