Galaxy properties and environment in GAMA

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OUTLINE

- Introduction
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- Marked correlation function
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- Results
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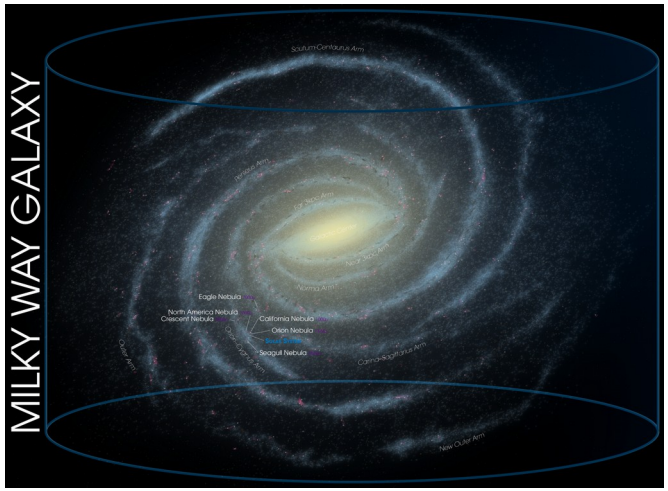
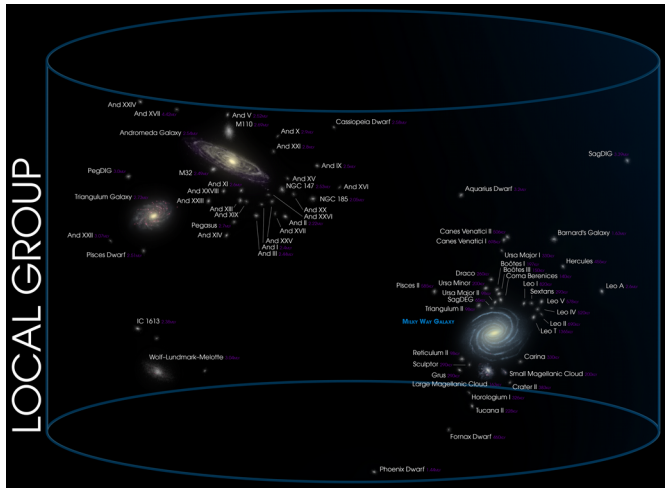
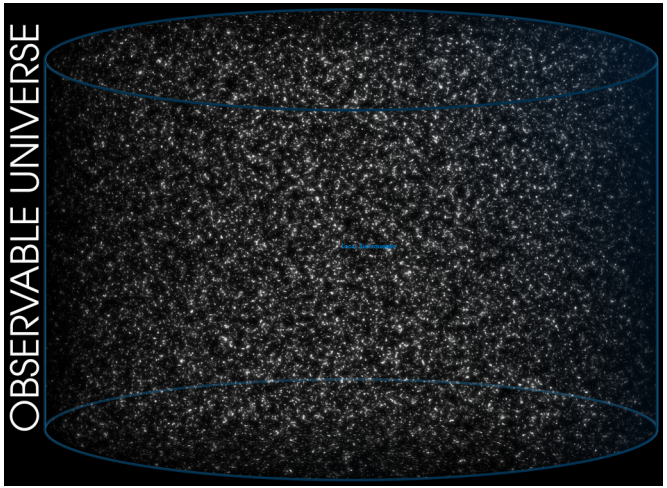
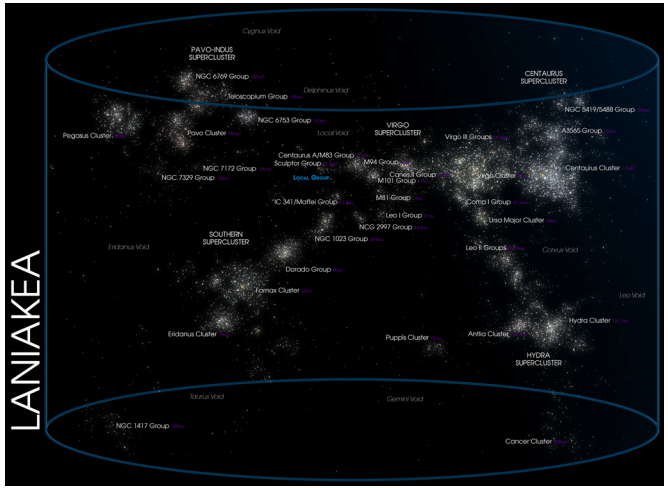
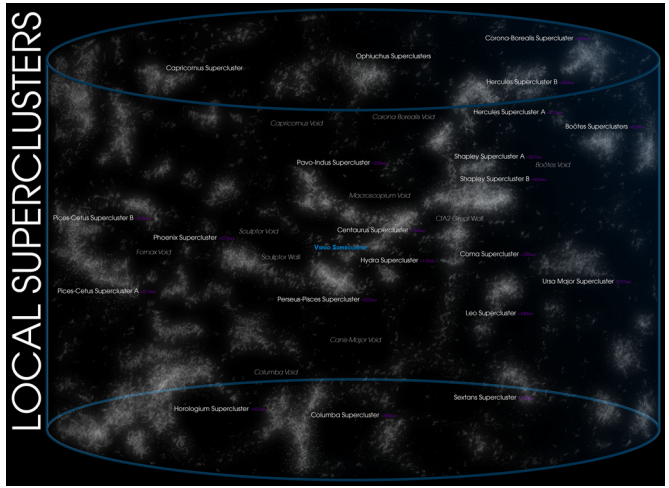


