Title: How galaxies trace large scale structure at redshift z~3?

Studies of the galaxy clustering at low and intermediate redshifts show that the relation between the luminous structure and underlying dark matter distribution is not straightforward and depends on properties of galaxies. However, to understand the origin of this separation these studies need to be extended to the high redshift ranges (z>2).

With this aim in mind, we study the dependence of galaxy clustering on their luminosity and stellar mass in the redshift range 2<z<3.5 using spectroscopic data from the VIMOS Ultra Deep Survey (VUDS). We make use of the two-point correlation function quantified using both a power-law approximation and the five parameter HOD (Halo Occupation Distribution) model. Similarly as at lower redshift ranges, at z~3 the bright and most massive galaxies are found to be the most strongly clustered and to occupy the most massive dark matter haloes. Measurements of the large scale galaxy bias indicate that it is (1) significantly higher than in the local universe and (2) luminosity and stellar mass dependent. This measurements are in good agreement with the expectation of the hierarchical model of the large scale structure growth, with fainter galaxies being less biased tracers of the mass than brighter galaxies even at high redshifts.

However, the contrast in the DM halo masses of most luminous (most massive) and faintest (least massive) galaxies is much more strongly pronounced than at lower redshifts. Moreover, at z~3, average masses of haloes hosting at least one luminous satellite in addition to a central galaxy are significantly lower than observed at z~0. This implies that before z~3 the frequency of halo mergers, that led to appearance of satellite galaxies exceeded significantly the frequency of galaxy major mergers, responsible for destruction of these satellites, which must have increased later on. In the same time, measurements of the stellar-to-halo mass ratio (SHMR) indicate a significant model-observation discrepancy for low-mass galaxies, suggesting a higher than expected star formation efficiency of these galaxies.