Galaxies at High Redshift and Their Evolution Over Cosmic Time
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The Enhancement of BAO in the SDSS MGS

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Abstract. We show that redshift-space distortions of galaxy correlations have a strong effect on correlation functions with the signature of the Baryon Acoustic Oscillations (BAO). Near the line of sight, the features become sharper as a result of redshift-space distortions. We analyze the SDSS DR7 main-galaxy sample (MGS), splitting the sample into slices 2.5 deg on the sky in various rotations. Measuring 2D correlation functions in each slice, we do see a sharp bump along the line of sight. Using Mexican-hat wavelets, we localize it to $(110 \pm 10)\ h^{-1}$ Mpc and estimate its significance at about 4σ.

Keywords. cosmology: large-scale structure of Universe - methods: data analysis

1. BAO in the SDSS MGS

BAO has been typically characterized by the observations(Eisenstein *et al.* 2005, Cole *et al.* 2005). Correlation functions of lower-dimensional subsets for a homogeneous isotropic random field are identical to the one estimated from the full 3-dimensional one.

We build a sample of SDSS DR7 MGS (Strauss *et al.* 2002) galaxies, and analyze the LOS and 2D correlation functions (Fig. 1) using thus a methodology: we subdivide the sample into many 2.5 deg on the sky in various rotations slices, compute the 2D redshift space correlation function and calculate the average (Tian *et al.* 2011).

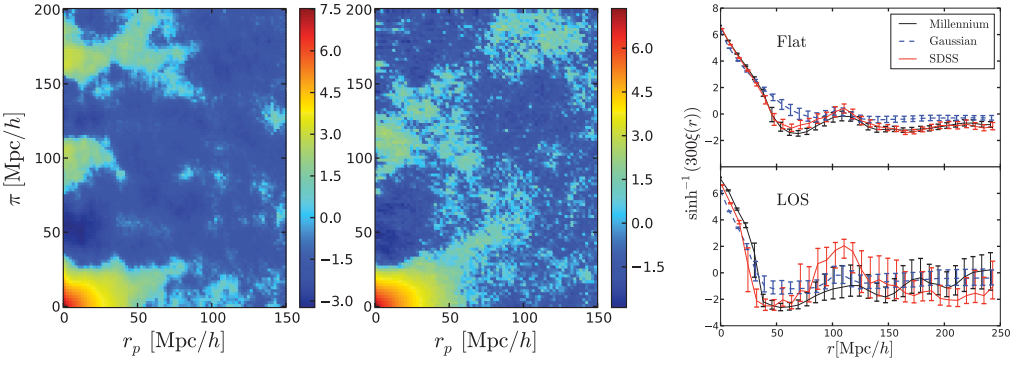

Figure 1. The 2-D and 1-D correlation functions. The left panel is measured from the $100 - 750\ h^{-1}$ Mpc full SDSS MGS sample, and the middle is from the $300 - 750\ h^{-1}$ Mpc high-z sample (excluding the **Sloan Great Wall**, which alters clustering statistics substantially). The right-top panel shows the ξ averaged uniformly over angle from the simulations and the high-z SDSS sample, and the right-bottom uses only data within 6 deg of the LOS.

References

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