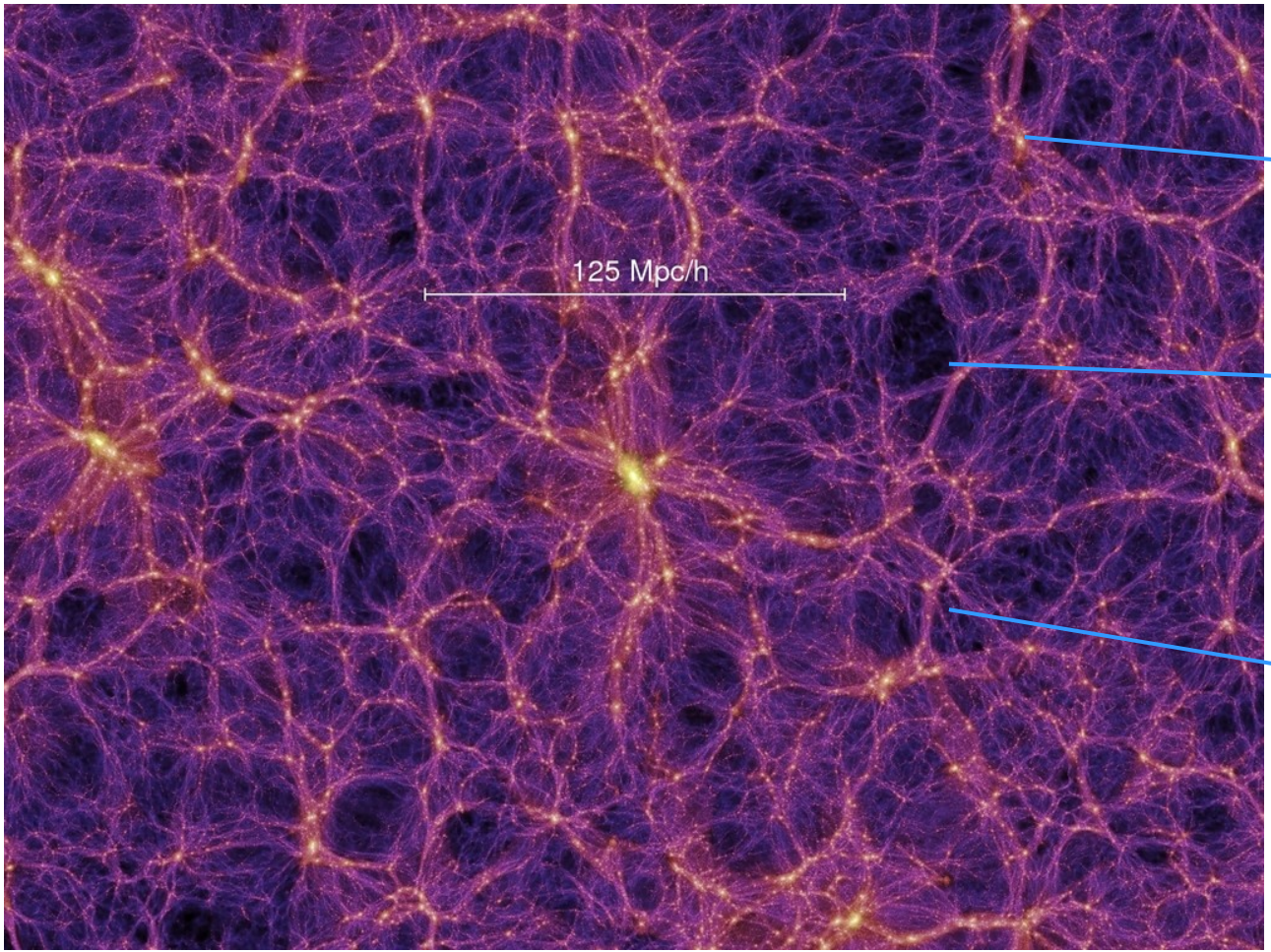








Credit: Andrew Z. Colvin



Nodes

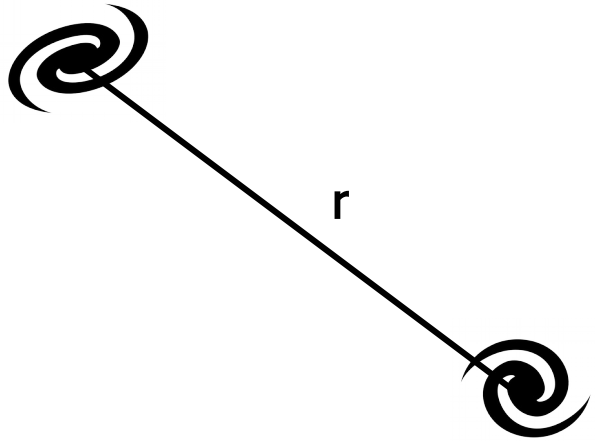
Voids

Filaments

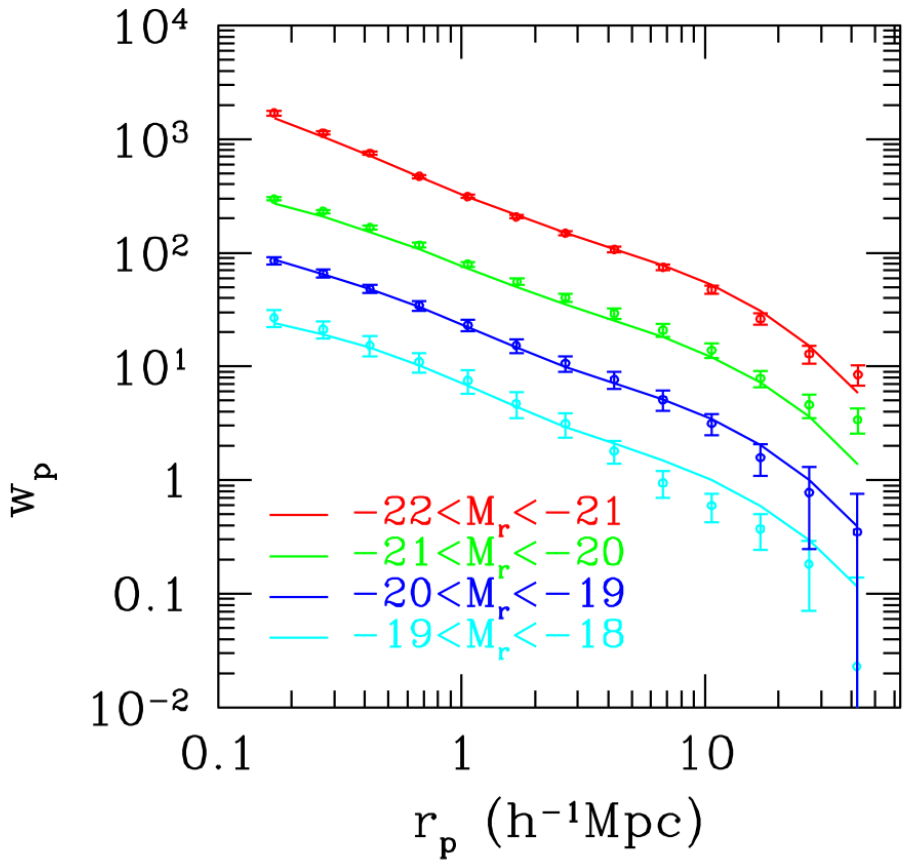
