

The Properties of Galaxies in Voids

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Introduction

Cosmic Voids are regions in the Universe where the number density of galaxies is very low. Consequently, studying the properties of galaxies that live in those regions can provide strong constraints to galaxy formation models. Here, we use SDSS data to study color, morphology and specific star formation rate of galaxies in located voids and compare with those of galaxies living in more common regions

Searching for voids in the SDSS

We define voids as the maximal non-overlapping spheres empty of Milky Way-like galaxies ($M_r < -20.4$). We searched for voids in the Data Release 4 of the SDSS using the HB void finder (Patiri et al 2006). We found a total of 46 voids larger than 10 Mpc. In turn, we found 495 galaxies fainter than the void-defining magnitude down to the limiting magnitude of our sample ($M_r = -19.4$)

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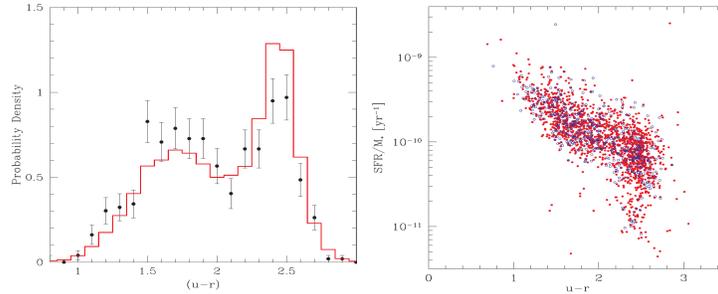


Fig 1- color distribution for galaxies in voids (dots) and the field (curve)

Fig 2- Specific Star Formation Rate for galaxies in voids (open circles) and the field (full circles)

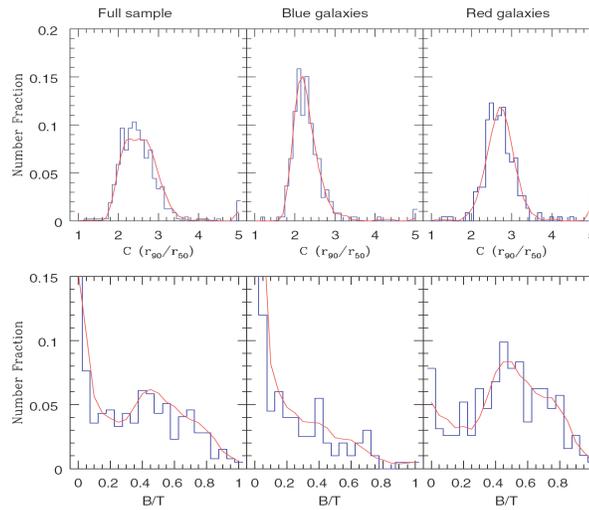


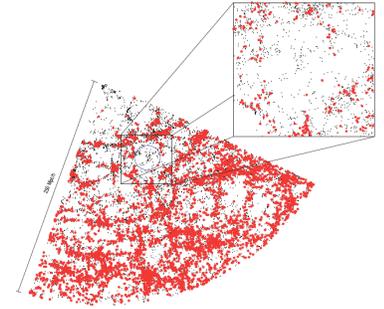
Fig 3- Morphology of galaxies in voids (histograms) vs galaxies in the field (curve). Top panel: Concentration. Bottom panel: B/T ratios.

Conclusion

We found an excess of blue and a deficit of red galaxies in voids compared to the overall population. However, in spite of the fact that galaxies in voids live in the least dense large-scale environment, this environment makes very little impact on the intrinsic properties of those galaxies.

References

- Patiri et al 2006, MNRAS, 369, 335
- Patiri et al 2006, MNRAS, 372, 1710



Results

From Fig 1 we clearly see that galaxies in voids (dots) have a bimodal color distribution similar to that of field galaxies (curve). We also see that there are more blue galaxies and less red compared to the field. However, if we split galaxies in blue and red populations find the same mean color both in voids and the field. Moreover, from Fig 2 we see that there are not systematic differences in the SSFR of galaxies in voids compared to the field. Finally, in Fig 3 we do not find differences in morphology neither.