[구GC-19] Galaxy overdensities at Intermediate to High-redshift

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Recently, we have reported the discovery of possible overdensities of galaxies at z ~ 3.7 in the GOODS-South field. These overdensities are identified from a photometric redshift-selected sample and a BVz-selected sample with 4-7σ significant level. The line-of-sight velocity dispersions of these overdensities are found to be σv ~ 500-800 km/s, and the mass is found to be a few $\times 10^{14}$Msun. Using the same technique, we have expanded the search redshift in both the GOODS South and North fields and we have found several possible overdensities at $0.7 < z < 4.5$. To understand their physical properties and predict the probability to find those massive structures at intermediate to high redshift, we analyzed galaxy overdensities using mock catalog (Kitzbichler & White (2007)) based on the Millennium run simulation. Using the newly identified overdensities and the analysis of the simulation data, we will provide the constraints on the theoretical models of structure formation.

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[구GC-20] Faraday Rotation Measure in the Large Scale Structure

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We report the first statistical study of Faraday rotation measure (RM) in the large-scale structure using the data of cosmological structure formation simulations. For the IGMF, we employed the one based on a turbulence dynamo model; the average strength of the IGMF is <B> ~ a few microG in clusters and 10 nanoG in filaments. The coherence length of the IGMF is estimated to be ~ 10 kpc in clusters and a few times 100 kpc in filaments. Our findings are as follows. The probability distribution function of RM in the large-scale structure follows the lognormal distribution. The root mean square of RM through filaments is <RM>_rms ~ 1.5 rad/m^2. The power spmenrum of RM in the large-scale structure has ~ 1eak at ~ Mpc scale, close to the peak of the power spectrum of the IGMF, while it is far from the peak of the power spectrum of the baryonic matter. Our results can be used to simulate future RM observations by the Square Kilometer Array, and eventually to constrain the origin and evolution of the IGMF in the large-scale structure.