Springer et al. 2005

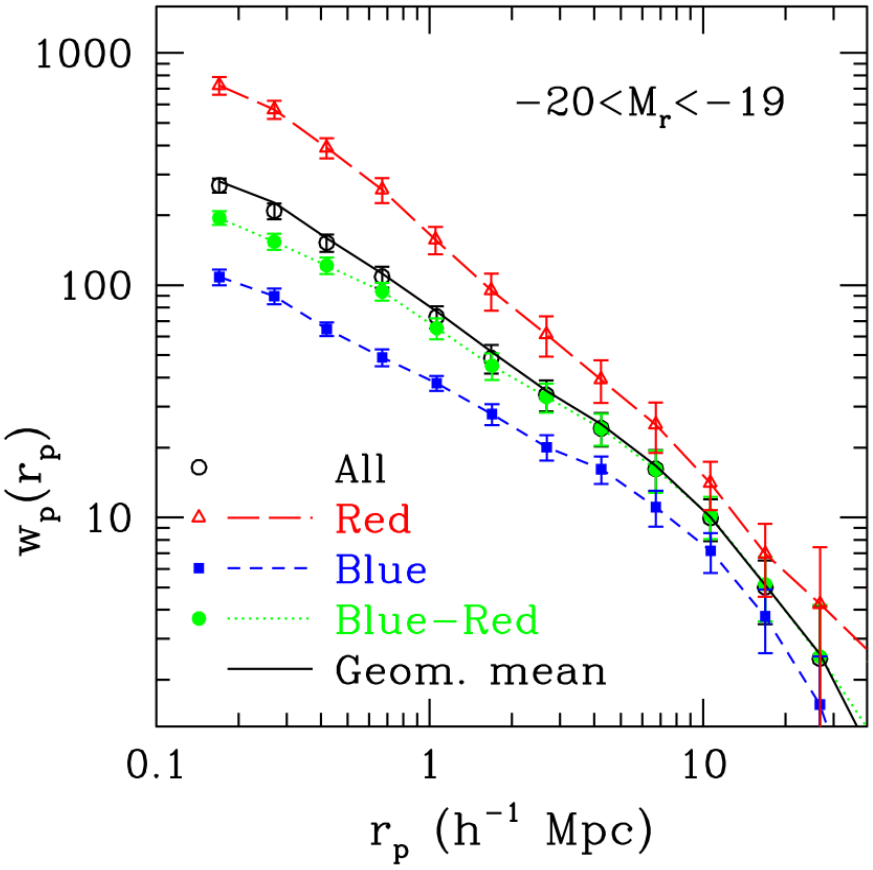
GALAXY CORRELATION FUNCTION

CF(r) = Excess number of galaxy pairs separated by ‘r’ over the random distribution.

