

ABSTRACT ONLY

LARGE SCALE STRUCTURES IN THE SOUTHERN SKY

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We use the data from the final data release of the 6Df galaxy redshift survey. We built 7 volume limited samples containing at least 7000 galaxies and use them to reconstruct the mass density field of the survey. Using a halo based method we identify halos in the volume of the survey and use it as an input for a halo based reconstruction of the density field. The reconstructed density field consist of a set of particles tracing the mass density, much in the way dark matter particles trace the density field in cosmological simulations, so one can use standard methods of particle distributions to study the structures in the density field.

We use a Friends of Friends method on the particle distribution to identify bound structures above a given density threshold. In the volume of the survey we find two large mass concentrations. First, we find that the method is able to identify the Shapleys concentration. We use our results to provide a independent estimate of the mass of the structure, finding a value of $5 \times 10^{16} h^{-1}M_{\odot}$ (close to what is reported using dynamical methods). We also report an evident filamentary structure surrounding the center of the overdensity full of galaxy groups and clusters.

We report the finding of a large structure not reported yet in the literature. It has a well defined filamentary geometry that extends for more that 200 Mpc. We estimate the mass of the structure on $6 \times 10^{15} h^{-1}M_{\odot}$ and found it hosts around 600 dark matter halos (hosting galaxy clusters) with masses above $10^{12.5} h^{-1}M_{\odot}$.

The finding of such a structure, the Sloan Great Wall and Shapley overdensity represent an important challenge for the standard cosmological model LCDM. Considering that the probability of having such a large structures in a volume of the size of our galaxy surveys turns to small, this leads to a tension in the model.

This work is presented as an Oral Contribution