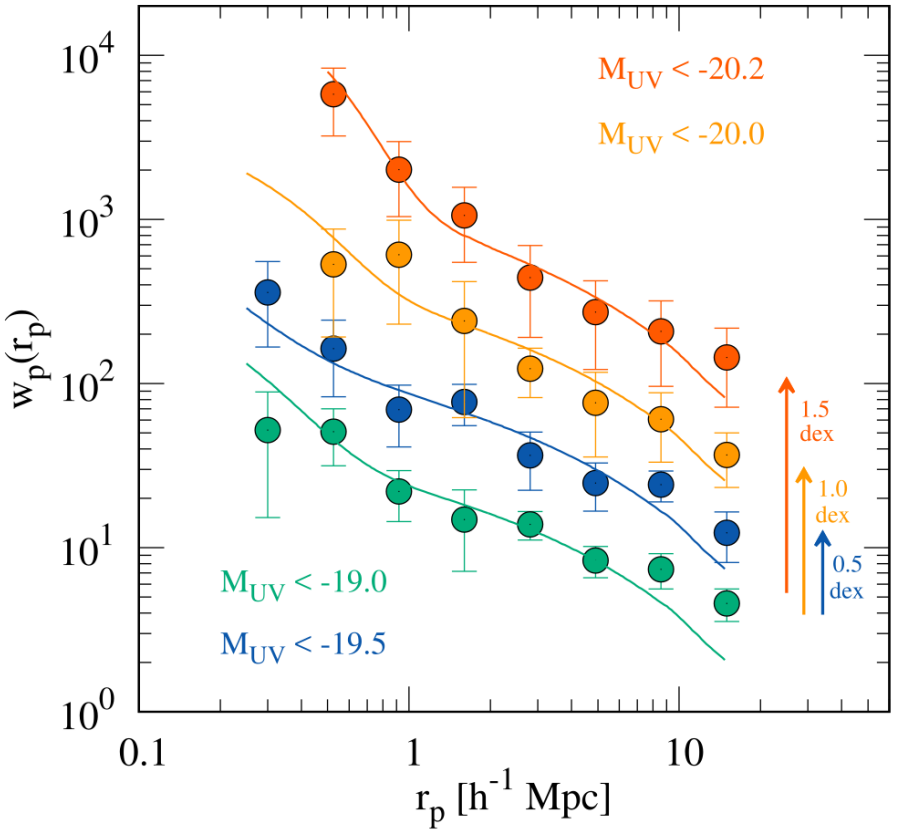


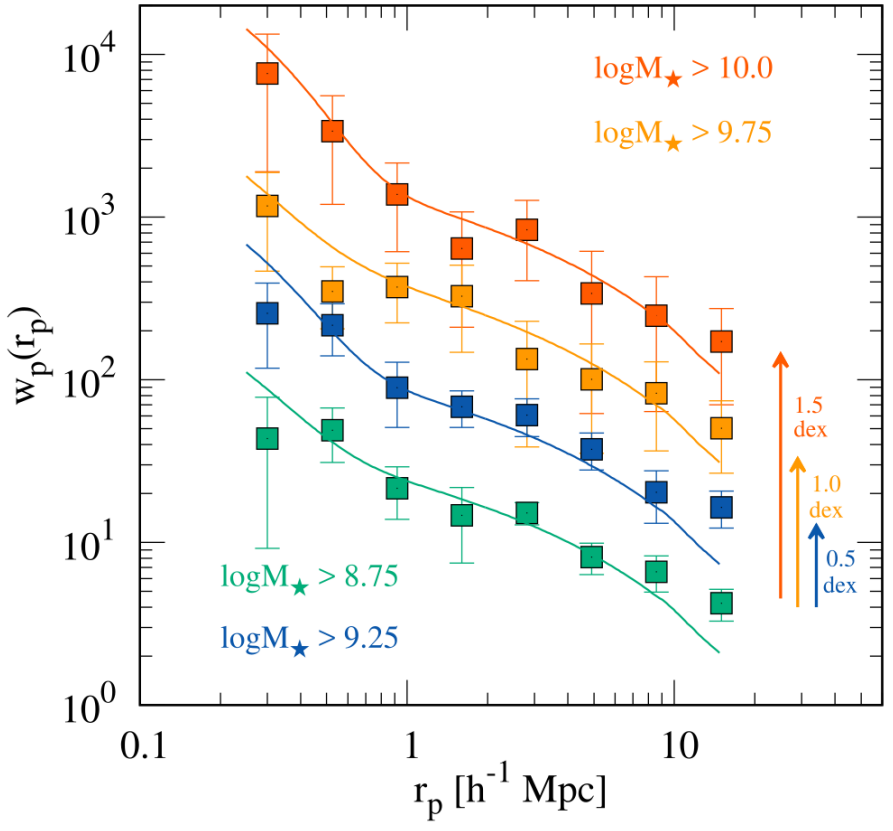
- Greater the value of correlation function at a particular scale, greater is the strength of clustering at that scale





Zehavi et al. 2011 : SDSS; z < 0.25

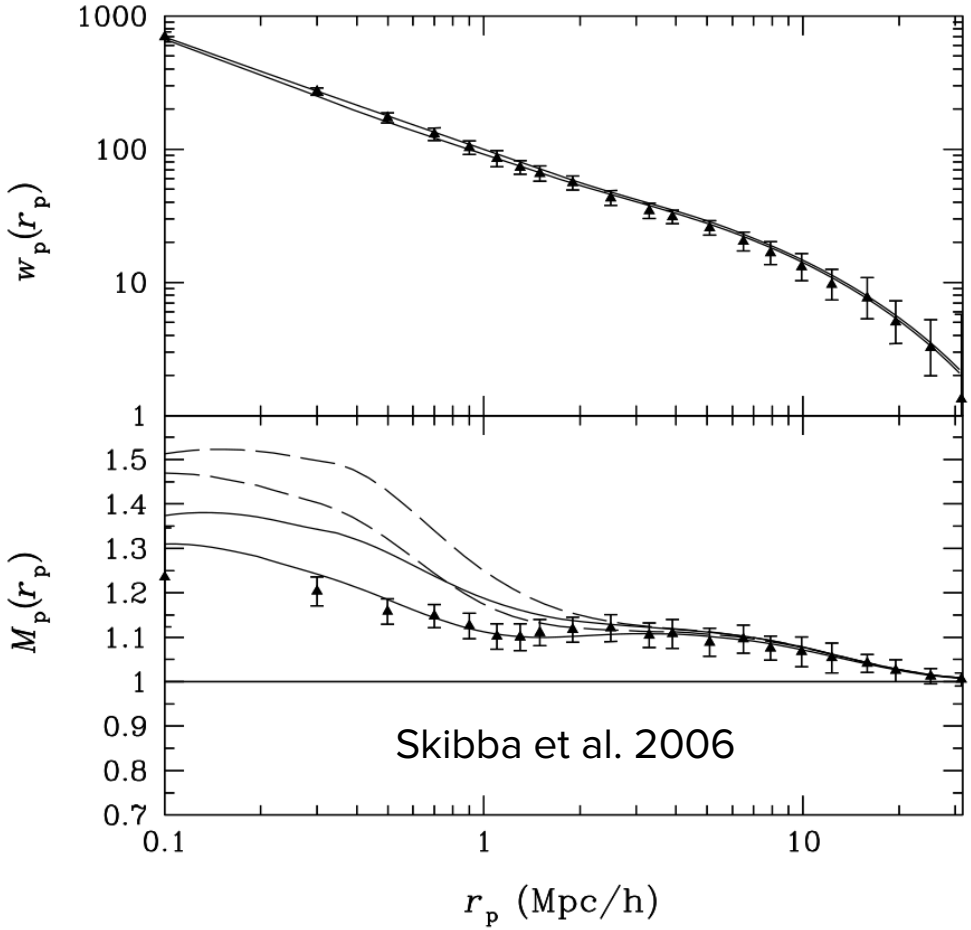




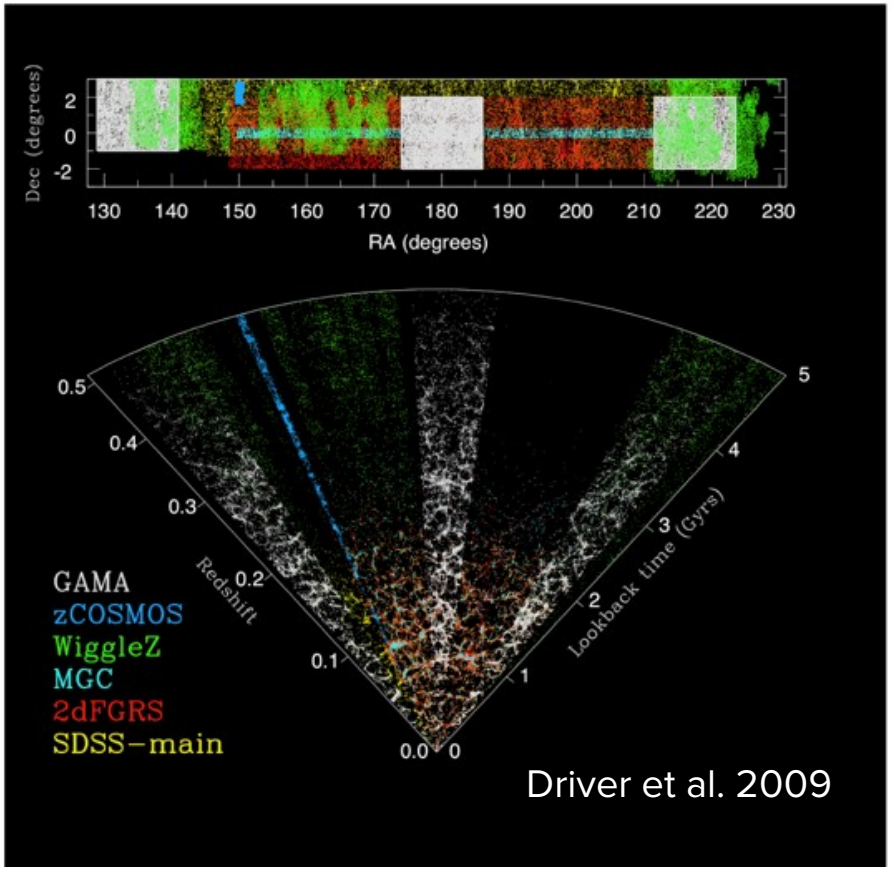
Durkalec et al. 2018
VIMOS Ultra Deep Survey
z ~ 3

MARKED CORRELATION FUNCTION

- Clustering measurement by taking into account the properties of galaxies.
- Weighing each galaxy with the ratio of its mark to the mean mark of the sample.
- Environmental dependence of galaxy properties.
- Better statistics.

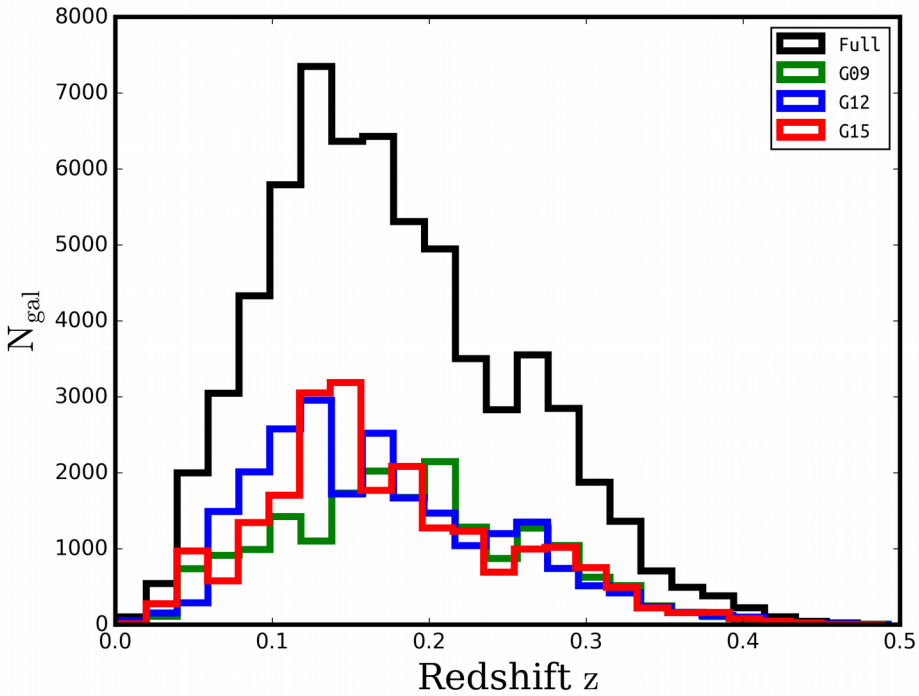


DATA: Galaxy And Mass Assembly DR3

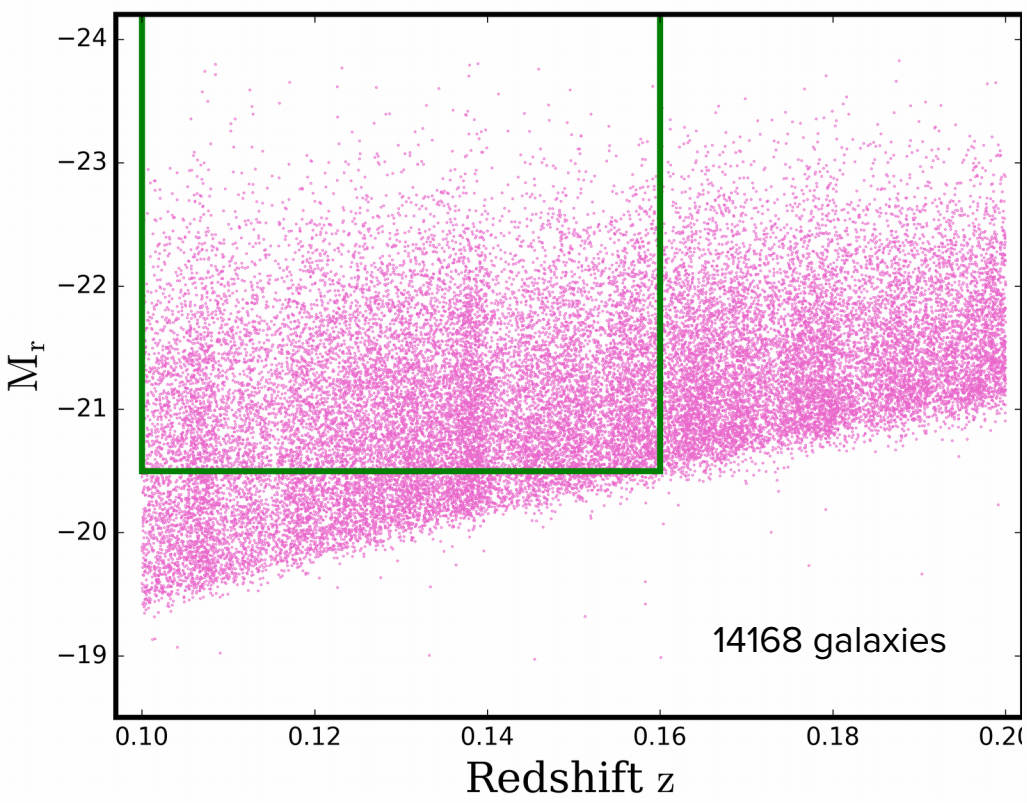


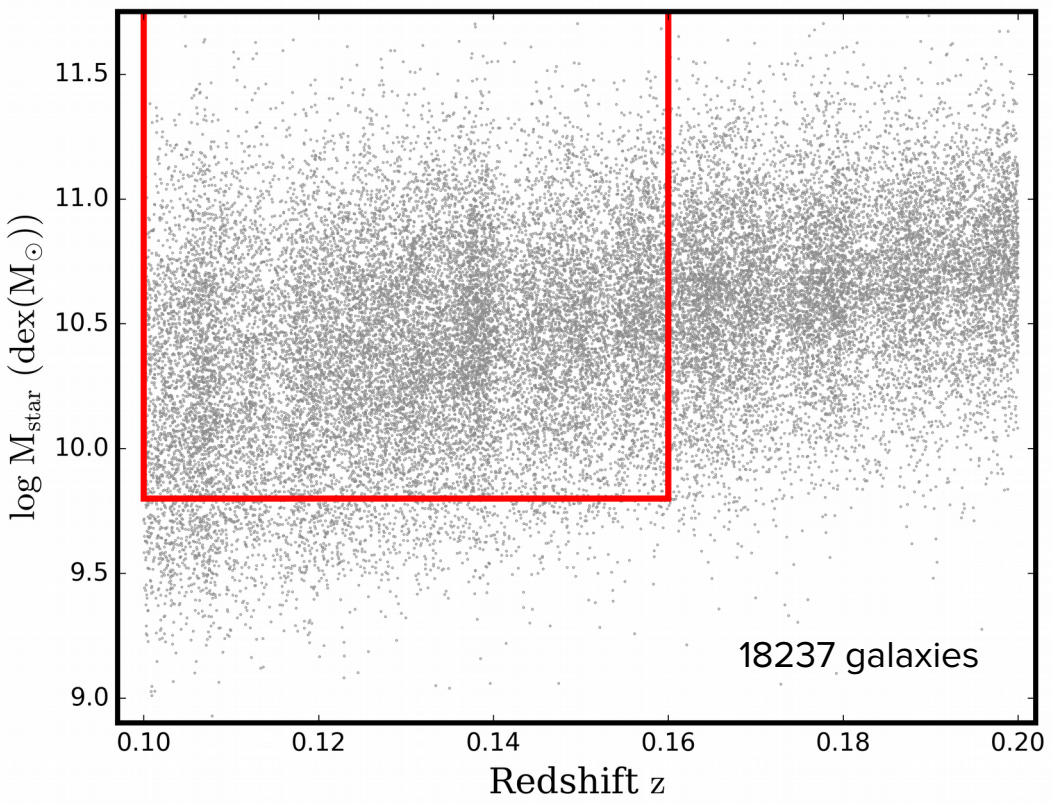
Driver et al. 2009

Spectroscopic survey of ~300,000 galaxies down to r < 19.8

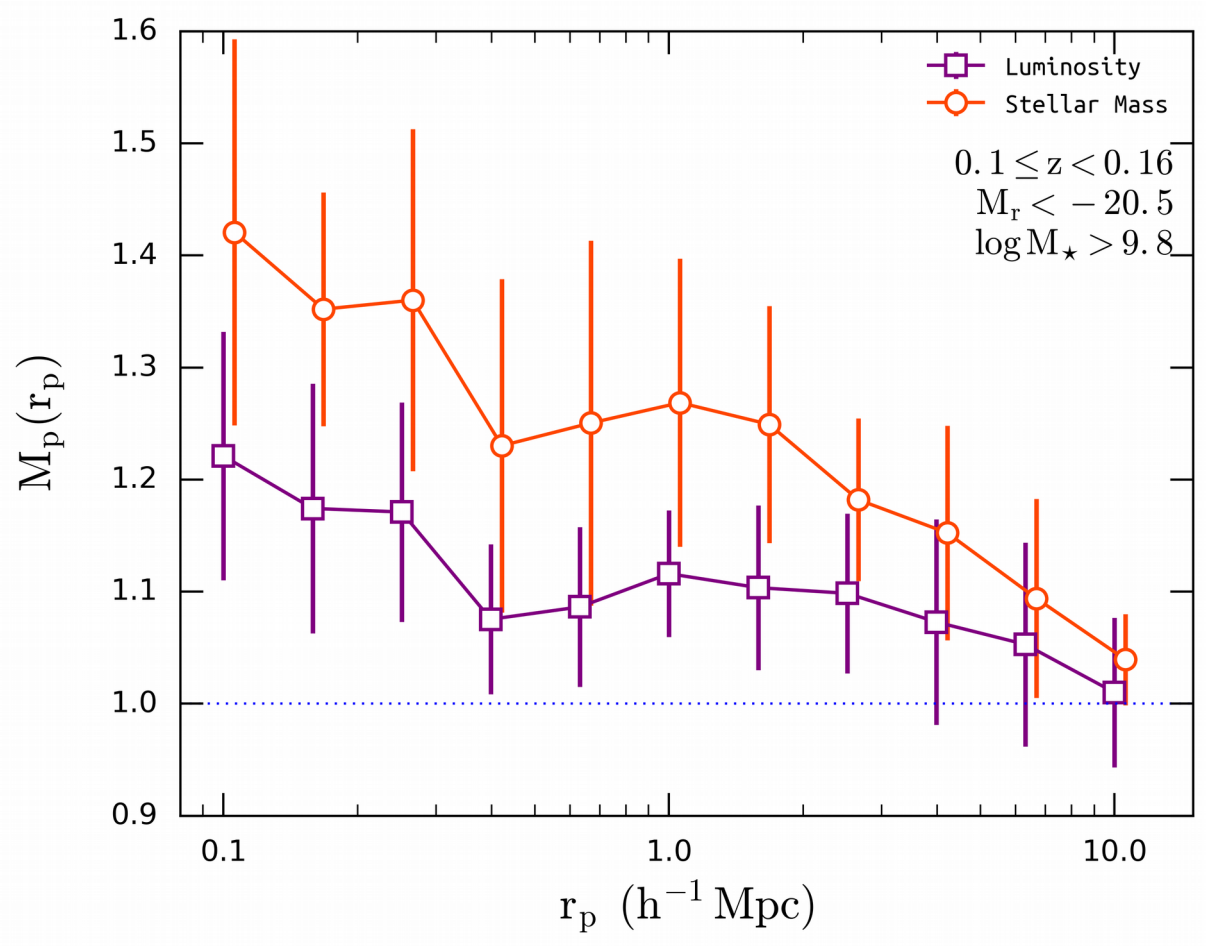


Volume-limited samples : 0.1 < z < 0.16, r < 19

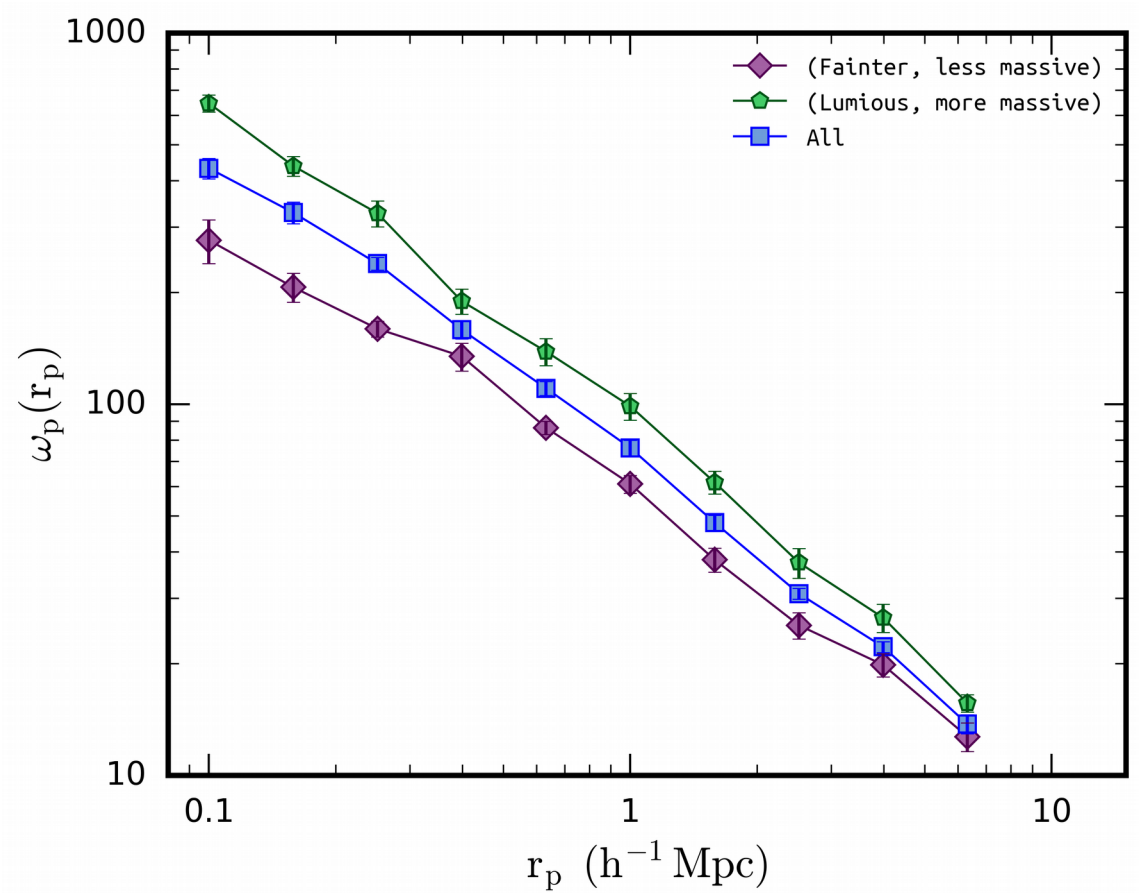




Rank-ordered marked correlation functions with Luminosity and Stellar mass as marks



Cross correlation functions between luminosity selected and mass selected samples



Conclusions

- Luminous and massive galaxies are more clustered than fainter and less massive galaxies.
- Stellar mass is a better tracer of environment at small scales.
- Luminous and more massive galaxies are more correlated to each other than fainter and less massive galaxies.

THANK YOU!

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Equations!!!

Landy – Szalay (1993) estimator : $$\xi(r) = \frac{DD(r) - 2\ DR(r) + RR(r)}{RR(r)}$$

Projected correlation function : $$\omega_p(r_p) = 2 \int_0^{\pi_{max}} \xi(r_p, \pi)\, \mathrm{d}\pi$$

Marked correlation function : $$M(r) = \frac{1 + W(r)}{1 + \xi(r)}$$